UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2023

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM TO**

Commission File Number 1-39083

Vir Biotechnology, Inc.
(Exact Name of Registrant as Specified in its Charter)

Delaware	**81-2730369**
(State or Other Jurisdiction of Incorporation or Organization)	**(I.R.S. Employer Identification No.)**
1800 Owens Street, Suite 900 San Francisco, California	**94158**
(Address of Principal Executive Offices)	**(Zip Code)**

Registrant's telephone number, including area code: (415) 906-4324

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, $0.0001 par value	VIR	Nasdaq Global Select Market

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☒ No ☐

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

Indicate by check mark whether the Registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the Registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit such files). Yes ☒ No ☐

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐	Smaller reporting company	☐
Emerging growth company	☐		

If an emerging growth company, indicate by check mark if the Registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the Registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the Registrant as of June 30, 2023 was approximately $1.8 billion based upon the closing price of its Common Stock on June 30, 2023 of $24.53 per share, as reported by The Nasdaq Global Select Market.

The number of shares of the Registrant's Common Stock outstanding as of February 16, 2024 was 135,032,268.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the definitive proxy statement, or the Proxy Statement, for the Registrant's 2024 Annual Meeting of Stockholders are incorporated by reference into Part III of this Annual Report on Form 10-K. The Proxy Statement will be filed with the Securities and Exchange Commission within 120 days of the Registrant's fiscal year ended December 31, 2023.

Auditor PCAOB ID: 42 Auditor: Ernst & Young LLP Address: San Mateo, California

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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS AND INDUSTRY DATA

This Annual Report on Form 10-K contains forward-looking statements about us and our industry that involve substantial risks and uncertainties. All statements other than statements of historical facts contained in this Annual Report on Form 10-K, including statements regarding our strategy, future financial condition, future operations, research and development, potential of, and expectations for, our pipeline and technology platforms, the timing, potential of and expectations for planned clinical trials and preclinical studies, the timing and likelihood of regulatory filings and approvals for our product candidates, our ability to commercialize our product candidates, the potential benefits of collaborations, projected costs, prospects, plans, objectives of management, expected market size and growth for our potential products, the timing of availability of clinical data, program updates and data disclosures, and our plans for our hepatitis B virus, hepatitis delta virus, influenza, COVID-19 and human immunodeficiency virus portfolios, are forward-looking statements. In some cases, you can identify forward-looking statements by terminology such as "aim," "anticipate," "assume," "believe," "contemplate," "continue," "could," "design," "due," "estimate," "expect," "goal," "intend," "may," "might", "objective," "plan," "positioned," "potential," "predict," "seek," "should," "target," "will," "would" and other similar expressions that are predictions of or indicate future events and future trends, or the negative of these terms or other comparable terminology.

We have based these forward-looking statements largely on our current expectations and projections about future events and financial trends that we believe may affect our financial condition, results of operations, business strategy and financial needs. These forward-looking statements are subject to a number of known and unknown risks, uncertainties and assumptions described in the sections titled "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" and elsewhere in this report. Other sections of this report may include additional factors that could harm our business and financial performance. Drug development and commercialization involve a high degree of risk, and only a small number of research and development programs result in commercialization of a product. Results in early-stage clinical trials may not be indicative of full results or results from later stage or larger scale clinical trials and do not ensure regulatory approval. You should not place undue reliance on these statements, or the scientific data presented. Moreover, we operate in a very competitive and rapidly changing environment. New risk factors emerge from time to time, and it is not possible for our management to predict all risk factors nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in, or implied by, any forward-looking statements.

In light of the significant uncertainties in these forward-looking statements, you should not rely upon forward-looking statements as predictions of future events. Although we believe that we have a reasonable basis for each forward-looking statement contained in this report, we cannot guarantee that the future results, levels of activity, performance or events and circumstances reflected in the forward-looking statements will be achieved or occur at all. You should refer to the section titled "Risk Factors" for a discussion of important factors that may cause our actual results to differ materially from those expressed or implied by our forward-looking statements. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. Except as required by law, we undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise.

This Annual Report on Form 10-K includes statistical and other industry and market data that we obtained from industry publications and research, surveys, and studies conducted by third parties as well as our own estimates of potential market opportunities. All of the market data used in this Annual Report on Form 10-K involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such data. Industry publications and third-party research, surveys, and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. Our estimates of the potential market opportunities for our product candidates include several key assumptions based on our industry knowledge, industry publications, third-party research, and other surveys, which may be based on a small sample size and may fail to accurately reflect market opportunities. While we believe that our internal assumptions are reasonable, no independent source has verified such assumptions.

PART I

Item 1. Business.

Overview

Powering the Immune System to Transform Lives.

Vir Biotechnology, Inc. (including its subsidiaries, referred to as "Vir," "the Company," "we," "our" or "us") is an immunology company focused on combining cutting-edge technologies to treat and prevent serious infectious diseases and other serious conditions, including viral-associated diseases. At Vir, we have a bold vision – powering the immune system to transform lives. We aim to achieve this in two fundamental ways – first, through developing powerful antibody therapeutics and second, by generating unique T cell responses in vivo through our T cell-based viral vector platform. Our growth and pursuit of scientific innovation is fueled by our world-class leading monoclonal antibody (mAb) platform that has a proven track record and is further strengthened by our artificial intelligence-led mAb optimization and engineering capabilities.

Our current clinical development pipeline consists of product candidates targeting hepatitis delta virus (HDV), hepatitis B virus (HBV), and human immunodeficiency virus (HIV). The most advanced preclinical candidates in our pipeline include those targeting influenza A and B, coronavirus disease 2019 (COVID-19), respiratory syncytial virus (RSV), human metapneumovirus (MPV), and human papillomavirus (HPV). We have assembled two technology platforms that modulate the immune system by exploiting critical observations of natural immune processes— a mAb discovery platform and a T cell-based viral vector platform. Additionally, Vir is evaluating small interfering RNA (siRNA) through a collaboration with Alnylam Pharmaceuticals, Inc., or Alnylam, in our hepatitis clinical trials. We have established our own internal process development, analytical development, manufacturing, supply chain and quality capabilities and work with contract development and manufacturing organizations (CDMOs) to develop, manufacture, test and supply our early- and late-stage product candidates.

We have an industry-leading management team and board of directors with significant immunology and infectious diseases experience, including a proven track record of progressing product candidates from early-stage research through clinical development, and worldwide regulatory approval and commercialization experience. Given the global impact of infectious diseases and other serious conditions, we are committed to providing broad access to our therapeutics.

Our Strategy

We are leveraging our core capabilities to drive patient impact and growth in infectious disease treatments and beyond to areas such as viral-associated and immune-mediated diseases, focusing our capital and resources on areas where Vir can be best-in-class.

Our core capabilities include our deep immunology and virology expertise. In addition, our proven world-class mAb platform with artificial intelligence (AI) driven protein engineering capabilities allows us to discover and engineer next-generation antibodies with enhanced properties. Our cytomegalovirus (CMV) based viral vector platform is designed with the goal of generating unique, potent and long-lasting T cell responses.

The core elements of our business strategy include:

- **Advancing our pipeline**. We are conducting multiple clinical trials in multiple therapeutic areas including hepatitis and HIV.
- **Expanding our pipeline**. We are leveraging our two platforms (mAbs and CMV) to discover and develop novel product candidates targeting HDV, HBV, HIV, influenza A & B viruses, COVID-19, RSV/MPV, precancerous HPV lesions, and additional viral-associated and immune-mediated diseases. We anticipate moving additional preclinical candidates into the clinic in the next 12 to 24 months.
- **Disciplined approach to capital allocation**. We are thoughtfully leveraging our strong balance sheet to ensure advancement of our multiple product candidates through major inflection points and invest in our people, processes and systems across the Company, while maintaining the ability to invest in external innovation.

- **Augmenting our pipeline and capabilities by accessing external assets and innovation.** We actively monitor the external innovation landscape to identify technologies and assets to license or acquire that could complement our existing pipeline and enhance our capabilities.
- **Partnering for success.** We have established relationships with organizations such as the Bill & Melinda Gates Foundation (BMGF), the Biomedical Advanced Research and Development Authority (BARDA), the National Institute of Health (NIH), and the National Health Service (NHS) to further facilitate access to our potential future medicines and to support our clinical development efforts. We will continue to pursue similar alliances that help achieve our strategy with a focus on patient impact and value creation.

Our Pipeline

Our current product and product candidates are summarized by disease are in the chart below:

Disease Area	Product Candidate	Treatment / Prevention	Preclinical	Phase 1	Phase 2	Phase 3	Authorized	Collaborator
Chronic Hepatitis Delta	tobevibart + elebsiran	Treatment						Alnylam
Chronic Hepatitis B	elebsiran + PEG-IFN-α	Treatment						Alnylam
	tobevibart + elebsiran ± PEG-IFN-α[1]	Treatment						Alnylam
	elebsiran + TLR8[2] + PD-1[3]	Treatment						Alnylam/ Gilead Sciences
HIV	VIR-1388	Prevention						Bill & Melinda Gates Foundation/HVTN/NIAID
	Cure: mAb combination	Treatment						Bill & Melinda Gates Foundation
RSV/MPV	VIR-8190*	Prevention						
Influenza	VIR-2981 (Influenza A+B)*	Prevention						
Pre-cancerous HPV lesions	VIR-1949	Treatment						
COVID-19	VIR-7229	Prevention						
	Sotrovimab	Treatment (Early)						GSK

PEG-IFN-α = peg-interferon alfa-2a; HVTN = HIV Vaccine Trials Network; NIAID= National Institute of Allergy and Infectious Diseases

[1]MARCH trial (Part B); [2]GS-9688; [3]nivolumab

**Per the collaboration agreement announced in February 2021, Vir and GSK are continuing to advance new monoclonal antibody therapeutics for other respiratory viruses, including RSV*

† Sotrovimab for early treatment by IV currently has marketing approval, temporary authorization or emergency use authorization in >30 countries. In April 2022, the FDA deauthorized sotrovimab's use in all U.S. regions. Sotrovimab incorporates Xencor's Xtend™ technology. Tobevibart incorporates Xencor's Xtend™ and other fragment crystallizable technologies.

Our Clinical Product Portfolio

HDV

Summary

According to a 2020 article in the Journal of Hepatology and the World Health Organization's July 2023 hepatitis D Factsheet, approximately 12 million people globally are infected with HDV, representing approximately 5% of the HBV population, and other studies show up to an estimated 72 million people living with HDV globally, many of which are likely undiagnosed. HDV is considered the most severe and aggressive form of viral hepatitis leading to increased rates of cirrhosis, hepatocellular carcinoma, hepatic decomposition, and liver failure. People with HDV are four times more likely to develop liver cancer than people with HBV and more than half of people with HDV will die of liver disease within 10 years of diagnosis. There are no approved therapies for HDV in the U.S. Hepcludex (bulevirtide), a once daily subcutaneous injection, has approval in the European Union (EU) and the United Kingdom (U.K.). Pegylated interferon alpha (IFN-α) has been used off-label with limited success due to its tolerability profile and low rates of sustained virologic response. Our current internal estimates project the HDV treatment market could be as large as $2 billion annually.

We are developing tobevibart, a monoclonal antibody also known as VIR-3434, and elebsiran, an siRNA also known as VIR-2218, for the treatment and suppression of chronic HDV. Hepatitis B surface antigen (HBsAg) is a critical component necessary for the HDV lifecycle and both tobevibart and elebsiran act independently to inhibit the replication of HDV by targeting HBsAg. Tobevibart binds to a conserved region of HBsAg, which helps eliminate HDV virions from the blood and also blocks the infection of hepatocytes with HDV. Elebsiran targets a conserved region of the HBV genome and inhibits production of all HBV proteins including HBsAg.

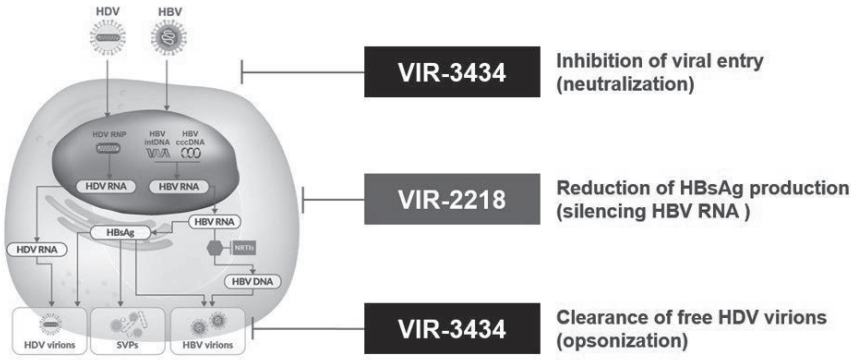
In September 2022, we initiated the Phase 2 SOLSTICE trial evaluating tobevibart and elebsiran as monotherapy and in combination for the chronic treatment of people living with HDV. The trial is assessing the safety and ability of the regimens to reduce HDV viremia and normalize alanine aminotransferase (ALT): endpoints that may indicate improved clinical outcomes. The current endpoint for regulatory approval is a combined endpoint consisting of a 2 log10 decline in HDV RNA or undetectable HDV RNA and ALT normalization. Initial data presented in November 2023 demonstrated median HDV RNA reductions of -2.0 log10 and -1.4 log10 with once monthly subcutaneous (SC) doses of tobevibart and elebsiran monotherapy, respectively, for 12 weeks. Once monthly SC combination therapy after 12 weeks of monotherapy with either tobevibart or elebsiran achieved -4.3 log10 reduction. As of January 2024, of the participants entering combination therapy with tobevibart and elebsiran, data on 6 participants through week 20 of combination therapy was available. Of these, 6/6 achieved HDV RNA < lower limit of quantitation (LLOQ) and 5/6 achieved HDV RNA < limit of detection (LOD) 12 weeks after starting combination therapy, which was maintained through week 20. One participant in the tobevibart monotherapy arm achieved the combined endpoint with ALT normalization and two participants receiving combination therapy achieved the combined endpoint at week 12, which was maintained through week 20. These data support continued evaluation of tobevibart and elebsiran for the chronic treatment of chronic hepatitis delta (CHD).

Tobevibart + elebsiran for HDV

Molecular Characteristics and Preclinical Data. Tobevibart is an investigational neutralizing mAb that has been engineered for immune engagement and targets a conserved region on HBsAg that allows it to neutralize strains from all 10 HBV genotypes. Tobevibart specifically targets the antigenic loop (AGL) on HBsAg. The AGL helps the virus bind to hepatocytes and subsequently infect these liver cells. By binding to the AGL, tobevibart prevents viral entry, which prevents the spread of HDV to uninfected hepatocytes. Tobevibart's proprietary fragment crystallizable (Fc) Gamma engineering enhances its ability to engage immune cells, promoting the removal of antibody-virion complexes. Tobevibart also incorporates Xencor's Xtend™ neonatal Fc receptor technology, which extends its half-life. Tobevibart was identified using Vir's proprietary mAb discovery platform.

Elebsiran is an investigational HBV-targeted siRNA that reduces HBsAg, a protein which is required for the HDV viral life cycle. Elebsiran is a single siRNA targeting a conserved sequence of HBV that allows for predicted activity against 99.7% of the strains of HBV, including all 10 HBV genotypes. Because this conserved sequence falls within a specific region of the X gene of HBV that exists within all four HBV RNA transcripts, elebsiran is able to degrade each transcript, and consequently decrease the expression of all proteins produced by the virus: X, polymerase, S, and core. Elebsiran is thus potentially a potent antiviral.

HBV DNA can become integrated into human DNA as intDNA. Because elebsiran targets a region of HBV that is conserved in the large majority of HBV intDNA, this single siRNA is predicted to be able to prevent the production of HBV proteins derived from intDNA, as well as the production of all other HBV proteins from covalently closed circular DNA (cccDNA).

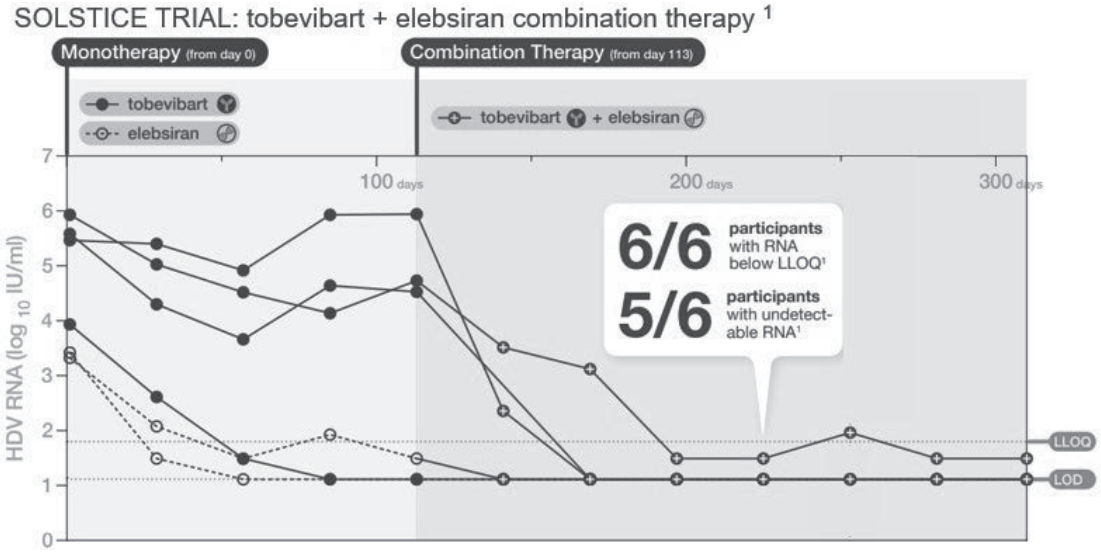


MOA = mechanism of action; NRTI = nucleotide reverse transcriptase inhibitor; RNP = ribonucleoprotein; SVP = subviral particle

Tobevibart has been shown to neutralize HDV infection with pan-genotypic activity. Single and combination treatments with tobevibart and elebsiran of HBV/HDV-co-infected primary human hepatocytes *in vitro* reduced HBV antigens as well as secreted infectious HDV virions. *In vivo*, the parental molecule of tobevibart reduced the levels of HBsAg, HDV and HBV viremia in HBV/HDV-co-infected liver-chimeric mice. These data support the clinical evaluation of tobevibart and elebsiran in HDV.

Phase 2 Trial of tobevibart in combination with elebsiran. In September 2022, we initiated the Phase 2 SOLSTICE trial evaluating tobevibart and elebsiran as monotherapy and in combination for the chronic treatment of people living with HDV. The trial is assessing the safety and ability of the combination to reduce HDV viremia (2 log10 decline in HDV RNA or undetectable HDV RNA) and normalize ALT, the current combined endpoints used for regulatory approval. The SOLSTICE trial initially evaluated once monthly SC injections of either tobevibart or elebsiran as monotherapy for 12 weeks. If participants did not achieve the primary endpoint of virologic response (2 log10 IU/mL decline or undetectable HDV RNA) and ALT normalization, participants were eligible to initiate combination therapy. Median decline of HDV RNA in participants receiving tobevibart or elebsiran as monotherapy were -2.0 log10 and -1.4 log10 IU/mL, respectively after 12 weeks of treatment.

Six participants entered combination treatment. As of the January 2024 data cutoff, data was available on all 6 participants through week 20 of combination therapy or day 225 of any therapy. At week 12 of combination therapy, a median reduction in HDV RNA of -4.29 log10 from baseline was observed. At that time, 6/6 achieving HDV RNA <LLOQ and 5/6 participants achieving HDV RNA <LOD, which has continued through Week 20. One participant in the tobevibart monotherapy arm achieved the combined endpoint with ALT normalization and 2 participants also achieved the combined endpoint after the initial 12 weeks of combination therapy, which was maintained through week 20. No serious adverse events (SAEs) were reported with few treatments emergent adverse events across cohorts with most being Grade 1 and 2. No ALT elevations above baseline were observed to Week 20 with the tobevibart/elebsiran combination therapy regardless of baseline HBsAg or HDV RNA. Additional cohorts evaluating the combination of tobevibart and elebsiran and tobevibart monotherapy are currently ongoing with additional data anticipated to be available in 2024.



LLOQ = 63 IU/mL; LOD = 14 IU/mL

[1]Cohort 2C has 6 total participants enrolled. As of January 2024, from the 6 participants who have reached day 225 (week 20 of combination therapy), 5 participants achieved HDV RNA < LLOQ.

HBV

Summary

According to the Hepatitis B Foundation, approximately 300 million people globally are chronically infected with HBV and approximately 900,000 die from HBV-associated complications each year. There is a significant unmet medical need for more effective therapies that lead to life-long control of the virus after a finite duration of therapy, which is the definition of a functional cure. Currently, a year-long course of IFN-α is the best available curative therapy and has a low functional cure rate of approximately 3% to 7%. Alternatively, suppressive therapy with daily nucleotide/nucleoside reverse transcriptase inhibitors (NRTIs) is commonly used, but patients often require a lifetime of therapy and NRTI therapy does not eliminate the risk of cirrhosis or hepatocellular carcinoma.

Our two therapeutic candidates, tobevibart and elebsiran, are both antivirals and potential immunomodulators. We believe that a functional cure for HBV will require an effective immune response, in addition to antiviral activity, based on the observation that severe immunosuppression can reactivate HBV disease. Our hypothesis is that the large amount of HBV protein that is transcribed in liver cells can suppress the immune system. There are at least two potential mechanisms by which suppression occurs. The first mechanism is T cell tolerance and exhaustion by the presentation of intracellular HBV antigens on hepatocytes. The second is the large quantities of HBV proteins that are released into the blood, especially HBsAg, which may also be immunosuppressive. We therefore believe that tobevibart and elebsiran have the potential to play a critical role in interrupting the mechanisms of immunosuppression and reactivating the immune response to deliver high functional cure rates.

Tobevibart and elebsiran demonstrated declines in HBsAg and were generally well tolerated in dose-escalation Phase 1 studies in healthy volunteers and adults with HBV. Phase 2 clinical trials evaluating tobevibart and elebsiran are in progress and described below.

A Phase 2 clinical trial evaluating elebsiran in combination with PEG-IFN-α for 24 and up to 48 weeks showed that 25.8% (8/31) of the participants receiving up to 48 weeks of elebsiran plus IFN-α treatment achieved higher rates of HBsAg seroclearance with hepatitis B surface antibodies (anti-HBs) seroconversion by the end of treatment, with 16.1% (5/31) maintaining seroclearance 24 weeks after end of treatment. The treatment regimens were generally well tolerated and resulted in no new safety signals. These initial results support our hypothesis of combining an antiviral with an immunomodulator to achieve HBsAg seroclearance and seroconversion.

In July 2021 we initiated a two-part study to evaluate the combination of tobevibart and elebsiran in virally suppressed HBV patients. Part A evaluated short treatment courses of tobevibart and elebsiran to rapidly evaluate safety, PK and HBsAg suppression when tobevibart is given weekly concomitantly with or after pre-treatment with elebsiran. Results from MARCH Part A in 2022 showed that the combination of tobevibart and elebsiran resulted in an approximate 3 log10 IU/mL decline in HBsAg with no safety signals. In November 2022, we announced end of treatment data for all MARCH Part A that the combination of tobevibart and elebsiran achieved mean HBsAg reductions >2.7 log10 IU/mL in all cohorts, absolute HBsAg levels <10 IU/mL were achieved in most participants, and no safety signals. Follow-up data after end of treatment showed rebounds in HBsAg levels over time.

MARCH Part B includes cohorts treated for 24- and 48-weeks with monthly doses of tobevibart plus elebsiran with and without PEG-INF-α. In November 2023, we announced initial 24-week treatment arm results from MARCH Part B that evaluated the combination of tobevibart and elebsiran with and without IFN-α. End of treatment results at 24-weeks demonstrated 15.0% (3/20) and 14.3% (3/21) of participants achieving HBsAg seroclearance in the tobevibart+elebsiran and tobevibart+elebsiran+IFN-α arms, respectively. This was higher than what was observed with elebsiran+IFN-α in which 5.6% of participants achieved HBsAg seroclearance after 24 weeks, demonstrating that tobevibart improved the rate of HBsAg seroclearance. At 12 weeks after end of treatment, all participants who achieved HBsAg seroclearance in the tobevibart+elebsiran arm had rebounded while 2 of 3 participants in the tobevibart+elebsiran+IFN-α arm maintained HBsAg seroclearance. End of treatment data from the 48-week arms of tobevibart+elebsiran and tobevibart+elebsiran+IFN-α are expected in the fourth quarter of 2024.

The Phase 2 PREVAIL platform trial evaluating the efficacy and safety of tobevibart and elebsiran in participants with chronic HBV infection is ongoing evaluating inactive carriers and immune active, treatment-naïve patients.

Elebsiran is also being evaluated in additional Phase 2 clinical trials with collaborators. Brii Bio is the sponsor for the Phase 2 trial of elebsiran in combination with BRII-179, an investigational therapeutic vaccine, for the treatment of chronic HBV infection. Treatment has completed in this trial. Treatment with elebsiran alone or in combination with BRII-179 with and without coadjuvant IFN-α was generally well tolerated. Although the combination of elebsiran and BRII-179 had greater anti-HBs responses and improved HBsAg-specific T-cell responses, comparable HBsAg reduction was observed in all cohorts at end of treatment (-1.7-1.8 log10 IU/mL). As described in further detail below under the heading "Our Collaboration, License and Grant Agreements," we granted Brii Bio an option to obtain exclusive rights to develop and commercialize elebsiran and tobevibart in China, Taiwan, Hong Kong and Macau, or collectively the China Territory, for the treatment, palliation, diagnosis, prevention or cure of acute and chronic diseases of infectious pathogen origin or hosted by pathogen infection, or the Field of Use. In December 2021, we and Gilead (study sponsor) initiated a Phase 2 clinical trial of elebsiran in combination with GS-9688 (selgantolimod), Gilead's investigational TLR-8 agonist, and nivolumab in both NRTI-suppressed patients and viremic patients. Patients with HBV treatment experience also may receive tenofovir alafenamide, or TAF. In February 2023, nivolumab was discontinued in cohorts evaluating nivolumab in combination with elebsiran and GS-9688 due to immune-related adverse events associated with nivolumab, which are consistent with the safety profile of the class.

HBV Life Cycle and Undetectable HBsAg as a Clinical Endpoint

After infecting a cell, the virus forms cccDNA. This form of HBV DNA is located in the nucleus of hepatocytes and acts like a mini-chromosome. HBV DNA can also integrate into the patient's DNA. This form of HBV DNA is known as integrated DNA, or intDNA.

HBV releases infectious virions and subviral particles (SVPs) from infected cells. Both virions and SVPs include forms of an HBV protein called HBsAg, a blood biomarker that indicates that the HBV cccDNA and/or intDNA in that patient's hepatocytes are actively making HBV RNA and HBV proteins. The formal endpoint accepted by the FDA for functional cure is undetectable HBsAg, defined as less than 0.05 IU/mL, as well as HBV DNA less than the lower limit of quantification, in the blood six months after the end of therapy. Achievement of this endpoint has been shown to predict improved clinical outcomes and the lack of need for further therapy.

Limitations of Current Standard of Care

There is a significant unmet medical need for finite versus chronic therapies that achieve functional cure. The most commonly used therapy for chronic HBV is life-long suppressive therapy with daily oral NRTIs, like tenofovir or entecavir. However, NRTIs rarely achieve functional cure, defined as the sustained loss (seroclearance) of detectable HBsAg and HBV DNA in serum, after a finite course of treatment. NRTIs prevent HBV ribonucleic acid, or RNA, from being transcribed into HBV DNA, which is a process known as reverse transcription. NRTIs therefore have little to no direct impact on covalently closed circular DNA(cccDNA) the reservoir for HBV or HBsAg production. It has been reported that after a year of therapy with NRTIs, zero to 3% of patients experience a functional cure. Additionally, NRTIs reduce, but do not eliminate, the risk of HBV associated liver failure and liver cancer. Despite its low utilization rate, suppressive therapy with NRTIs for HBV represented approximately $500 million in the U.S. alone in 2022, according to IQVIA (Midas data).

An alternative treatment option for chronic HBV is a year-long course of IFN-α therapy, which has poor tolerability and low functional cure approximately 3% to 7% of the time. The mechanisms by which IFN-α, an immune cytokine, achieves a functional cure are not known, but there is additional evidence supporting the need for immune stimulation to achieve a functional cure.

Of the hundreds of millions of people with chronic HBV worldwide, only about 10% are diagnosed, and of those diagnosed, only about 22% are treated. New, functional cure therapies have potential to increase diagnosis and treatment rates. Our current internal estimates project the global HBV functional cure market could be as large as $10 billion annually.

Tobevibart for HBV

Molecular Characteristics and Preclinical Data. Tobevibart is an investigational neutralizing mAb that has been engineered for immune engagement and targets a conserved region on the antigenic loop (AGL) of HBsAg that allows it to neutralize strains from all 10 HBV genotypes. The AGL helps the virus bind to hepatocytes and subsequently infect these liver cells. By binding to the AGL, tobevibart prevents viral entry, which prevents the spread of HBV to uninfected hepatocytes. Tobevibart, through a process called opsonization, also helps remove HBV virions and SVPs from the blood. Hepatitis B immunoglobulin (HBIG) an approved therapy for preventing reinfection after transplantation and which consists of polyclonal antibodies against HBV, acts by similar mechanisms. In vitro, tobevibart demonstrates approximately 5,000-fold greater potency than HBIG in neutralization assays.

Tobevibart also has the potential to activate the immune system, via three different processes. First, due to specialized mutations in the Fc domain, tobevibart, has the potential to act as a T cell vaccine. Tobevibart has been engineered with mutations that enhance binding to the Fc receptor (FcR) IIa activating receptor and diminish binding to the FcR IIb inhibitory receptor. As such, tobevibart is designed to capture virions and SVPs, deliver such virions and SVPs to dendritic cells (DCs), and instruct these DCs to mature and stimulate T cells that can eliminate HBV infected hepatocytes. Second, tobevibart has the potential to act via antibody-dependent cell cytotoxicity (ADCC). In this process, by binding to HBsAg at the cell surface, tobevibart recruits natural killer cells to eliminate infected hepatocytes. The Fc domain of tobevibart has been engineered to promote ADCC. Third, by reducing the amount of HBsAg in the blood, tobevibart has the potential to remove a brake on the immune system by decreasing the ability of HBV to suppress it. Additionally, tobevibart, incorporates Xencor's Xtend™ to extend serum half-life.

Phase 1 Trial of tobevibart. The trial was an adaptive clinical trial designed to evaluate the safety, tolerability, pharmacokinetics and antiviral activity of tobevibart. The Phase 1 clinical trial had four parts.

Part A was a single ascending dose design in healthy volunteers, with Parts B and C as single ascending dose designs in adults with chronic HBV on NRTIs. Part B included patients with HBsAg levels less than 1,000 IU/ml for the 6 mg cohort and less than 3,000 IU/mL for the other dose cohorts. Part C included patients with HBsAg levels greater than or equal to 3,000 IU/mL. Part D included patients with HBV DNA greater than or equal to 1,000 IU/mL who were not receiving NRTI therapy.

The primary endpoints across all parts of the trial were safety and tolerability. The key secondary endpoint in Parts B and C was the maximum reduction of serum HBsAg from baseline. In Part D, an additional key secondary endpoint was the maximum change of HBV DNA from baseline.

Across all study parts, tobevibart up to 3,000 mg intravenously, or IV, was generally well tolerated with no clinical safety concerns observed. In Part B, most participants achieved a ≥1 log10 IU/mL reduction from baseline in HBsAg within 1-3 days. Mean HBsAg reductions in the 6 mg, 18 mg, 75 mg, and 300 mg groups were 1.30, 1.27, 1.96, and 2.21 log10 IU/mL, respectively, at nadir. All participants who received 75 mg or 300 mg of tobevibart achieved HBsAg <100 IU/mL and 5/6 (83%) in the 300 mg group achieved HBsAg <10 IU/mL. In Part D, single doses of 75 mg or 300 mg was associated with rapid reductions in HBsAg and HBV DNA in the majority of participants. Across both cohorts, 11/12 participants receiving tobevibart achieved a >1 log10 IU/mL decline in HBsAg and 11/12 achieved a >1 log10 IU/mL decline in HBV DNA with the changes in HBsAg and HBV DNA showing similar kinetics. Across all parts of the study, tobevibart was generally well tolerated with the majority of adverse events being mild to moderate in severity. The rapid reductions in HBsAg after just one dose and the safety profile supported further evaluation in Phase 2.

Elebsiran for HBV

Molecular Characteristics. Elebsiran is an investigational, single siRNA targeting a conserved sequence of HBV that allows for predicted activity against 99.7% of the strains of HBV, including all 10 HBV genotypes. Because this conserved sequence falls within a specific region of the X gene of HBV that exists within all four HBV RNA transcripts, elebsiran is able to degrade each transcript, and consequently decrease the expression of all proteins produced by the virus: X, polymerase, S, and core. Elebsiran is thus potentially a broad-spectrum, potent antiviral.

HBV DNA can become integrated into human DNA as intDNA. Because elebsiran targets a region of HBV that is conserved in the large majority of HBV intDNA, this single siRNA is predicted to be able to prevent the production of HBV proteins derived from intDNA, as well as the production of all other HBV proteins from cccDNA.

We believe that the large amount of HBV protein that is transcribed in liver cells can suppress the immune system. There are at least two potential mechanisms by which suppression occurs. The first mechanism is T cell tolerance and exhaustion by the presentation of intracellular HBV antigens on hepatocytes. The second is the large quantities of HBV proteins that are released into the blood, especially HBsAg, which may also be immunosuppressive. By directly reducing the amount of HBV proteins made, elebsiran has the potential to decrease the ability of HBV to suppress the immune system—in effect removing a brake on the immune system. In mice models, siRNAs that are able to reduce HBsAg expression can transform an otherwise ineffective therapeutic HBV vaccine into one that can functionally cure such mice of HBV, suggesting that HBsAg suppression has the ability to enhance the immune response against HBV.

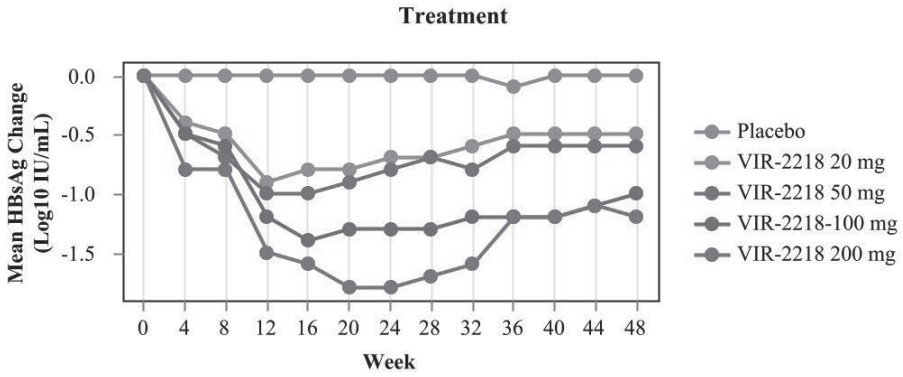
We believe that elebsiran is the only HBV-targeting siRNA currently in development that includes enhanced stabilization chemistry (ESC+) technology and preclinical, modeling and initial clinical data suggest this technology may be able to enhance the potential safety of elebsiran.

Phase 1/2 Trial of elebsiran. The trial was an adaptive clinical trial designed to evaluate the safety, tolerability, pharmacokinetics and antiviral activity of elebsiran. It evaluated single ascending doses (50 mg to 900 mg) of elebsiran in healthy volunteers and multiple ascending doses (50 mg to 200 mg for 2 doses) in adults with chronic HBV suppressed on NRTI therapy.

Across healthy volunteers and chronic HBV patients, elebsiran has been generally well-tolerated. No clinically significant ALT abnormalities, which are a marker of liver inflammation, have been observed. In the Part A 900 mg cohort, asymptomatic Grade 1 ALT elevations with no associated changes in bilirubin, or other markers of liver function, have been observed. Three SAEs have been reported, all in Part B. The first, a Grade 2 headache, resolved with IV fluids and non-opioid pain medications. This patient had additional symptoms of fever, nausea, vomiting and dehydration, assessed by us as consistent with a viral syndrome. The second SAE, a Grade 4 depression, occurred over 50 days after the last drug dose was administered, and was assessed by us as not related to elebsiran. The third SAE, a patient suicide, occurred 241 days after the last dose of study drug and was assessed by us as not related to elebsiran. Three Grade 3 adverse events of upper-respiratory tract infection, chest pain and low phosphate levels in the blood have also been reported. We did not consider any of these Grade 3 events as related to elebsiran.

Antiviral activity of elebsiran was assessed by changes in HBsAg. The activity of elebsiran through Week 48 for each dose level is shown in the graph below. For Parts B and C, the mean baseline HBsAg levels were 3.3 log10 IU/mL and 3.9 log10 IU/mL, respectively. The mean decline in HBsAg across hepatitis B e-antigen (HBeAg) negative and HBeAg positive subjects at Week 16 was 1.5 log10, or an approximately 32-fold reduction. The declines observed in HBsAg at Week 16 ranged from 0.97 log10 to 2.2 log10, or an approximately nine to 160-fold reduction, after two 200 mg doses of elebsiran given four weeks apart. The mean HBsAg level at Week 16 was 314 IU/mL, with half of the patients achieving HBsAg values < 100 IU/mL and 5/6 achieving HBsAg values < 1000 IU/mL. Five of the 12 patients that achieved HBsAg values of <100 IU/mL maintained it through Week 48. Therefore, even though HBsAg levels gradually rebounded, overall, a durable effect was observed.

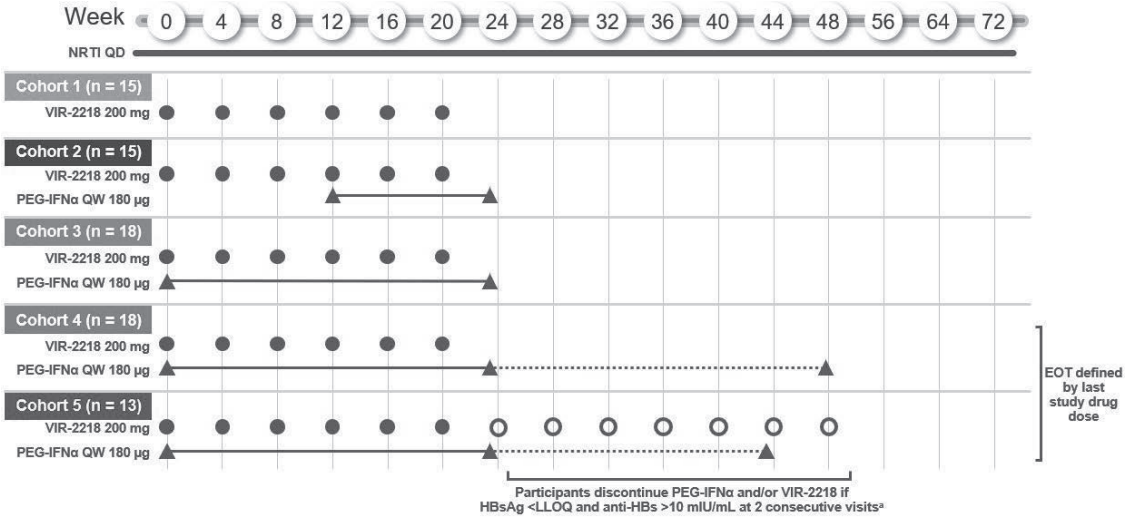
The ability of elebsiran to result in substantial and durable declines in HBsAg after only two doses suggests that elebsiran has the potential to play an important role in the functional cure of chronic HBV. We have initiated additional clinical trials evaluating elebsiran in combination with other immunomodulatory agents.



Change from Baseline in HBsAg following administration of elebsiran. Each line represents the mean decline from baseline in HBsAg for elebsiran for each dosing level or pooled placebo in Parts B and C.

HBV Combinations and New Product Candidates

Phase 2 Trial of elebsiran in combination with IFN-α. This is a clinical trial evaluating the safety, tolerability, pharmacokinetics and antiviral activity of elebsiran alone and in combination with IFN-α in adults with chronic HBV infection on NRTIs. The trial is evaluating multiple doses of elebsiran 200 mg, alone or in combination with IFN-α for 24 to 48 weeks. The trial cohorts are shown below.



EOT = end of treatment; LLOD = lower limit of detection; QD = daily; QW = every week

[a]*HBsAg assay LLOQ and LLOD are 0.05 IU/mL.*

Elebsiran in combination with IFN-α for 24 weeks from Day 1 (Cohort 3) resulted in a more rapid and substantial decline in HBsAg compared to elebsiran alone (Cohort 1) and elebsiran lead-in followed by concomitant administration with IFN-α from Week 12-24 (Cohort 2). Through Week 24, mean HBsAg change from baseline were -1.9, -2.0, and -2.4 log10 IU/mL in Cohorts 1, 2, and 3, respectively, with greater than 1 log10 decline in HBsAg maintained at Week 48. Cohorts 4 and 5 evaluated treatment beyond 24 weeks. In both Cohorts 4 and 5, participants took elebsiran and IFN-α from Day 1 through Week 24. In Cohort 4, participants were eligible to continue IFN-α up to 48 weeks if they did not achieve HBsAg less than the lower limit of quantitation, or LLOQ, and participants in Cohort 5 were able to continue elebsiran and IFN-α up to Week 48 if they did not achieve HBsAg <LLOQ. If a participant in Cohorts 4 or 5 achieved HBsAg <LLOQ at 2 consecutive visits, they were eligible to stop therapy. Through Week 48, mean HBsAg change from baseline were -1.8 and -2.9 log10 IU/mL in Cohorts 4 and 5, respectively. Overall, 10 participants achieved HBsAg seroclearance by Week 48 across all cohorts with the majority occurring in Cohorts 4 and 5. Importantly, nine out of these 10 participants, including all four in Cohort 5, also achieved seroconversion defined as anti-HBsAb > 10 mIU/mL, which suggests the potential for durability of response after stopping therapy. Participants in Cohorts 4 and 5 were able to maintain HBsAg seroclearance 24 weeks after end of treatment at 16.7% (3/18) and 15.4% (2/13), respectively. Among participants who had HBsAg seroclearance by end of treatment, 4/4 had anti-HBs levels >500 mIU/mL at end of treatment had sustained HBsAg seroclearance 24 weeks post end of treatment. All participants (3/3) who had anti-HBs levels <100 mIU/mL at end of treatment experienced rebound in HBsAg. Three participants had anti-HBs between 100-500 mIU/mL; 2 experienced a rebound and 1 sustained HBsAg seroclearance through 24 weeks post end of treatment. The treatment regimens were generally well tolerated and resulted in no new safety signals.

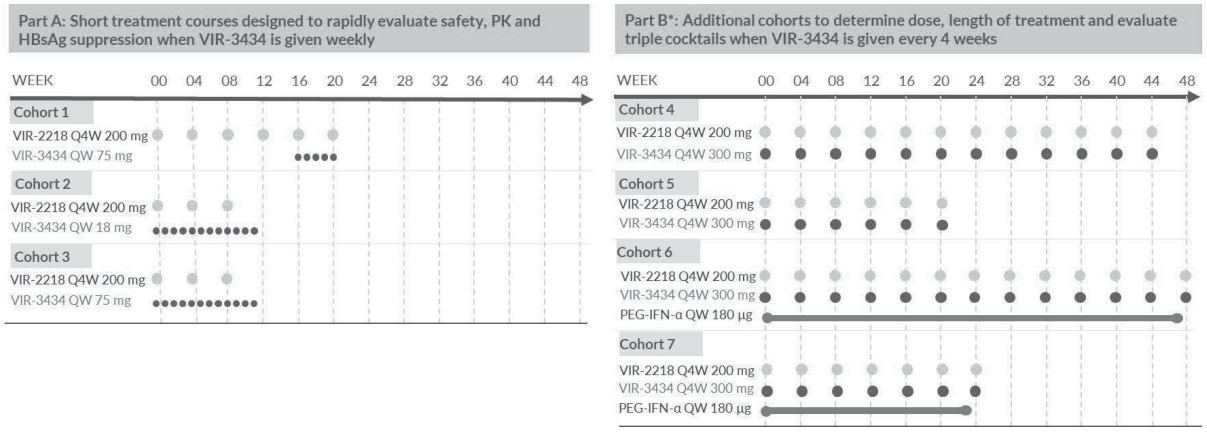
We believe the data from this study provides us proof of concept of our approach to achieving a functional cure in HBV and that anti-HBs titers >500 mIU/mL at end of treatment were associated with sustained HBsAg seroclearance at 24 weeks post end of treatment.

Participants with HBsAg seroclearance, n (%)	Cohort 1 (n=15) VIR-2218 x6	Cohort 2 (n=15) VIR-2218 x 6 lead-in + PEG-IFNα x 12	Cohort 3 (n=18) VIR-2218 x 6 + PEG-IFNα x 24	Cohort 4 (n=18[1]) VIR-2218 x 6 + PEG-IFNα x ≤48	Cohort 5 (n=13) VIR-2218 x 13 + PEG-IFNα x ≤44
At any time up to Week 48	0 (0%)	1 (6.7%)	1 (5.6%)	4 (22.2%)	4 (30.8%)
At Week 48	0 (0%)	1 (6.7%)	0 (0%)	3 (16.7%)	4 (30.8%)
With Anti-HBs (>10mIU/mL) at Week 48	0 (0%)	1 (6.7%)	0 (0%)	3 (16.7%)	4 (30.8%)
At 24 weeks post-EOT	0 (0%)	1 (6.7%)	0 (0%)	3 (16.7%)	2 (15.4%)

Preliminary 48-week safety and efficacy data from novel investigative cohorts of elebsiran alone and in combination with IFN-α in participants with chronic HBV infection. All participants are virally suppressed on NRTIs.

[1] Two participants withdrew from study prior to Week 16; 1 participant had HBsAg seroclearance at Week 32, stopped PEG-IFN per protocol, and had a rebound in HBsAg by Week 48.

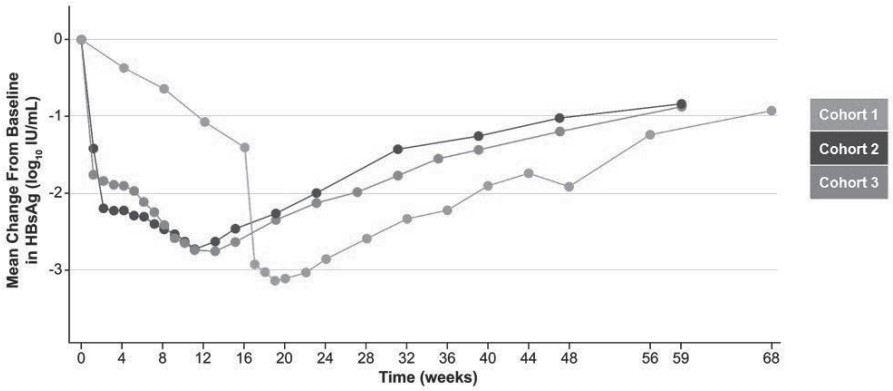
Phase 2 Trial of tobevibart and elebsiran with and without IFN-α (MARCH). In July 2021, we initiated the Phase 2 MARCH trial to evaluate the combination of tobevibart and elebsiran as a functional cure regimen for chronic HBV infection. Tobevibart and elebsiran have the potential to act in concert by inhibiting virion production, removing potentially tolerogenic HBV proteins, and stimulating new HBV specific T cells. All patients were virally suppressed on NRTIs. The MARCH trial is being conducted in two parts. Part A is the first evaluation of the combination of tobevibart and elebsiran and is primarily assessing the safety of the combination as well as efficacy. Part B of the trial is evaluating 24- and 48-week regimens of the tobevibart and elebsiran combination with and without IFN-α.



Q4W = every 4 weeks

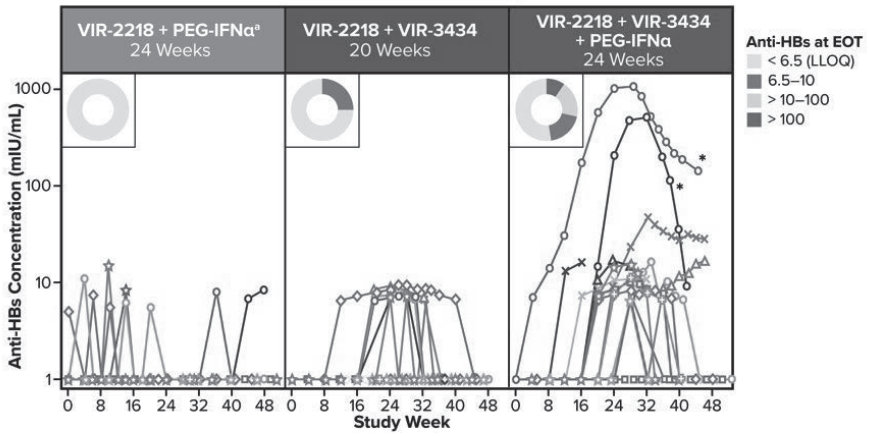
** Not exhaustive – does not include monotherapy arms for tobevibart. Additional cohorts may be added.*

Part A of the MARCH trial evaluated the safety of the combination of tobevibart and elebsiran. Cohort 1 was a lead-in with elebsiran followed by coadministration of tobevibart from Week 16-20. Cohort 2 and 3 evaluated the concomitant administration of tobevibart and elebsiran and from Day 1 through Week 12, evaluating 18 mg and 75 mg tobevibart administered weekly. Cohort 1 demonstrated a mean 3.1 log10 decline in HBsAg at end of treatment while Cohorts 2 and 3 demonstrated a 2.7 log10 decline in HBsAg. Although no participants achieved HBsAg <LLOQ, most participants achieved HBsAg <10 IU/mL. Tobevibart in combination with elebsiran was generally well tolerated with most adverse events being mild. Follow-up data showed rebound of HBsAg after end of therapy but HBsAg levels remained -0.8 to -0.9 log10 IU/mL below baseline 48 weeks post end of treatment.



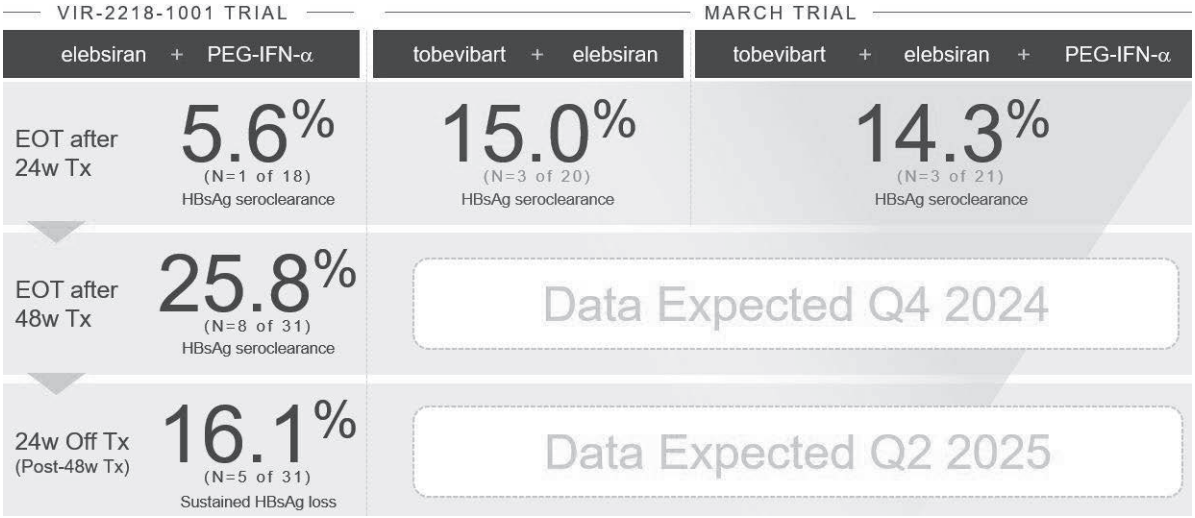
Preliminary data from the ongoing open-label Phase 2 MARCH trial evaluating the safety, tolerability and antiviral activity of tobevibart in combination with elebsiran in virally suppressed participants with chronic HBV infection who received continuous NRTI therapy for two months or more. All participants are virally suppressed on NRTIs.

Part B of the MARCH trial is evaluating the combination of tobevibart and elebsiran with and without IFN-α for 24 and 48 weeks. Initial 24-week data from Part B demonstrated that tobevibart+elebsiran and tobevibart+elebsiran+IFN-α achieved HBsAg seroclearance in 15.0% (3/20) and 14.3% (3/21) of participants, respectively. All participants who received tobevibart+elebsiran and achieved HBsAg seroclearance had rebound in HBsAg. Of the three participants who received tobevibart+elebsiran+IFN-α and achieved HBsAg seroclearance, only one had rebound in HBsAg. Participants who had sustained HBsAg seroclearance had higher anti-HBs antibodies levels compared to those who did not. All treatment emergent adverse events in the tobevibart+elebsiran cohort were Grade 1-2 in severity. Of those treated with tobevibart+elebsiran+IFN-α, treatment-emergent adverse events were generally consistent with those expected for IFN-α with Grade 3 treatment-emergent adverse events reported in five participants. 48 week cohorts of tobevibart+elebsiran and tobevibart+elebsiran+IFN-α are ongoing with end of treatment data expected in the fourth quarter of 2024.



**Denotes participants who sustained HBsAg loss at 12 weeks post-EOT*
Anti-HBs concentrations in the VIR-2218-1001 and VIR-2218-1006 studies were determined using the Anti-HBs2 Assay IVD Kit on the Siemens ADVIA Centaur instrument and the Elecsys Anti-HBs II assay on the Roche Cobas instrument, respectively. The laboratory developed test using the Elecsys Anti-HBs II assay incorporated the addition of a VIR-3434 binding blocker (anti-idiotype Fab fragment) to the samples prior to analysis, preventing assay interference by VIR-3434.
Values <LLOQ were imputed as 1 mIU/mL

Summary of Phase 2 Combination Trials. Data from VIR-2218-1001 and the MARCH trial support our approach to achieving functional cure in HBV. In the VIR-2218-1001 trial, we were able to demonstrate that the combination of elebsiran+IFN-α was able to increase HBsAg seroclearance rates to 25.8% compared to what has been observed with siRNAs (0%) and IFN-α as monotherapy (3-7%) at end of treatment. In addition, we were able to observe an approximate 5-fold increase in HBsAg seroclearance rates between Week 24 and 48. From MARCH Part B, 24 weeks of tobevibart+elebsiran and tobevibart+elebsiran+IFN-α resulted in HBsAg seroclearance rates about 3-fold higher compared to elebsiran+IFN-α alone demonstrating the additional activity of tobevibart. Data expected in the fourth quarter of 2024 should inform whether a similar increase in HBsAg seroclearance rates will be observed between Week 24 and Week 48 as was observed in VIR-2218-1001.



2 HBsAg > 10 mIU/mL; Tx = Treatment

Other Collaborators. In April 2021, Brii Bio initiated a Phase 2 trial of elebsiran in combination with BRII-179, an investigational therapeutic vaccine, for the treatment of chronic HBV infection. Treatment has been completed in this trial. Treatment of elebsiran alone or in combination with BRII-179 with and without coadjuvant IFN-α was generally well tolerated. Although the combination of elebsiran and BRII-179 had greater anti-HBs responses and improved HBsAg-specific T cell responses, comparable HBsAg reduction was observed in all cohorts at EOT (-1.7-1.8 log10 IU/mL).

In December 2021, we and Gilead initiated a multi-center, open-label Phase 2 clinical trial designed to evaluate the safety, tolerability and efficacy of various combinations of elebsiran, GS-9688 (selgantolimod), Gilead's investigational TLR-8 agonist, nivolumab and TAF in adults with chronic HBV. The trial enrolled approximately 120 patients ages 18 to 65 who were either viremic or are NRTI-suppressed. Patients who were HBeAg-positive (an indicator of acute viral replication), as well as those who were HBeAg-negative, were enrolled. The primary efficacy endpoint is the proportion of patients who achieve a functional cure (defined as HBsAg loss and HBV DNA <20 IU/mL at follow-up week 24). In February 2023, nivolumab was discontinued in cohorts evaluating nivolumab in combination with elebsiran and GS-9688 due to immune-related adverse events associated with nivolumab, which are consistent with the safety profile of the class.

The Phase 2 PREVAIL platform trial and its THRIVE/STRIVE sub-protocols of tobevibart and/or elebsiran and/or IFN-α in viremic patients with chronic HBV infection was initiated in the first half of 2023. The THRIVE sub-protocol is evaluating the safety and efficacy of regimens containing combinations of an NRTI with tobevibart and/or elebsiran in inactive carriers defined as adults with chronic HBV that are HBeAg negative with HBV DNA ≤2000 IU/mL and ALT ≤ upper limit normal (ULN). The STRIVE sub-protocol is evaluating the safety and efficacy of regimens containing combinations of an NRTI with tobevibart and/or elebsiran and/or IFN-α in adults with chronic HBV infection who have not received prior NRTI or IFN-α treatment. Participants will be HBeAg positive or negative with HBV DNA >2000 IU/mL, ALT>ULN and ≤ 5× ULN.

HIV

Summary

Forty years after the start of the epidemic, HIV remains one of the world's most serious public health challenges. With approximately 1.5 million new cases of HIV worldwide each year, there remains a strong need for prophylactic vaccine. We are taking a different immunologic approach to HIV prevention using human cytomegalovirus (HCMV) as a vector designed to maximize T cell immunity. Based on in vivo data, we hypothesize an HCMV-based vaccine may be able to "program" unique T cell responses against HIV, which is different from other vaccine approaches. HCMV as a vector is a weakened version of the virus designed to deliver the HIV vaccine material to the immune system without itself causing disease in the trial participants. HCMV has been present in much of the global population for centuries. Most people living with HCMV experience no symptoms and are unaware that they are living with the virus. HCMV remains detectable in the body for life, which suggests it has the potential to deliver and then safely help the body retain HIV vaccine material for a long period of time, potentially overcoming the waning immunity observed with more short-lived vaccine vectors.

VIR-1111, a prototype HIV vaccine, was evaluated in a Phase 1 first-in-human study that demonstrated no safety signals and no vector shedding or viremia. No sustained HIV-insert-specific T cell responses were observed. VIR-1388 has incorporated modifications that have the potential to enhance HIV-specific immunogenicity compared to VIR-1111 and provide broader coverage against circulating strains of HIV. The VIR-1388 Phase 1 study was initiated in 2023.

Disease Overview and Limitations of the Current Standard of Care

According to the Joint United Nations Programme on HIV/AIDS (UNAIDS), each year there are approximately 700,000 HIV-related deaths globally. Unless treated, infection with HIV results in an almost universally fatal disease, acquired immune deficiency syndrome, or AIDS. According to the World Health Organization (WHO), almost 36 million people have died from HIV-related illnesses globally since cases were first reported in 1981.

Highly effective HIV treatments are now available, but these medicines only suppress HIV and are not curative. They require life-long administration and carry the risk for viral breakthrough and resistance. Furthermore, while HIV prevention programs based on behavioral modification, pharmacological intervention, use of barrier devices and other methods continue to be developed, such approaches have had at most a modest effect on HIV transmission globally in high-risk populations. Although pre-exposure prohylaxis (PrEP) with antiretroviral therapy has been available for several years, it requires daily administration to be effective. Long-acting antiretroviral PrEP has recently been approved but still requires injections every 2 months to be effective. Therefore, we believe the most effective means of curbing the worldwide HIV epidemic would be a safe and effective vaccine for individuals who are or may become sexually active.

VIR-1111 and VIR-1388 for HIV

Molecular Characteristics and Preclinical Data. VIR-1111 is a prototype T cell vaccine using an engineered HCMV vector designed to elicit T cells that recognize HIV epitopes different from those recognized by prior HIV vaccines, to exploit the capacity of HCMV to induce persistently high frequencies of T cells pre-programmed to migrate into tissues, and to stimulate a different type of immune response to HIV, known as an human leukocyte antigen E (HLA-E) restricted cluster of differentiation (CD) 8 T cell response. VIR-1388 contains a novel immunogen intended to provide broader coverage against circulating strains of HIV compared to the clade A Gag immunogen in VIR-1111. Genetic modifications of the HCMV vector used for VIR-1388 recapitulate those of rhesus CMV vectors that elicited an HLA-E restricted immune response and protected more than 50% of nonhuman primates (NHPs) from repeated exposure to simian immunodeficiency viruses (SIV).

Phase 1 Trial of VIR-1111. The trial was a multiple ascending dose clinical trial designed to evaluate the safety, tolerability, reactogenicity and immunogenicity of VIR-1111 in CMV-positive healthy adult volunteers, initiated in December 2020 and completed in December 2022. The immunogenicity evaluation included an assessment of the breadth and nature of the T cell response to the vaccine. In November 2022, we announced that safety and immunology data from the initial two cohorts of the trial showed no safety signals and no vector shedding or viremia reported to date. In addition, no sustained HIV insert-specific T cell responses were observed in the first two cohorts. Safety and immunology data reported in 2023 from the highest dose cohort 3 were consistent with the data from cohorts 1 and 2. The manufacture and early clinical development of VIR-1111 was funded by the Bill & Melinda Gates Foundation.

Phase 1 Trial of VIR-1388. Learnings from VIR-1111 have informed the vector and trial design of VIR-1388. We initiated a Phase 1 trial of VIR-1388 in September 2023. The trial is a multiple ascending dose clinical trial designed to evaluate the safety, tolerability, reactogenicity and immunogenicity of VIR-1388 in CMV-positive healthy adult volunteers. VIR-1388 is a subcutaneously administered HIV T cell vaccine using HCMV as a vector. Like VIR-1111, VIR-1388 has been designed to elicit T cells that recognize HIV epitopes that are different from those recognized by prior HIV vaccines and to stimulate a different and specific type of T cell immune response to HIV, known as an HLA-E restricted immune response. VIR-1388 has additional modifications that have the potential to enhance immunogenicity compared to VIR-1111. This trial is supported by the National Institute of Allergy and Infectious Diseases, part of the National Institutes of Health, and the Bill & Melinda Gates Foundation, and is being conducted by the HIV Vaccine Trials Network. Initial data from the trial is expected in the second half of 2024.

COVID-19

Summary

In response to the COVID-19 pandemic, we moved rapidly to address this global health challenge. Our focus has been on treating and preventing COVID-19, as well as potential future coronavirus outbreaks. To do so, together with our collaborator GSK, we developed the mAb sotrovimab for the treatment and prophylaxis of COVID-19. Sotrovimab is based on a parent antibody, S309, which was derived from samples previously gathered for research on pan-coronavirus-neutralizing mAbs. Data suggest that sotrovimab has the potential for 'dual-action', or the ability to block viral entry into healthy cells and an enhanced ability to clear infected cells.

In May 2021, the FDA granted an emergency use authorization (EUA) to sotrovimab for the early treatment of mild to moderate COVID-19 in adults and pediatric patients (12 years of age and older weighing at least 40 kg) with positive results of direct severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) viral testing, and at high risk for progression to severe COVID-19, including hospitalization or death. In December 2021, the European Commission granted marketing authorization to Xevudy® (sotrovimab) in the EU for the treatment of adults and adolescents at increased risk of progressing to severe COVID-19. In March 2022, the FDA de-authorized sotrovimab's use in all U.S. regions due to increases in the proportion of COVID-19 cases caused by non-susceptible new variants. Sotrovimab has obtained emergency authorization, temporary authorization or marketing approval (under the brand name Xevudy®) for early treatment of COVID-19 in more than 30 countries. Over 2.1 million doses of sotrovimab have been delivered as of December 31, 2022. We continue to conduct in vitro testing of sotrovimab against new variants and subvariants as they emerge, and to collect and evaluate real-world evidence, both of which are being shared with regulatory authorities.

Sotrovimab is also being evaluated in two additional indications: (1) to determine if sotrovimab can prevent symptomatic COVID-19 infection in uninfected immunocompromised adults, and (2) to evaluate if sotrovimab treatment can improve clinical outcomes in patients hospitalized with COVID-19.

In addition, Vir is preparing for future pandemics by developing coronavirus mAbs that we believe have the potential to have even broader application and be more potent than sotrovimab.

Disease Overview and Limitations of Current Standard of Care

The FDA has granted either EUAs or marketing approvals to multiple vaccines, drugs and/or antibodies to prevent or treat COVID-19 in the U.S. For prophylaxis, despite the high efficacy of the COVID-19 vaccines, there are still populations in whom vaccine immunogenicity is suboptimal, such as the elderly with comorbidities, immunocompromised persons, or those who may not want or be able to tolerate vaccines. For early treatment, both mAbs and small molecules have shown strong efficacy data and have pros and cons around convenience and compliance. For example, for some patients and their physicians, intramuscular, or IM, or IV mAbs may be preferred to small molecules due to administration in a single treatment visit ("one and done"), concerns about compliance with small molecules (multiple pills, multiple times per day, over multiple days), and concerns about oral treatment initiation requirements. For hospitalized patients, there is still significant unmet need. Data suggest that COVID-19 mAbs may have a role in improving clinical outcomes such as decreasing intensive care unit stays and/or mortality in hospitalized patients who have severe or critical COVID-19. Importantly, the ongoing durability of current vaccines, small molecules, and mAbs in the setting of the continued emergence of variants is uncertain.

Sotrovimab for COVID-19

Molecular Characteristics

Sotrovimab is an engineered human immunoglobulin 1 (IgG1) neutralizing anti-SARS-CoV-2 monoclonal antibody that has Fc modifications designed to improve bioavailability in the respiratory mucosa and increase half-life, and incorporates Xencor's Xtend™ technology. Sotrovimab binds with high affinity to the receptor binding domain of the SARS-CoV-2 spike protein. It is designed to have dual-actions of neutralizing the virus by blocking viral entry into healthy cells, while also enhancing the ability to clear infected cells. Sotrovimab potently neutralizes live SARS-CoV-2 in vitro and in vivo, and binds to a highly conserved epitope that is shared with SARS-CoV-1.

Early Treatment

In August 2020, we initiated the lead-in phase of our Phase 2/3 trial COVID-19 Monoclonal antibody Efficacy Trial - Intent to Care Early, or COMET-ICE, for the treatment of adults at high risk of hospitalization or death from COVID-19 via IV administration. This trial was a Phase 2/3, randomized, double-blind, multi-center, placebo-controlled trial investigating IV infusion of 500 mg of sotrovimab in adults with mild to moderate COVID-19 at high-risk of progression to severe disease, who were not hospitalized and did not require oxygen. The trial included a lead-in phase to evaluate the safety and tolerability of sotrovimab, followed by an expansion phase with 1:1 randomization of sotrovimab and placebo. The final COMET-ICE trial results in the full trial population of 1,057 participants demonstrated an adjusted relative risk reduction of 79% ($p<0.001$) in all-cause hospitalization for more than 24 hours or death due to any cause by day 29 compared to placebo, meeting the primary endpoint of the trial.

In May 2021, the FDA granted an EUA to sotrovimab for the early treatment of mild to moderate COVID-19 in adults and pediatric patients (12 years of age and older weighing at least 40 kg) with positive results of direct SARS-CoV-2 viral testing, and at high risk for progression to severe COVID-19, including hospitalization or death. In December 2021, the European Commission granted marketing authorization to Xevudy® (sotrovimab) in the European Union (EU) for the treatment of adults and adolescents at increased risk of progressing to severe COVID-19. In March 2022, the FDA de-authorized sotrovimab's use in all U.S. regions due to increases in the proportion of COVID-19 cases caused by the Omicron BA.2 subvariant. Sotrovimab has obtained emergency authorization, temporary authorization or marketing approval (under the brand name Xevudy®) for early treatment of COVID-19, supplying more than 30 countries.

We continue to conduct in vitro testing of sotrovimab's ability to neutralize new variants and subvariants as they emerge, and to collect and evaluate real-world evidence, both of which are being shared with regulatory authorities.

Prophylaxis

In August 2022, sotrovimab entered the Phase 3 PROphylaxis for paTiEnts at risk of COVID-19 infecTion, or PROTECT-V, platform trial sponsored by Cambridge University Hospitals National Health Service, or NHS, Foundation Trust assessing the use of a 2 g dose of sotrovimab administered IV in uninfected, high-risk immunocompromised individuals. This is a randomized, double-blinded, placebo-controlled trial that is currently enrolling participants. The primary endpoint is PCR-confirmed symptomatic COVID-19 infection at three months. Key secondary endpoints include PCR-confirmed symptomatic COVID-19 infection at subsequent timepoints, time to confirmed SARS-CoV2 infection, safety, mortality and disease severity. Due to significant uncertainty in the anticipated infection rate, the sample size will be monitored and reviewed regularly by the independent Data Monitoring Committee (IDMC). Timing of initial data will depend on continued rate of enrollment.

Hospitalized treatment

In December 2021, sotrovimab entered the Randomized Evaluation of COVID-19 Therapy, or RECOVERY, trial, a Phase 3 trial in the UK evaluating standard of care alone versus usual standard of care plus a single 1 g dose of sotrovimab given IV. This is a randomized, controlled, open-label, platform trial assessing several possible treatments in patients hospitalized with COVID-19 in the UK. Trial participants who are hospitalized with COVID-19 are eligible for random assignment in a 1:1 ratio to usual standard of care alone versus usual standard of care plus a single dose of sotrovimab given IV. Timing of initial data will depend on continued rate of enrollment.

Influenza

Summary

There remains medical need for prevention of serious influenza illness. The variability in the efficacy of influenza vaccines could be due to incomplete coverage against seasonal strains and the lack of an effective immune response in many individuals after receiving the vaccine. We are developing influenza mAbs as a universal prophylactic for influenza to address the limitations of flu vaccines. In May 2021, we signed a definitive collaboration agreement, or the 2021 GSK Agreement, with Glaxo Wellcome UK Limited to expand our existing collaboration to include the research and development of new therapies for influenza and other respiratory viruses. See the section titled "Our Collaboration, License and Grant Agreements—Collaboration Agreements with GSK" for a description of the 2021 GSK Agreement.

Disease Overview and Limitation of Current Standard of Care

According to the WHO, on average, each year the influenza virus is estimated to infect one billion individuals and to result in 290,000 to 650,000 deaths globally. According to the Centers for Disease Control and Prevention (CDC), in the 2018-2019 flu season, despite the availability of the flu vaccine, approximately 36 million people were diagnosed with influenza, 500,000 people were hospitalized, and 34,000 people died from influenza in the U.S. alone. Influenza vaccines have historically had limited success, with an average efficacy of 40% overall, across all populations. This limited efficacy results from incomplete coverage against seasonal strains and the lack of an effective immune response in many individuals after receiving the vaccine. We are developing influenza mAbs as a universal prophylactic for influenza to address the limitations of existing flu vaccines, which we believe will lead to meaningfully higher levels of protection against seasonal and pandemic strains of influenza.

VIR-2482 for Influenza A

Molecular Characteristics

VIR-2482 is an investigational mAb targeting a functionally conserved epitope on the influenza A hemagglutinin protein located within the stem region. In preclinical studies, we demonstrated that in vitro VIR-2482 covers all the major strains of influenza A that have arisen since 1918. In addition, in prophylactic lethal challenge studies of influenza A in mice, VIR-2482 was able to protect mice from death at VIR-2482 exposures we believe to be clinically relevant. We engineered the parent form of VIR-2482 to extend its half-life to create VIR-2482, which incorporates Xencor's Xtend™ technology.

Phase 1 and 2 Clinical Studies

VIR-2482-3001 was a Phase 1 first-in-human, randomized, double-blinded, placebo-controlled single ascending dose trial in healthy adult volunteers with endpoints of safety, tolerability, and pharmacokinetics, or PK, when VIR-2482 is administered intramuscular (IM) in four different doses: 60 mg, 300 mg, 1200 mg, and 1800 mg. This trial was initiated in August 2019 and is now complete. The trial showed VIR-2482 was well-tolerated up to 1800 mg and is estimated to have a half-life of 58 days based on preliminary clinical data.

In October 2022, we initiated PENINSULA (PrevENtIoN of illnesS dUe to InfLuenza A), a Phase 2 randomized, double-blind, placebo-controlled, dose-ranging trial in healthy adult volunteers aged 18 to 64 to evaluate the safety, tolerability and efficacy of two different intramuscularly administered doses of VIR-2482 in preventing illness due to influenza A. The primary efficacy endpoint is the proportion of trial participants with protocol-defined influenza illness[1], requiring one systemic symptom and one respiratory symptom with polymerase chain reaction (PCR) confirmed influenza A infection, compared to placebo. Secondary endpoints included the proportion of participants with CDC-defined influenza-like-illness with PCR-confirmed influenza A infection[2], and the proportion of participants with WHO-defined influenza-like-illness with PCR-confirmed influenza A infection[3]. This study enrolled ~3,000 healthy adults aged 18-64 randomized 1:1:1 into placebo, 450 mg, and 1200 mg of VIR-2482 arms. The results showed that the primary and secondary efficacy endpoints were not met. Specifically, there was a non-statistically significant reduction in influenza illness of approximately 16% at 1,200 mg using the primary endpoint. In this same group, an approximate 57% reduction in influenza A illness was observed when illness was defined according to CDC criteria. Post-hoc analyses showed that the relative risk reduction in CDC-defined criteria increases further to 65% when excluding the confirmed flu cases that occurred within a few days of dosing. VIR-2482 was generally well tolerated and no safety signals were identified. The PENINSULA trial was funded in part with federal funds from the Department of Human Services (HHS); the Administration for Strategic Preparedness (ASPR); and the BARDA, under OT number 75A50122C00081.

Efficacy Analyses

Occurrence of Influenza-Like-Illness (ILI) with PCR-Confirmed Influenza A

	# of Participants with Endpoint/ VIR-2482 vs. Placebo	Placebo N = 983 n (%)	VIR-2482 450 mg N = 981 n (%)	VIR-2482 1,200 mg N = 992 n (%)
Primary Endpoint	Number of Participants Protocol-Defined ILI[1]	25 (2.54%)	24 (2.45%)	21 (2.12%)
	Relative Risk Reduction (%)	-	3.78%	15.85%
	95% CI (%)	-	-67.23, 44.63	-49.27, 52.56
	p-value	-	0.89	0.56
Secondary Endpoints	Number of Participants with CDC-Defined ILI[2]	17 (1.73%)	15 (1.53%)	7 (0.71%)
	Relative Risk Reduction (%)	-	11.45%	57.23%
	95% CI (%)	-	-76.25, 55.51	-2.51, 82.15
	Number of Participants with WHO-Defined ILI[3]	11 (1.12%)	12 (1.22%)	6 (0.60%)
	Relative Risk Reduction (%)	-	-9.80%	44.13%
	95% CI (%)	-	-147.41, 51.27	-50.49, 79.26

Note: Percentages are calculated relative to the number of participants in the full analysis set.

[1] Protocol-defined ILI is defined as PCR-confirmed influenza A infection with at least one respiratory symptom: sore throat, cough, sputum production, wheezing, or difficulty breathing and at least one systemic symptom: fever (temperature >37.8°C), chills, weakness, or myalgias.

[2] CDC-ILI is defined as fever (temperature >37.8°C) and cough and/or sore throat.

[3] WHO-ILI is defined as fever (temperature >38°C) and cough.

We are continuing to develop next generation antibodies that we believe have the potential to have even broader applications in treating both influenza A and B.

Our Preclinical Programs

We continue to advance next-generation mAbs based on our proprietary platform and enabled by AI and machine learning to deliver high-quality drug candidates more efficiently.

We expect to file multiple investigational new drug applications (INDs) in the next 12-24 months, including:

- **VIR-1949**, an investigational therapeutic T cell vaccine based on our HCMV vector platform that is designed to treat precancerous lesions caused by human papillomavirus;
- **VIR-7229**, an investigational mAb against COVID with exceptional breadth and potency against SARS-CoV variants and related animal coronaviruses;
- **VIR-2981**, an investigational neuraminidase-targeting mAb against both influenza A and B viruses;
- **VIR-8190**, an investigational mAb with dual specificity against RSV and MPV; and
- **HIV Cure:** potential cocktail of broadly neutralizing antibodies with Fc modifications to control viral load and achieve a functional cure of HIV.

HPV: VIR-1949

HPVs cause primary infections acquired in childhood or by sexual transmission. Persistent HPV infections may result in cervical or anal dysplasia that can progress to cancer. HPV also causes head and neck and other less common cancers. Most pre-cancerous cervical and anal dysplasia and HPV-related cancers are due to HPV 16 and 18 types. Cancer is caused by the viral oncogenes, E6 and E7. Licensed vaccines are protective, but the HPV disease burden is expected to remain for decades due to pre-existing infections and poor vaccine uptake.

Building upon our CMV vectored vaccine platform, Vir's CMV-HPV vaccine candidate (VIR-1949) offers a novel approach to therapy for HPV-associated diseases because the CMV vector has the potential to stimulate high frequencies of HPV-specific CD4+ and CD8+ T cells that are predominantly effector memory T cells pre-programmed to traffic into tissues. Proof of biology studies using rhesus CMV vaccines demonstrate T cell homing to tissues, clearance of simian immunodeficiency virus and TB and long-term persistence of immunity. The CMV-HPV immunogen is a multi-component fusion protein designed for breadth against HPV 16 and 18, and other cancer causing HPV types. CMV-HPV is anticipated to generate high frequencies of HPV-specific T cells with the potential to eliminate pre-cancerous disease and limit HPV tumor progression. Notably, cervical high-grade squamous intra-epithelial lesion (HSIL) regression has been associated with a local CD8+ T cell response. The benefits of an HPV therapeutic vaccine are as an alternative to the risks of surgery for dysplasia and to improve often poor outcomes of HPV cancer.

VIR-1949 is our first oncology program that expands our pipeline beyond infectious disease into viral-associated cancer.

COVID: VIR-7229

COVID-19 continues to be a disease area with high unmet medical need and currently there are no FDA approved or authorized products for Pre-exposure Prohylaxis (PREP) for immunocompromised individuals who may not respond sufficiently to vaccines. We have leveraged our mAb platform 2.0 to develop VIR-7229, an investigational, pre-clinical COVID mAb, which was optimized using data AI structure and antibody (dAIsY™), our proprietary AI-driven design of fragment antigen binding (Fab) and FC mAb variants, to improve potency, breadth, and resistance to viral escape. In vitro data show that VIR-7229 can neutralize all historical and current variants of SARS-CoV-2 as well as related animal coronaviruses with potency compatible with intramuscular injection. Our goal for VIR-7229 is to provide a next-gen COVID mAb with exceptional breadth against future variants for prophylaxis in individuals who do not mount an adequate response to vaccines. We have validated that this potentially prophylactic mAb continues to be efficacious even as the virus evolves and is potent enough for intramuscular administration.

In September 2023, we received approximately $50 million in new BARDA funding, including $40 million in Project NextGen funding, which supports the development of VIR-7229 through Phase 1 in the context of developing alternative mAb delivery technologies.

Influenza: VIR-2981

VIR-2981, is an investigational neuraminidase-targeting mAb that has been shown in in vitro and in vivo models to neutralize both flu A and flu B, including seasonal and zoonotic strains with pandemic potential. Because it inhibits the neuraminidase enzyme – similar to flu antivirals currently used to prevent or treat influenza symptoms – VIR-2981's mechanism of action has been clinically validated. Vir-2891 is being developed as a single administration for season-long prophylaxis of influenza in individuals at risk of severe disease. The passive immunization approach planned for VIR-2981 has been effective in other acute viral respiratory diseases such as RSV and COVID-19. Compared to Vir's previous candidate for influenza A prophylaxis, Vir-2482, Vir 2981 has been shown to have higher potency in in vivo studies, in addition to extended breadth.

RSV and MPV: VIR-8190

We are identifying and refining human antibodies with antiviral activity against RSV alone and those that also have dual specificity against RSV and MPV. Both RSV and MPV cause significant medical burden in young children and individuals with a variety of immune deficits. The passive immunization concept of using antibodies to prevent respiratory viral infections, and/or reduce disease associated with infection, has been successfully demonstrated for RSV (nirsevimab) and other respiratory viruses such as COVID-19.

HIV: mAb combination (cure)

Despite recent advances in the availability of antivirals to control HIV, treatments still require frequent, if not daily administration over a lifetime. Notably, there is precedent indicating that in a subset of patients, the administration of bNAbs subsequent to antiretroviral interruption can mediate sustained suppression of HIV-1 replication. This effect may result from the elicitation of enduring HIV-specific T cell responses, offering a rationale for exploring bNAbs as a candidate for enduring HIV-1 functional cure. With the support of the Bill and Melinda Gates Foundation, we are selecting and engineering bNAbs to optimize their breadth, potency, half-life, effector functions and manufacturability. This aims to develop a unique and innovative HIV-1 therapy approach for both long-acting therapy and functional cure of HIV-1 infected individuals.

Our Technology Platforms

Our technology platforms are designed to modulate the immune system by exploiting critical observations of natural immune processes. We are using our platforms to advance our current product candidates and generate additional product candidates for multiple indications.

Platforms for the Creation of Transformative Medicines

We have purposefully assembled a portfolio of technology platforms that we believe will, individually or in combination, allow us to modulate the immune system in innovative ways and to exploit the vulnerabilities of pathogens. Our current platforms are focused on antibodies and T cells. We have assembled these platforms through internal development, collaborations and acquisitions. We are using our platforms, and continue to evaluate others, to advance our current product candidates and generate additional product candidates for multiple indications.

We follow the science to select the modality, or combination of modalities, that gives us the highest chance of success for a specific pathology in a given patient population. The diversity of our different platforms allows us to select the best modality or modalities for a given clinical need.

Antibody Platform

We have established robust methods for identifying rare antibodies with unique breadth/potency/resistance profile and development potential. We then improve on their properties with AI-enabled protein engineering. Our antibody platform capitalizes on successful immune responses occurring in (i) people who have recovered from infectious diseases or (ii) transgenic mice expressing human-IgG following immunization. In both approaches, we select rare and highly potent antibodies that can be developed to treat and prevent rapidly evolving and/or previously untreatable pathogens or to treat disorders beyond infectious diseases. We have applied this platform to identify mAbs for a range of pathogens including SARS-CoV-2, HBV, HDV, influenza A and influenza B virus, Ebola, HIV, RSV, MPV, malaria, rabies, *clostridium difficile*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Acinetobacter spp*. Examples of the power of this platform are sotrovimab, our anti-SARS-CoV-2 mAb, which has been granted Emergency Use Authorization or marketing authorization under the brand name Xevudy® in multiple regions, and Ebanga™ (ansuvimab), the anti-Ebola virus mAb identified by our scientists in collaboration with the NIH and others and marketed by Ridgeback Biotherapeutics LP. The fully-human antibodies that we discover may also be modified via our proprietary AI-driven protein engineering technology platform, dAIsY™, to enhance their therapeutic potential by further improving affinity, resistance profile, PK and/or manufacturability properties.

Overview

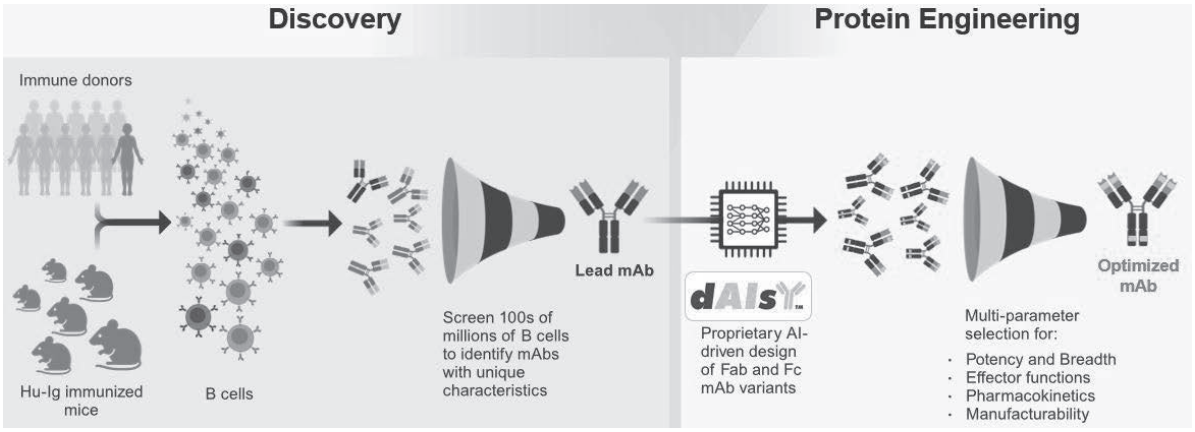
We are developing antibody-based therapies for the treatment or prevention of infections by rapidly evolving and/or previously untreatable pathogens, as well as of disorders beyond infectious diseases, for which we believe we can make an impact. mAbs rely on multiple mechanisms of action, including neutralization, killing of target cells (i.e., virus-infected cells, tumor cells, immune cells), as well as modulation of the immune response. We combine high-throughput, rapid isolation of rare, highly potent, broad-spectrum and fully human antibodies with targeted AI-enhanced engineering to increase their therapeutic potential.

We expect the following benefits from mAb candidates identified using our antibody platform:

- Effective regardless of an individual's ability to generate their own immune response;
- Diminished likelihood of self-reactivity (e.g., off-target binding) because our mAbs are fully human and purged from autoreactivity by the host immune system;
- For infectious disease mAbs, broad coverage of most or all strains of a pathogen, or even multiple pathogens and high affinity binding to conserved antigen epitopes characterized by structural/functional constraint, resulting in a high barrier to resistance from viral escape;
- Longer half-life than naturally occurring antibodies through Fc engineering;
- Potential to induce a vaccinal effect, i.e. to elicit endogenous adaptive immune response that may provide durable protection even after the mAb is no longer present;
- Antibody-mediated cell killing affects against infection and tumors; and
- Tunable potency/affinity for inhibitory or agonist properties

Sotrovimab, ansuvimab, tobevibart,VIR-2482 as well as other mAbs in early preclinical development such as VIR-7229 were generated using our antibody platform.

Our Approach



Hu-Ig = humanized immunoglobulin

We use a proprietary antibody screening technology that allows us to screen the antibodies produced from hundreds of millions of B cells derived from survivors of an infection or from human-Ig immunized mice to identify those rare mAbs that have the characteristics needed to create an effective medicine. Rare characteristics include, for example, the ability to bind to a highly conserved antigen within a pathogen, to neutralize multiple different pathogens or to selectively bind host target proteins. We refer to this technology as High Throughput Isolation since we are able to screen hundreds of millions of B cells to find rare antibodies in just a few weeks.

After identification of top mAb development candidates, our proprietary AI-driven protein engineering technology, dAIsY™, is used to generate libraries of mAb variants which are further screened using functional assays, as well as screened for favorable pharmacokinetic and manufacturability properties. Top mAb variants may be recombined as the basis for new libraries, in iterative cycles to identify the lead antibody sequence.

Precision Antibody Engineering to Create the Best Medicines

Our strategy is to optimize both the Fab and Fc domains of mAbs using our proprietary AI-driven engineering approach to generate the best medicine to treat or prevent a broad range of infectious and non-infectious diseases. Once we isolate a rare, fully human antibody via High Throughput Isolation, we then engineer the Fab and Fc domains, to enhance expected efficacy, potency and manufacturability. The Fab portion binds to the target antigen of interest. The Fc portion binds to effector proteins and cells in the body to engage the immune system in killing and clearing targeted cells.

Fab engineering is performed to further increase mAb potency and breadth of coverage. MAb potency and breadth depend on the epitope targeted, affinity of binding and valency. In some cases, it may be valuable to create mAbs that bind to more than one epitope, so-called “multi-specific” mAbs, by engineering the Fab region using a wide range of proprietary and non-proprietary formats.

Effector functions can be enhanced or reduced via Fc mutations that alter the binding affinity of the Fc domain of a mAb to the various FcRs, based on a detailed understanding of the role of individual FcRs in immunity. Fc engineering selects and optimizes the specific ways in which mAbs engage FcRs, which in turn govern properties such as the half-life of the antibody as well as “effector functions,” i.e. the way that the immune system is recruited by the mAb to fight infection or kill other target cells. The Fc engineering of our mAbs fine tune the interactions with activating and inhibiting FcRs, which are differentially expressed on immune cells, and takes into account the FcgR polymorphisms in the human population, to generate mAbs tailored for specific indications.

Examples of immunity that can be altered via Fc engineering include the recruitment of serum proteins to infected areas, phagocytosis and destruction of viruses and viral particles, the killing of target cells through a process known as ADCC and the presentation of antigens to elicit potentially long-lasting B and T cell immunity.

Antibodies as T Cell Vaccines

We are using Fc engineering to create antibodies that are designed to not only directly treat or prevent infection but also to elicit an effective adaptive immune response against chronic viral infections, such as HBV or HIV. We refer to this property as a vaccinal effect, i.e., eliciting continued protection even after the mAb is no longer present. This technology benefits from the fact that FcRs on specialized antigen-presenting cells, which are called dendritic cells, or DCs, internalize complexes of antibody and antigen. Our strategy leverages the observation that different FcRs on antigen presenting cells can bind differentially to the Fc portion of the mAb. By engineering the Fc region, we can therefore select which FcRs preferentially interact with the antibody-antigen complex to generate activated DCs that we believe can mediate an effective and durable T cell immunity.

Specific vaccinal mutations in the Fc domain can enhance immune responses to a pathogen in two ways. First, the mAb can deliver increased amounts of antigen to DCs. Second, FcRs deliver signals that activate DCs. In turn, activated DCs can stimulate T cells specific to the delivered antigen, resulting in T cell immunity. In this way, an antibody with vaccinal Fc mutations can potentially actively immunize infected patients. The in vivo data supporting enhancement of the vaccinal effect through Fc mutants has been demonstrated by others, e.g. in a CD20 positive tumor model, using mice with humanized Fc receptors. In this experiment, anti-CD20 mAbs and CD20 tumor cells were administered to mice months before being later rechallenged with a lethal dose of CD20 tumor cells. Most of the mice (80%) who received a mAb with Fc mutants that enhanced binding to activating FcRs IIa and IIIa survived. Conversely, 70% or more mice who received a mAb without the enhancing Fc mutations died. This durable protection is believed to be the result of the induction of a protective T-cell response. We have also generated similarly compelling animal data in the context of influenza infection, in which vaccinal antibodies induced CD8 T cell responses. We are testing this technology in chronic HBV infection with tobevibart, and if it performs as expected at mediating HBV functional cure, we believe the technology could be used similarly with other mAbs to control other chronic infections, including HIV.

T Cell-Based Viral Vector Platform

We are exploiting the unique immunology of HCMV, a commonly occurring virus in humans, as a vaccine vector to potentially prevent and treat infection by pathogens refractory to current vaccine technologies. HCMV infects a large proportion of the human population and causes a life-long asymptomatic infection that typically causes no harm. This is due to millions of years of co-evolution between the virus and host in which the virus evades sterilizing immunity using specialized viral genes, while at the same time allowing the generation of certain T cell responses that prevent HCMV infection from becoming lethal.

Overview

We have modified the HCMV genome to express proteins from HIV and HPV. This approach is based on fundamental observations made in NHPs, with vaccine vectors made from rhesus cytomegalovirus, or RhCMV. HCMV is the most potent known inducer of T cell responses of any human virus and may induce potent and long-lasting T cell responses to a broader range of epitopes than observed for other viral vaccines. In addition, we can make proprietary modifications in the HCMV genome that we expect will elicit different types of pathogen-appropriate T cell responses. We term this approach “immune programming.” We believe this platform may also have applicability beyond infectious diseases, potentially to cancers that can be controlled by T cells that recognize tumor antigens.

We expect the following benefits from using HCMV as a platform:

- Highly potent and long-lived T cell responses throughout the body, targeting the antigens of interest;
- Induction of high numbers of specialized T cells, known as effector memory cells, that are present in tissues and allow control of infection in the first few days;
- Immune responses to three- to four-fold more antigenic epitopes in a target protein than other viral vectors;
- Programmable T cell responses allowing selection of the type of T cells elicited;
- Opportunity for repeated vaccination using the same backbone HCMV vector against different infections;
- Opportunity to use the same HCMV vector to protect against or treat multiple pathogens; and
- Potential to induce responses even to proteins that the host is tolerant of, such as self-proteins expressed in a tumor.

VIR-1111, VIR-1388 and VIR-1949 were generated using our T cell platform.

Our Approach

We believe that the type of T cell response elicited by an HCMV-based vaccine vector can be selected by mutating certain genes in HCMV. We term this approach "immune programming." We believe that immune programming is critical to combating infections such as HIV and TB that have proven intractable, to date, for other vaccine technologies.

The unique immunology of HCMV depends on the virus's ability to elicit high frequencies of memory T cells, especially tissue-trafficking T cells and to regulate the normal immune processes of antigen presentation by major histocompatibility complex, or MHC proteins. The MHC proteins, class I, class II and MHC-E (called HLA proteins in humans) bind small peptide fragments on the surfaces of antigen presenting cells that are detected by T cells. HCMV contains multiple genes that regulate many of the steps in antigen presenting cells that elicit T cell immunity by altering antigen presenting cell biology, the types of antigen presenting cells infected by the viral vaccine and the mechanisms responsible for the ability of a T cell to recognize antigens together with MHC molecules. Through manipulation of the HCMV genome, we believe we can program different types of pathogen-appropriate T cell responses.

Immune programming and protection from lethal challenge were observed in NHPs vaccinated with RhCMV vectors against SIV and TB. An RhCMV vaccine with genome changes favoring T cell detection of peptide fragments bound by MHC-E protected more than half of NHPs from infection when challenged with a highly virulent form of SIV, whereas all animals in the control group became infected. RhCMV vaccines manipulated to generate T cells that detected peptides bound to MHC-I were not protective, demonstrating the potential value of a programmable T cell vaccine platform. Protection has also been observed against TB in preclinical studies of NHPs after immunization with either of two RhCMV vaccines. Modifications to one of the protective vaccines elicited T cells that recognized peptides plus MHC-II and MHC-E responses, while the other was programmed to elicit a T cell response against peptides attached to MHC-I. This shows the potential significance of being able to specifically program a vaccine to elicit T cells that will be most effective against a given infection, as the programming of a vaccine to protect against SIV can be different from the programming of a vaccine to protect against TB. These preclinical data supported our use of the HCMV T cell platform to vaccinate against HIV and TB.

The Bill & Melinda Gates Foundation is providing funds for the process development and manufacturing and early clinical development of our HIV vaccine program.

MHC-E as a Near-Universal Target for Medicines that Leverage T Cell Receptors

T cells need to be able to recognize a highly diverse set of pathogen proteins to be effective. This diversity comes from the use of multiple different host immune response major histocompatibility complex (MHC) proteins to present foreign antigens to T cells. The genes for HLA class I and to a lesser extent the HLA class II are highly variable between individuals, while HLA-E genes are less variable between individuals. The immune response MHC genes that are highly variable between individuals are responsible for eliciting most T cell responses. These MHC molecules enable T cells to recognize foreign proteins through the use of a specific T cell receptor (TCR) on the T cell surface. The programmed T cell responses elicited by HCMV vectors with certain gene modifications are predicted to use MHC -E, which may have advantages when MHC class I proteins have been blocked on infected cells and tumors. T cells with TCRs recognizing antigenic peptides together with MHC-E may be functional when typical T cell responses are not functional and potentially allow for the generation of universal TCR-based medicines beyond vaccines, such as off-the-shelf cancer T cell therapy.

Our Collaboration, License and Grant Agreements

Collaboration Agreements with GSK

2020 Collaboration Agreement with GSK

In June 2020, we entered into a definitive collaboration agreement with GSK, or the 2020 GSK Agreement, pursuant to which we agreed to collaborate to research, develop and commercialize products for the prevention, treatment and prophylaxis of diseases caused by SARS-CoV-2, the virus that causes COVID-19, and potentially other coronaviruses. The collaboration initially focused on the development and commercialization of three types of collaboration products under three programs: (1) antibodies targeting SARS-CoV-2, and potentially other coronaviruses, or the Antibody Program; (2) vaccines targeting SARS-CoV-2, and potentially other coronaviruses, or the Vaccine Program, and (3) products based on genome-wide CRISPR screening of host targets expressed in connection with exposure to SARS-CoV-2, and potentially other coronaviruses, or the Functional Genomics Program. The initial antibodies under the Antibody Program are sotrovimab and VIR-7832.

The original 2020 GSK Agreement contained the following key terms. For a period of four years beginning April 2020, the parties agreed to conduct certain research and development activities under mutually agreed development plans and associated budgets for each of the three programs, and under the oversight of a joint steering committee, or JSC. During such period, generally, subject to certain rights granted to WuXi Biologics (Hong Kong) Limited, or WuXi Biologics, under then existing agreements between us and WuXi Biologics, the parties would have an exclusive research collaboration with respect to antibody products directed to SARS-CoV-2 or to any other coronavirus, and in connection with functional genomics CRISPR screens for drug discovery and development in connection with SARS-CoV-2 or other coronaviruses. We are primarily responsible for the development and clinical manufacturing activities for the Antibody Program, and for conducting the initial development activities directed to a vaccine in the Vaccine Program. GSK is primarily responsible for the commercialization activities for the Antibody Program (except in connection with sales of antibody products licensed to WuXi Biologics in mainland China, Hong Kong, Macau and Taiwan), the later-stage development, manufacturing and commercialization activities for the Vaccine Program and the development, manufacturing and commercialization activities for the Functional Genomics Program. We and GSK are required to use commercially reasonable efforts to conduct the activities assigned to each party under each development plan and to seek and obtain regulatory approval for collaboration products that arise from such activities in the United States and specified major markets. Subject to an opt-out mechanism, we and GSK share all development costs, manufacturing costs and costs and expenses for the commercialization of the collaboration products, with us bearing 72.5% of such costs for the antibody products, 27.5% of such costs for the vaccine products, and we and GSK sharing equally all such costs for the functional genomics products, and all profits will be shared in the same ratios. If we and GSK elect to conduct a technology transfer of manufacturing technology under our agreement with WuXi Biologics (as further described below), we will bear 72.5% of the costs related to such manufacturing technology transfer and for commercial manufacturing of the antibody products under such agreement with WuXi Biologics, and GSK will bear 27.5% of such costs. The parties will also share the committed costs for the reservation of manufacturing capacity for the drug substance for antibody products in the foregoing ratio under our agreement with Samsung Biologics as well as such costs relating to committed manufacturing capacity for antibody products as are approved by the JSC from time to time.

On a collaboration product-by-collaboration product basis, each party has the one-time right, at specified points in development, to opt out of its co-funding obligations, and the other party may, at its election, either pursue such program unilaterally, or also cease research and development activities and funding of such collaboration product. If the opt-out provisions are not exercised by either party subject to the terms of the 2020 GSK Agreement, the parties share all profits and losses arising from any collaboration product in the same ratios in which the parties bore development costs for such collaboration program. For each collaboration product as to which a party exercises its opt-out right, the commercializing party pays to the opt-out party royalties on net sales of the applicable collaboration product at rates based on factors such as the stage of development of such collaboration product at the time the opt-out party exercises such right, and whether the opt-out party is the lead party, or a portion of the sublicense revenue if the commercializing party chooses to sublicense or otherwise divest rights to such collaboration product. On an antibody product-by-antibody product basis, we have a co-promotion right for such antibody product in the United States, under which we have the right to perform up to 20% of details in connection with such antibody product. GSK will lead commercialization and book all sales and is required to use commercially reasonable efforts to commercialize each collaboration product following regulatory approval in the United States and specified major markets. This definitive agreement superseded and replaced the April 2020 preliminary agreement with GSK. In connection with the 2020 GSK Agreement, we also entered into a stock purchase agreement in April 2020, pursuant to which we issued 6,626,027 shares of our common stock to Glaxo Group Limited, or GGL, an affiliate of GSK, at a price per share of $37.73, for an aggregate purchase price of approximately $250.0 million.

The 2020 GSK Agreement as amended will remain in effect with respect to each collaboration program for as long as there is a collaboration product being developed or commercialized by the lead party, or the non-opt-out party, in such program. Either party has the right to terminate the 2020 GSK Agreement in the case of the insolvency of the other party, an uncured material breach of the other party with respect to a collaboration program or collaboration product, or as mutually agreed by the parties.

In December 2021, Beecham S.A. assigned and transferred all its rights, title, interest, and benefit in the 2020 GSK Agreement to GlaxoSmithKline Biologicals S.A., including all its rights to bring claims under such agreement.

On May 27, 2022, we entered into Amendment No. 1 to the 2020 GSK Agreement, or Amendment No. 1. Pursuant to Amendment No. 1, we and GSK acknowledged that the antibody products that had been licensed to WuXi Biologics in mainland China, Hong Kong, Macau and Taiwan and had reverted to us pursuant to the Termination Agreement (described below) and agreed with GSK that they are now included in and governed by the 2020 GSK Agreement, subject to certain amendments relating to sotrovimab.

Under the terms of Amendment No. 1, GSK has the sole right to develop (including to seek, obtain or maintain regulatory approvals), manufacture and commercialize sotrovimab in and for mainland China, Hong Kong, Macau and Taiwan at GSK's sole cost and expense (other than certain payments for which we remain responsible under certain of our existing agreements with third parties). GSK paid us a one-time upfront payment of $7.0 million in consideration for the rights and licenses granted to GSK under Amendment No. 1. In addition, GSK will be obligated to pay us tiered royalties on net sales of sotrovimab in mainland China, Hong Kong, Macau and Taiwan in percentages ranging from the high teens to the low thirties. Such royalties are payable to us during the term of the 2020 GSK Agreement applicable to the Antibody Program.

On February 8, 2023, we and GSK entered into Amendment No. 2 and Amendment No. 3 to the 2020 GSK Agreement. Pursuant to Amendment No. 2 to the 2020 GSK Agreement, effective as of March 31, 2022, or the Effective Date, we and GSK agreed to remove the Vaccine Program from the 2020 GSK Agreement, and to wind down and terminate the cost-sharing arrangements and all ongoing activities in relation to the Vaccine Program. As of the Effective Date, the Vaccine Program had not yet advanced to its predefined development candidate stage. We retain the right to progress development of vaccine products directed to SARS-CoV-2 and other coronaviruses independently (including with or for third parties) outside the scope of the 2020 GSK Agreement, subject to the payment of tiered royalties to GSK on net sales of any vaccine products covered by certain GSK intellectual property rights in the low single digits, subject to certain deductions in certain circumstances. Pursuant to Amendment No. 3 to the 2020 GSK Agreement, we and GSK agreed to modify the Antibody Program to remove from the collaboration all coronavirus antibodies other than sotrovimab and VIR-7832, and certain variants thereof. Sotrovimab and VIR-7832, and certain variants thereof, remain subject to the terms of the 2020 GSK Agreement, and we retain the sole right to progress the development and commercialization of the terminated antibody products independently (including with or for third parties), subject to the payment of tiered royalties to GSK on net sales of such terminated antibody products at percentages ranging from the very low single digits to the mid-single digits, depending on the nature of the antibody product being commercialized, and subject to certain deductions in certain circumstances.

2021 Expanded GSK Collaboration

In May 2021, we entered into the 2021 GSK Agreement under which the parties agreed to expand the 2020 GSK Agreement, to include collaboration on three separate programs: (1) a program to research, develop and commercialize mAbs for the prevention, treatment or prophylaxis of the influenza virus, or the Influenza Program, excluding VIR-2482 unless GSK exercises its exclusive option (the VIR-2482 Option) to co-develop and commercialize after the Company completes a Phase 2 clinical trial; (2) an expansion of the parties' current Functional Genomics Program to focus on functional genomics screens directed to targets associated with respiratory viruses, or the Expanded Functional Genomics Program; and (3) additional programs to develop neutralizing mAbs directed to up to three non-influenza target pathogens selected by GSK, or the Selected Pathogens, and such programs, or the Additional Programs.

In connection with the 2021 GSK Agreement, we entered into a stock purchase agreement with GGL pursuant to which we issued 1,924,927 shares of our common stock to GGL for an aggregate purchase price of approximately $120.0 million. The 2021 GSK Agreement superseded and replaced the preliminary agreement entered into with GSK in February 2021, or the 2021 Preliminary Agreement.

On February 21, 2024, the Company and GSK entered into a letter agreement (the "Letter Agreement") pursuant to which the Company and GSK agreed to remove the Influenza Program from the 2021 GSK Agreement and to wind down and terminate the cost-sharing arrangements and all ongoing activities in relation to the Influenza Program. As of the effective date of the Letter Agreement, GSK had not exercised the VIR-2482 Option.

As it relates to the Expanded Functional Genomics Program and Additional Programs, for a period of three years following the effective date of the 2021 GSK Agreement, or the Research Term, the parties will conduct certain research and development activities under mutually agreed development plans and associated budgets for the programs within the expanded collaboration. Subject to certain exceptions, we will exclusively collaborate with respect to (a) functional genomic screens for targets associated with respiratory viruses during the Research Term, and compounds or products developed through the Expanded Functional Genomics Program directed to a collaboration target for five years following the target selection (unless either party elects to opt-out earlier), and (b) products directed to Selected Pathogens during the Research Term, which ends in 2024.

We will mutually agree upon the allocation of responsibility for the development of products under the Expanded Functional Genomics Program, and for the development and early-stage manufacturing of products under the Additional Programs if and when GSK decides which Selected Pathogens to pursue. GSK will be primarily responsible for commercial manufacturing and commercialization activities for products under the Expanded Functional Genomics Program and Additional Programs, if and when selected by GSK. For each collaboration program, upon execution of the definitive agreement, we will grant GSK certain license rights related to the development, manufacturing and commercialization of products arising from the program.

The parties will share 50% of all development costs in accordance with the budget for each of the collaboration programs, with each party having the right (on a target-by-target, or collaboration product-by-collaboration product basis, as applicable) to opt-out of its co-funding obligations at specified points in development. In such case, the party continuing with the program will pay to the opt-out party a royalty on net sales of products arising from such program at specified rates based on the stage of development at which the opt-out is exercised. Following the exercise of an opt-out right by a party the other party may, at its election, either pursue development and commercialization of such product or program unilaterally, or also cease the conduct and funding of such collaboration product or program. In the absence of any opt-out, the parties will also share 50% of all profits and losses arising from any collaboration product. Each party is required to use commercially reasonable efforts to conduct the activities assigned to it under each development plan and, where applicable, to seek and obtain regulatory approval for collaboration products that arise from such activities in the United States and specified major markets. GSK will lead commercialization and book all sales, and is required to use commercially reasonable efforts to commercialize each collaboration product following regulatory approval in the United States and specified major markets.

GSK made an upfront payment to us of $225.0 million, 50% became payable at the effective date of the 2021 Preliminary Agreement and 50% of became payable following the execution of the 2021 GSK Agreement.

In September 2022, GSK exercised its first Selected Pathogen Right, selecting RSV as its first pathogen under the Additional Programs of the 2021 GSK Agreement. GSK agreed to retroactively share the research and development costs that we had incurred under its RSV program since April 2022 in accordance with the applicable provisions of the 2021 GSK Agreement. GSK can select up to two additional non-influenza target pathogens prior to March 25, 2024.

With respect to each Additional Program, unless earlier terminated, the 2021 GSK Agreement will remain in effect for as long as there is a product from such collaboration program being developed or commercialized by the lead party in the collaboration program or by the non-opt-out party, if applicable. With respect to the Expanded Functional Genomics Program, unless earlier terminated, the 2021 GSK Agreement will remain in effect (a) until the end of the Research Term, if no targets are selected for the Expanded Functional Genomics Program prior to the end of the Research Term, or (b) if at least one target is selected for the Expanded Functional Genomics Program prior to the end of the Research Term, for as long as there is a product from the Expanded Functional Genomics Program being developed or commercialized by the lead party in the Expanded Functional Genomics Program or by the non-opt-out party, if applicable. Either party has the right to terminate the 2021 GSK Agreement in the case of the insolvency of the other party, an uncured material breach of the other party with respect to a collaboration program or a collaboration product, or as mutually agreed by the parties.

Collaboration and License Agreement with Alnylam

In October 2017, we entered into a collaboration and license agreement with Alnylam, or the Alnylam Agreement, for the development of siRNA products for the treatment of HBV and following the exercise of certain program options, the development and commercialization of siRNA products directed to up to four other infectious disease targets selected by us. The technology licensed under the Alnylam Agreement forms the basis of our siRNA technology platform.

Pursuant to the Alnylam Agreement, we obtained a worldwide, exclusive license to develop, manufacture and commercialize the HBV siRNA product candidates, including elebsiran, for all uses and purposes other than agricultural, horticultural, forestry, aquaculture and other residential applications, such excluded fields, the Excluded Fields. In addition, Alnylam granted us an exclusive option, for each of the infectious disease siRNA programs directed to our selected targets, to obtain a worldwide, exclusive license to develop, manufacture and commercialize siRNA products directed to the target of each such program for all uses and purposes other than the Excluded Fields. Our options are each exercisable during a specified period following selection of candidates for each program, or two years following the initiation of certain activities under an agreed-upon development plan, if earlier. On a product-by-product basis for each product arising from the HBV and, following our option exercise, the infectious disease programs, Alnylam has an exclusive option, exercisable during a specified period for each such product, to negotiate and enter into a profit-sharing agreement for such product.

We and Alnylam were jointly responsible for funding the initial research and development activities for elebsiran through completion of proof of concept trials. Prior to the exercise of our option for each siRNA program directed to one of our selected infectious disease targets, Alnylam is responsible for conducting all development activities, at our expense, in accordance with an agreed-upon development plan. Following our exercise of an option for a program and payment of the program option exercise fee and any outstanding program costs due to Alnylam, we are solely responsible, at our expense, for conducting all development, manufacture and commercialization activities for products arising from each such program unless Alnylam exercises its profit-sharing option. We are required to use commercially reasonable efforts to develop and commercialize one siRNA product directed to HBV and one siRNA product directed to the target of each other infectious disease program for which we exercise our option, in each of the major markets. If Alnylam exercises a profit-sharing option for a product, such as elebsiran, we will negotiate the terms of such profit-sharing agreement.

We retain final decision-making authority with respect to which infectious disease product candidates we advance and the development programs for the HBV and infectious disease product candidates, subject to certain limitations. During the term of the Alnylam Agreement, neither we nor Alnylam may develop or commercialize any gene-silencing, oligonucleotide-based product directed to the same target as any product candidate under the Alnylam Agreement, other than pursuant to the Alnylam Agreement, subject to certain exceptions.

Pursuant to the Alnylam Agreement, we paid Alnylam an upfront fee of $10.0 million and issued to Alnylam 1,111,111 shares of our common stock. Upon the achievement of a certain development milestone, as further discussed below, we were obligated to issue shares of our common stock equal to the lesser of (i) 1,111,111 shares or (ii) a certain number of shares based on our stock price at the time such milestone was achieved. We will be required to pay Alnylam up to $190.0 million in the aggregate for the achievement of specified development and regulatory milestones by the first siRNA product directed to HBV, and up to $115.0 million for the achievement of specified development and regulatory milestones for the first product directed to the target of each infectious disease siRNA program for which we exercised our option. Following commercialization, we will be required to pay to Alnylam up to $250.0 million in the aggregate for the achievement of specified levels of net sales by siRNA products directed to HBV and up to $100.0 million for the achievement of specified levels of net sales by products directed to the target of each infectious disease siRNA program for which we exercised our option. We will also be required to pay Alnylam tiered royalties at percentages ranging from the low double-digits to mid-teens on annual net sales of HBV products, and tiered royalties at percentages ranging from the high single-digits to the sub-teen double-digits on annual net sales of licensed infectious disease products, in each case subject to specified reductions and offsets. The royalties are payable on a product-by-product and country-by-country basis until the later of the expiration of all valid claims of specified patents covering such product in such country and 10 years after the first commercial sale of such product in such country. Alnylam is also entitled to receive a portion of any consideration we receive as a result of granting a sublicense under the licenses granted to us by Alnylam under the Alnylam Agreement or an option to acquire such a sublicense, determined based on the timing of the grant of such sublicense. In November 2018, in connection with the inclusion of the HBV siRNA program as the subject of a potential grant of a sublicense to Brii Bio under the Brii Agreement, as defined under the section titled “Collaboration, Option and License Agreement with Brii Bio,” which triggered certain payment obligations under the Alnylam Agreement, we entered into a letter agreement with Alnylam, or the Alnylam Letter, making certain modifications to the payments due to Alnylam as a result of the grant of the option and potential payments that would result from Brii Bio’s exercise of rights under such sublicense. As a result of the rights granted under the Brii Agreement and pursuant to the Alnylam Letter, in February 2020 we transferred to Alnylam a specified percentage of the equity consideration allocable to the HBV siRNA program that we received from Brii Bio and its affiliated companies in connection with the entry into the Brii Agreement.

The term of the Alnylam Agreement will continue, on a product-by-product and country-by-country basis, until expiration of all royalty payment obligations under the Alnylam Agreement. If we do not exercise our option for an infectious disease program directed to one of our selected targets, the Alnylam Agreement will expire upon the expiration of the applicable option period with respect to such program. However, if Alnylam exercises its profit-sharing option for any product, the term of the Alnylam Agreement will continue until the expiration of the profit-sharing arrangement for such product. We may terminate the Alnylam Agreement on a program-by-program basis or in its entirety for any reason on 90 days’ written notice. Either party may terminate the agreement for cause for the other party’s uncured material breach on 60 days’ written notice (or 30 days’ notice for payment breach), or if the other party challenges the validity or enforceability of any patent licensed to it under the Alnylam Agreement on 30 days’ notice.

In March 2020, we achieved one of the specified development milestones relating to elebsiran pursuant to the Alnylam Agreement, as amended. As such, we paid Alnylam $15.0 million in April 2020, and issued Alnylam 1,111,111 shares of our common stock in May 2020.

In March and April 2020, we entered into two further amendments to the Alnylam Agreement, or the Amended Alnylam Agreement, to expand our existing collaboration to include the development and commercialization of siRNA products targeting SARS-CoV-2 and potentially other coronaviruses, and up to three targeting human host factors for SARS-CoV-2, or collectively, the COVID Collaboration Targets.

In December 2020, we and Alnylam entered into a letter amendment, or the Letter Agreement, further amending the Amended Alnylam Agreement to modify certain funding and governance provisions in connection with the siRNA products directed to the COVID Collaboration Targets, including VIR-2703, or the COV Target, and to modify certain rights of each party with respect to products arising from such programs. Pursuant to the Letter Agreement, Alnylam was responsible for conducting pre-clinical research activities set forth in the existing workplan for the COV Target, or the COV Workplan, at its discretion and sole expense, and we were no longer obligated to reimburse Alnylam for any share of costs incurred by Alnylam in conducting activities under the COV Workplan after July 1, 2020. In July 2021, Alnylam elected to discontinue the development of the COV Target, and all other related research and development activities in accordance with their rights under the Letter Agreement. As a result, the COV Target and the siRNA program related thereto are no longer included within the Amended Alnylam Agreement and all rights to the siRNA program directed to the COV Target reverted to Alnylam.

License Agreements with MedImmune

2012 Sub-License and Collaboration Agreement with MedImmune

In March 2012, our subsidiary Humabs entered into a sub-license and collaboration agreement with MedImmune, LLC, or MedImmune, as amended, or the 2012 MedImmune Agreement, pursuant to which Humabs conducted certain activities under a mutually agreed research plan for the development of therapeutic antibodies directed to influenza viruses (including influenza A and influenza B) and to Klebsiella bacteria. The 2012 MedImmune Agreement was amended in April 2013, April 2015, December 2015, August 2016, July 2017, and September 2018 to designate Klebsiella as an extra target, to extend the term of the research program and provide for related payments, and to incorporate certain research activities funded by MedImmune under a specified government grant. Under the 2012 MedImmune Agreement, as amended, MedImmune obtained a worldwide exclusive license from Humabs to develop and commercialize products directed to such targets for all uses in humans and animals except for active vaccination.

In consideration for the grant of the license, MedImmune made certain upfront payments to Humabs. MedImmune is obligated to pay Humabs development, regulatory and commercial milestone payments of up to $96.5 million in the aggregate for the first product directed to influenza viruses to achieve the applicable milestones, and up to $12.0 million for the first product directed to Klebsiella to achieve the applicable milestones. MedImmune will also be obligated to pay royalties based on net sales of products directed to influenza viruses or Klebsiella at certain fixed percentages in the low to mid-single-digits, with the rate determined based on the specific target to which the product is directed, in each case subject to specified reductions and a royalty floor. The royalties are payable, on a product-by-product and country-by-country basis, until the later of the last to expire valid claim that would, but for the licenses granted under the 2012 MedImmune Agreement, be infringed by the sale of such product in such country, and 10 years from the first commercial sale of the first product in such country. MedImmune also made certain payments to Humabs in consideration for Humabs' conduct of the research program. We will be obligated to pass through the milestone payments and royalty payments that we receive under the 2012 MedImmune Agreement, following deduction of certain expenses incurred by us or Humabs thereunder, to Humabs' securities holders pursuant to the Humabs SPA, as defined under the section titled "—Securities Purchase Agreement with Humabs."

The 2012 MedImmune Agreement will remain in force until MedImmune has fulfilled all of its obligations to make milestone and royalty payments. MedImmune may terminate the 2012 MedImmune Agreement in its entirety, or on a product-by-product, license-by-license or country-by-country basis, for convenience, upon 90 days' notice. Either MedImmune or Humabs may terminate the 2012 MedImmune Agreement for the other party's uncured material breach or in the event of bankruptcy of the other party.

2018 License Agreement with MedImmune

In September 2018, we entered into a license agreement with MedImmune, or the 2018 MedImmune Agreement, pursuant to which we obtained a worldwide, exclusive license to develop and commercialize half-life extended versions of two specified antibodies under development by MedImmune that target influenza A and influenza B, respectively, for all uses in humans and animals. The license from MedImmune includes the grant of a sublicense under MedImmune's license to certain intellectual property controlled by Humabs that was granted to MedImmune pursuant to the 2012 MedImmune Agreement.

Under certain circumstances and during certain periods of time we have the right to nominate up to two variants of each of these antibodies for inclusion under the license. MedImmune retained the rights to continue to develop and to commercialize the two specified antibodies that target influenza A and influenza B, in each case that are not the half-life extended versions that are licensed to us. Additionally, we obtained a worldwide, exclusive license under MedImmune's antibody half-life extension technology to develop and commercialize half-life extended antibodies directed to up to two additional targets selected by us for all uses in humans or animals for the prevention, treatment or diagnosis of infectious diseases and had the right to nominate such additional targets during a specified period following the effective date of the 2018 MedImmune Agreement. We are solely responsible, at our sole cost, for the development of products containing half-life extended versions of antibodies directed to the influenza targets and any additional selected targets, and are obligated to use commercially reasonable efforts to develop and obtain regulatory approval for at least one product containing half-life extended versions of antibodies directed to each of influenza A, influenza B and any additional targets, if applicable, in the United States and specified markets in Europe and Asia. We are also obligated to use commercially reasonable efforts to commercialize products containing half-life extended versions of antibodies directed to such targets in such markets. .

In consideration for the grant of the licenses under the 2018 MedImmune Agreement, we made an upfront payment to MedImmune of $10.0 million. We will be obligated to make development and regulatory milestone payments to MedImmune of up to $92.0 million, of which $5.0 million was paid in the third quarter of 2019, in the aggregate for products containing half-life extended versions of antibodies directed to influenza A that we licensed, up to an additional $39.2 million in the aggregate for such products directed to influenza B that we licensed, and up to $250,000 in the aggregate for certain specified products directed to the additional selected targets, if applicable. We will also be required to make sales-related milestone payments to MedImmune following commercialization up to an aggregate of $200.0 million for the achievement of specified levels of aggregate annual net sales of products containing half-life extended versions of antibodies directed to influenza A and/or influenza B. MedImmune will also be entitled to receive tiered royalties based on net sales of products containing half-life extended versions of antibodies directed to influenza A and/or influenza B at percentages ranging from the mid-single-digits to sub-teen double-digits and a royalty based on net sales of products containing half-life extended versions of antibodies directed to any additional selected targets, if applicable, at a percentage in the low single-digits, in each case subject to specified reductions. These royalties are payable, on a product-by-product and country-by-country basis, until the latest to occur of expiration of the last to expire valid claim covering such product in such country, expiration of regulatory exclusivity for such product in such country, and 12 years after the first commercial sale of such product in such country. Additionally, we are responsible for paying any royalties due under the 2012 MedImmune Agreement as a result of our commercialization of products under the 2018 MedImmune Agreement.

The 2018 MedImmune Agreement will remain in force until the expiration on a country-by-country and product-by-product basis of all of our obligations to pay royalties to MedImmune. We may terminate the 2018 MedImmune Agreement in its entirety or on a product-by-product basis, for convenience, upon 120 days' notice. Either party may terminate the 2018 MedImmune Agreement for cause for the other party's uncured material breach on 60 days' notice or immediately in the event of bankruptcy of the other party. Additionally, MedImmune may terminate the 2018 MedImmune Agreement for cause on 30 days' written notice if we challenge the validity or enforceability of the patents to which we have obtained a license under the 2018 MedImmune Agreement.

Master Exclusive License Agreement with OHSU

In June 2012, our subsidiary TomegaVax, Inc., or TomegaVax, entered into a master exclusive license agreement, or the OHSU Agreement, with Oregon Health & Science University, or OHSU. The OHSU Agreement was revised and restated in August 2014 and again in August 2019, at which time we assumed TomegaVax's rights and obligations as licensee under the OHSU Agreement. Under the OHSU Agreement, we obtained a worldwide exclusive license under certain patent rights and a non-exclusive license under certain know-how to make, have made, use, offer to sell, sell, have sold and import certain products relating to CMV vectors in all fields of use. The OHSU Agreement provides for us to include within the license grant additional patent or know-how rights covering certain inventions arising at OHSU and relating to the use of CMV vaccine vectors through the execution of technology addenda, each such addendum, a Technology Addendum. Each Technology Addendum relates to one or more invention disclosures and their corresponding patent family or know-how rights. During the term of the OHSU Agreement to date, we have entered into 17 such Technology Addenda. We must use reasonably diligent efforts to develop and commercialize the CMV vector products consistent with its reasonable business practices and judgment, including by achieving certain specified development and regulatory milestones within certain periods. We use technology licensed under the OHSU Agreement in our T cell platform and in our product candidate VIR-1111.

Pursuant to the initial entry into the OHSU Agreement and certain of the Technology Addenda, TomegaVax issued a specified percentage of its then outstanding common stock to OHSU, which was subsequently exchanged for shares of our common stock as a result of our acquisition of TomegaVax in September 2016. In connection with the second revision and restatement of the OHSU Agreement in August 2019, we issued an additional specified number of shares of our common stock to OHSU. We are obligated to pay OHSU up to $1.3 million upon the achievement of certain development and regulatory milestones for each CMV vector product, and up to $2.0 million upon the achievement of certain aggregate annual net sales milestones for all CMV vector products. We will also be required to pay OHSU a royalty in the low single-digits on net sales of licensed products on a product-by-product basis, subject to specified reductions and offsets, and specified minimum annual royalty payments. The royalties are payable, on a product-by-product and country-by-country basis, until the later of (a) the expiration of all valid claims in the licensed patents covering such product in the country of sale or country of manufacture, as applicable, and (b) 10 years after the first commercial sale of such product in the country of sale. OHSU is also entitled to receive a specified percentage of any consideration received by us as a result of the grant of a sublicense under the rights granted under the OHSU Agreement, with the applicable percentage based on the development stage of the applicable program at the time of the grant of the sublicense.

The OHSU Agreement will remain in force until the expiration of all licensed patent rights or 10 years after the effective date of the last Technology Addendum, whichever is the later. Each individual Technology Addendum remains in force until the expiration of the patent rights to which it applies, or 10 years after the effective date of such Technology Addendum, whichever is later. Either party may terminate the OHSU Agreement, or any individual Technology Addendum, for the other party's uncured material breach on 60 days' written notice, which may be extended by an additional 120 days under certain conditions. The OHSU Agreement and each Technology Addendum also terminate in the event of bankruptcy of either party. We may also terminate the OHSU Agreement in its entirety, or any Technology Addendum individually, upon 60 days' notice. OHSU may immediately terminate the OHSU Agreement if we or our sublicensees bring any action or proceeding against OHSU, subject to certain exceptions.

Exclusive License Agreement with the Institute for Research in Biomedicine

In December 2011, Humabs Holdings GmbH, or Humabs Holdings, the former parent company of our subsidiary Humabs, entered into an exclusive license agreement, or the IRB Agreement, with the Institute for Research in Biomedicine, or IRB. The IRB Agreement amended and restated an original 2004 exclusive license agreement between the parties in connection with IRB's proprietary technologies relating to human monoclonal antibodies and the discovery of unique epitopes recognized by such antibodies. In May 2008, Humabs entered into an exclusive license agreement with IRB, or the Humabs IRB Agreement, and together with the IRB Agreement, the Current IRB License Agreements. Pursuant to the Humabs IRB Agreement, IRB granted to Humabs an exclusive license under certain intellectual property rights for the development of certain monoclonal antibodies. Following the entry into the Humabs IRB Agreement, in February 2012, Humabs and IRB entered into a research agreement, or the IRB Research Agreement, concurrently with the termination of an original research agreement dated July 2004 between Humabs Holdings and IRB, to provide for a continuing research collaboration between Humabs and IRB, and to coordinate the exploitation of intellectual property rights arising from the IRB Research Agreement with the rights granted under the Current IRB License Agreements. Under the terms of the IRB Research Agreement, IRB performs certain research activities for Humabs, and all intellectual property rights arising under the IRB Research Agreement are either owned by Humabs, or included in and licensed to Humabs pursuant to the terms of the Current IRB License Agreements. In August 2017, we acquired all of the share capital of Humabs as described further below. Prior to the closing of such acquisition, Humabs Holdings was consolidated into Humabs, such that Humabs Holdings ceased to exist as a separate legal entity, and Humabs became the successor-in-interest to Humabs Holdings' rights under the IRB Agreement. As a result, Humabs is the licensee under each of the Current IRB License Agreements.

We use technology licensed under the Current IRB License Agreements in our antibody platform and in our product candidates VIR-2482 and tobevibart.

Pursuant to the Current IRB License Agreements, IRB granted to Humabs an exclusive, worldwide, royalty-bearing, sublicensable license under patent and know-how rights covering or associated with IRB's proprietary technology platform relating to antibody discovery, as well as rights in certain antibodies, including as a result of activities under the IRB Research Agreement, in each case for all purposes, including to practice the licensed technology platform, and to develop, manufacture and commercialize any drug, vaccine or diagnostic product containing such licensed antibodies.

Humabs is required to use commercially reasonable efforts to develop and commercialize licensed products, and must maintain an active program to commercialize licensed products. Humabs is required to pay to IRB a flat royalty on net sales of licensed products approved for non-diagnostic use in the low single-digits, and a flat royalty on licensed products for diagnostic use at 50% of the non-diagnostic product rate, in each case subject to standard reductions and offsets. A single royalty stream is payable on products that include the licensed antibodies (including antibodies that are owned by Humabs, but developed using the licensed technology), irrespective of whether a given product is covered by patents under both of the Current IRB License Agreements. Humabs' obligation to pay royalties to IRB, on a country-by-country basis, is reduced upon the expiration of the relevant patents in such country, and expires 10 years after the date of first commercialization of a licensed product in such country. Humabs is also required to pay to IRB a specified percentage in the sub-teen double-digits of consideration received in connection with the grant of a sublicense to a non-affiliate third party, subject to a specified maximum dollar amount for the first up front or milestone payment received under such sublicense for each licensed product, and a lower specified maximum dollar amount for subsequent up front or milestone payments for such licensed product.

Each of the Current IRB License Agreements remains in force until the expiration of all valid claims of the licensed patent rights and trade secrets included in the licensed IRB know-how. Humabs may terminate the IRB Agreement at will on 90 days' written notice to IRB, and either party may terminate either of the Current IRB License Agreements on 60 days' written notice for the uncured material breach of the other party.

Exclusive License Agreement with The Rockefeller University

In July 2018, we entered into an exclusive license agreement with The Rockefeller University, or Rockefeller, which was amended in May 2019, in September 2020, and in March 2021, or the Rockefeller Agreement. Pursuant to the Rockefeller Agreement, Rockefeller granted us a worldwide exclusive license under certain patent rights, and a worldwide non-exclusive license under certain materials and know-how covering certain antibody variants relating to a specified mutation leading to enhanced antibody function and utility, to develop, manufacture and commercialize infectious disease products covered by the licensed patents, or that involve the use or incorporation of the licensed materials and know-how, in each case for all uses and purposes for infectious diseases. The licenses granted to us are freely sublicensable to third parties. Rockefeller retains the right to use the licensed patents outside the field of use, and within the field of use solely in connection with educational, research and non-commercial purposes, as well as for certain research being conducted in collaboration with us. We are obligated to grant sublicenses to third parties with respect to products that are not being pursued and are not of interest to us following a specified anniversary of the May 2019 amendment date. Pursuant to the Rockefeller Agreement, we are required to use commercially reasonable efforts to develop and commercialize infectious disease products as soon as reasonably practicable, including by achieving certain specified development milestone events within specified time periods for products arising from our HBV and influenza programs.

We use technology licensed under the Rockefeller Agreement in our antibody platform and in our product candidates tobevibart.

We paid Rockefeller an upfront fee of $0.3 million for entry into the Rockefeller Agreement, and are required to pay annual license maintenance fees of $1.0 million, which will be creditable against royalties following commercialization. In addition, for the achievement of specified development, regulatory and commercial success milestone events, we will be required to pay up to $80.3 million, in the aggregate, for up to six infectious disease products. Any follow-on products beyond six products may result in additional milestone event payments. We will also be required to pay to Rockefeller a tiered royalty at a low single-digit percentage rate on net sales of licensed products, subject to certain adjustments. Our obligation to pay royalties to Rockefeller will terminate, on a product-by-product and jurisdiction-by-jurisdiction basis, upon the latest of the expiration of the last valid claim of a licensed patent in such jurisdiction, the expiration of all regulatory exclusivity in such jurisdiction or 12 years following the first commercial sale of the applicable licensed product in such jurisdiction. If we grant a sublicense to a non-affiliate third party under the Rockefeller technology, we will be required to pay to Rockefeller a specified percentage of the consideration received from such sublicensee for the grant of the sublicense, depending on the date of receipt of the applicable sublicense income from such sublicensee.

The Rockefeller Agreement will remain in force, absent earlier termination, until the expiration of all of our obligations to pay royalties to Rockefeller in all jurisdictions. We have the right to terminate the Rockefeller Agreement in its entirety, or in part, for any reason on 60 days' written notice to Rockefeller. Rockefeller may terminate the Rockefeller Agreement on 90 days' written notice for our uncured material breach, or if we challenge the validity or enforceability of any of the licensed patents, or immediately in the event of our insolvency. Rockefeller may also terminate the Rockefeller Agreement if we cease to carry on business with respect to the rights granted to us under the agreement.

Collaboration, Option and License Agreement with Brii Bio

In May 2018, we entered into a collaboration, option and license agreement with Brii Biosciences Limited (previously named BiiG Therapeutics Limited), or Brii Bio Parent, and Brii Bio, and such agreement, the Brii Agreement, pursuant to which we granted to Brii Bio, with respect to up to four of our programs (excluding mAbs in Vir's active research and development program against coronaviruses), an exclusive option to obtain exclusive rights to develop and commercialize compounds and products arising from such programs in China, Taiwan, Hong Kong and Macau, or collectively the China Territory, for the treatment, palliation, diagnosis, prevention or cure of acute and chronic diseases of infectious pathogen origin or hosted by pathogen infection, or the Field of Use. Our HBV siRNA program being developed under the Amended Alnylam Agreement (described above) is included within the Brii Agreement as a program for which Brii Bio may exercise one of its options. Brii Bio may exercise each of its options following the achievement by us of proof of concept for the first product in such program. In partial consideration for the options granted by us to Brii Bio, Brii Bio Parent and Brii Bio granted us, with respect to up to four of Brii Bio Parent's or Brii Bio's programs, an exclusive option to be granted exclusive rights to develop and commercialize compounds and products arising from such Brii Bio programs in the United States for the Field of Use. The number of options that we may exercise for a Brii Bio program is limited to the corresponding number of options that Brii Bio exercises for a Vir program. All options granted to Brii Bio under the Brii Agreement that are not exercised will expire no later than seven years following the effective date, or two years earlier than such date if Brii Bio has not undergone an initial public offering within such shorter period. All options granted to us under the Brii Agreement that are not exercised will expire no later than two years following the expiration of all options granted to Brii Bio.

We are responsible, at our expense and discretion, for the conduct of all development activities under our programs prior to the exercise of Brii Bio's options, and Brii Bio is responsible, at its expense and discretion, for all activities under its programs prior to the exercise of our options. Following the exercise of an option for a specified program by either us or Brii Bio, the exercising party is granted an exclusive, royalty-bearing license to develop, manufacture and commercialize products arising from the applicable program in the United States (where we are exercising the option) or the China Territory (where Brii Bio is exercising the option), and such party is thereafter responsible for all development and commercialization activities, at its expense, in the optioned territory. If Brii Bio exercises its option with respect to our development program being conducted under the Amended Alnylam Agreement, Brii Bio's rights will be subject to the terms of such amended agreement.

Under the terms of the Brii Agreement, following our option exercise, we are obligated to use commercially reasonable efforts to develop at least one licensed product arising from each optioned Brii Bio program, and to commercialize each such product in the United States following regulatory approval, and following Brii Bio's option exercise, Brii Bio is obligated to use commercially reasonable efforts to develop at least one licensed product arising from each optioned Vir program and to commercialize each such product in the China Territory following regulatory approval.

With respect to programs for which Brii Bio exercises its options, Brii Bio will be required to pay us an option exercise fee for each such Vir program ranging from the mid-single-digit millions up to $20.0 million, determined based on the commercial potential of the licensed program. Brii Bio will also be required to pay regulatory milestone payments on a licensed product-by-licensed product basis ranging from the mid-single-digit millions up to $30.0 million, also determined based on the commercial potential of such program. Following commercialization, Brii Bio will be required to make sales milestone payments based on certain specified levels of aggregate annual net sales of products arising from each licensed program in the China Territory, up to an aggregate of $175.0 million per licensed program. Brii Bio also will pay us royalties that range from the mid-teens to the high-twenties, as described below. On June 12, 2020, Brii Bio notified us of the exercise of its option to obtain exclusive rights to develop and commercialize compounds and products arising from elebsiran in the China Territory. Brii Bio paid us a $20.0 million option exercise fee in connection with the option exercise. We separately paid $10.0 million, half of the option proceeds, to Alnylam in connection with the Amended Alnylam Agreement. In July 2022, Brii Bio notified us of the exercise of its option to obtain exclusive rights to develop and commercialize compounds and products arising from tobevibart in the China Territory. Brii Bio paid us a $20.0 million option exercise fee in connection with the option exercise. We are also eligible to receive the following payments related to tobevibart in the China Territory: a $30.0 million regulatory milestone payment, up to $175.0 million in sales-based milestone payments, and royalties on net sales ranging from mid-teens to mid-twenties.

As partial consideration for our entry into the Brii Agreement, upon closing of Brii Bio Parent's Series A preferred stock financing, we received Class A ordinary shares equal to 9.9% of the outstanding shares in Brii Bio Parent. As a result of Brii Bio's right to exercise one of its options for our HBV siRNA program, under the terms of the Amended Alnylam Agreement, in February 2020 we transferred to Alnylam a specified percentage of such equity consideration allocable to such program. In July 2021, Brii Bio Parent completed its initial public offering, or the Brii Bio Parent IPO, on the Stock Exchange of Hong Kong Limited. Upon completion of the Brii Bio Parent IPO, our Class A ordinary shares held at Brii Bio Parent converted into the same single class of ordinary shares issued in the Brii Bio Parent IPO.

Upon exercise of each option for a Brii Bio program, we will be required to pay to Brii Bio an option exercise fee ranging from the low tens of millions to up to $50.0 million, determined based on the commercial potential of the licensed program. We will be required to make regulatory milestone payments to Brii Bio on a licensed product-by-licensed product basis ranging from the low tens of millions up to $100.0 million, also determined based on the commercial potential of such program. We will also be required to make sales milestone payments based on certain specified levels of aggregate annual net sales of products in the United States arising from each licensed program, up to an aggregate of $175.0 million per licensed program.

In addition, we are obligated under the Brii Agreement to pay Brii Bio tiered royalties based on net sales of products arising from the licensed programs in the United States, and Brii Bio is obligated to pay us tiered royalties based on net sales of products arising from the licensed programs in the China Territory. The rates of royalties payable by us to Brii Bio, and by Brii Bio to us on net sales range from mid-teens to high-twenties. Each party's obligations to pay royalties expires, on a product-by-product and territory-by-territory basis, on the latest of 10 years after the first commercial sale of such licensed product in the United States or China Territory, as applicable; the expiration or abandonment of licensed patent rights that cover such product in the United States or China Territory, as applicable; and the expiration of regulatory exclusivity in the United States or the China Territory, as applicable. Royalty rates are subject to specified reductions and offsets.

The Brii Agreement will remain in force until the expiration of all options or, if any option is exercised, expiration of all royalty payment obligations for all licensed products within such licensed program, unless terminated in its entirety or on a program-by-program basis by either party. Each party may terminate for convenience all rights and obligations with respect to any program for which it has an option, with 30 days' written notice (if the terminating party has not exercised an option for such program) or 180 days' notice (following the exercise of an option for such program). The Brii Agreement may also be terminated by either party for insolvency of the other party, and either party may terminate the Brii Agreement in its entirety or on a program-by-program basis for the other party's uncured material breach on 60 days' written notice (or 30 days' notice following failure to make payment).

Patent License Agreements with Xencor

In August 2019, we entered into a patent license agreement, which was amended in February 2021, or the 2019 Xencor Agreement, with Xencor, pursuant to which we obtained a non-exclusive, sublicensable (only to our affiliates and subcontractors) license to incorporate Xencor's licensed technologies into, and to evaluate, antibodies that target influenza A and HBV, and a worldwide, non-exclusive, sublicensable license to develop and commercialize products containing such antibodies incorporating such technologies for all uses, including the treatment, palliation, diagnosis and prevention of human or animal diseases, disorders or conditions. We are obligated to use commercially reasonable efforts to develop and commercialize an antibody product that incorporates Xencor's licensed technologies, for each of the influenza A and HBV research programs. These technologies are used in our VIR-2482, incorporating Xencor's Xtend technology, and tobevibart, incorporating Xencor's Xtend and other Fc technologies.

In consideration for the grant of the license, we paid Xencor an upfront fee. For each of the influenza A and HBV research programs, we will be required to pay Xencor development and regulatory milestone payments of up to $17.8 million in the aggregate, and commercial sales milestone payments of up to $60.0 million in the aggregate, for a total of up to $77.8 million in aggregate milestones for each program and $155.5 million in aggregate milestones for both programs. On a product-by-product basis, we will also be obligated to pay tiered royalties based on net sales of licensed products ranging from low- to mid-single-digits. The royalties are payable, on a product-by-product and country-by-country basis, until the expiration of the last to expire valid claim in the licensed patents covering such product in such country.

In March 2020, we entered into a patent license agreement, which was amended in February 2021, or the 2020 Xencor Agreement, with Xencor pursuant to which we obtained a non-exclusive license to Xencor's licensed technologies into, and to evaluate, antibodies that target any component of a coronavirus, including SARS-CoV-2, SARS-CoV and MERS-CoV, and a worldwide, non-exclusive, sublicensable license to develop and commercialize products containing such antibodies incorporating such technologies for all uses, including the treatment, palliation, diagnosis and prevention of human or animal diseases, disorders or conditions. We are obligated to use commercially reasonable efforts to develop and commercialize an antibody product that incorporates Xencor's licensed technologies, for each of the coronavirus research programs. These technologies are used in sotrovimab, incorporating Xencor's Xtend technology, and VIR-7832, incorporating Xencor's Xtend and other Fc technologies.

In consideration for the grant of the license, we are obligated to pay royalties based on net sales of licensed products at the mid-single-digits. The royalties are payable, on a product-by-product and country-by-country basis, until the later of the expiration of the last to expire valid claim in the licensed patents covering such product in such country or 12 years.

The 2019 Xencor Agreement and 2020 Xencor Agreement will remain in force, on a product-by-product and country-by-country basis, until the expiration of all royalty payment obligations under each of the respective agreements. We may terminate each agreement in its entirety, or on a target-by-target basis, for convenience upon 60 days' written notice. Either party may terminate each agreement for the other party's uncured material breach upon 60 days' written notice (or 30 days in the case of non-payment) or in the event of bankruptcy of the other party immediately upon written notice. Xencor may terminate each agreement immediately upon written notice if we challenge, or upon 30 days' written notice if any of our sublicensees challenge, the validity or enforceability of any patent licensed to us under each respective agreement.

Amended and Restated Letter Agreement with the Bill & Melinda Gates Foundation

In January 2022, we entered into an amended and restated letter agreement with the Bill & Melinda Gates Foundation, or the Gates Agreement, which amended and restated the letter agreement with the Bill & Melinda Gates Foundation that we entered into in December 2016. In connection with the Gates Agreement, the Bill & Melinda Gates Foundation purchased $10.0 million of shares of our Series A-1 convertible preferred stock in December 2016, $10.0 million of shares of our Series B convertible preferred stock in January 2019 and $40.0 million of shares of our common stock in January 2022. We were obligated to use the proceeds of the Bill & Melinda Gates Foundation's December 2016 and January 2019 investments in furtherance of its charitable purposes to (i) conduct our programs to develop products to treat or prevent infectious disease caused by HIV and TB, respectively, with at least 50% of the funds to be used for such programs and (ii) develop our HCMV-based vaccine technology platform in a manner reasonably expected to result in the generation of products for the treatment or prevention of other specified infectious diseases, and we are obligated to use the proceeds of the Bill & Melinda Gates Foundation's January 2022 investment in furtherance of its charitable purposes to develop our vaccinal antibody program, in each case for use in specified developing countries. We agreed to use reasonable efforts to achieve specified research and development milestones with respect to our HIV program, TB program and vaccinal antibody program, and, if requested by the Bill & Melinda Gates Foundation, to work with the Bill & Melinda Gates Foundation on an additional mutually agreeable infectious disease program. Additionally, we are bound by specified global access commitments including a commitment to provide any products developed using the proceeds of the Bill & Melinda Gates Foundation's investment at an affordable price to the people most in need within the specified developing countries, not to exceed a specified percentage over our fully burdened manufacturing and sales costs.

If we fail to comply with (i) our obligations to use the proceeds of the Bill & Melinda Gates Foundation's investment for the purposes described in the paragraph above and to not use such proceeds for specified prohibited uses, (ii) specified reporting requirements or (iii) specified applicable laws, or if we materially breach our specified global access commitments (any such failure or material breach, a Specified Default), we will be obligated to redeem or arrange for a third party to purchase all of our stock purchased by the Bill & Melinda Gates Foundation under the Gates Agreement at the Bill & Melinda Gates Foundation's request, at a price equal to the greater of (a) the original purchase price or (b) the fair market value, such redemption or sale, a Gates Foundation Redemption. Following a Gates Foundation Redemption, if a sale of the company or all of our material assets relating to the Gates Agreement occurs prior to the six month anniversary of the first redemption or sale of any stock in such Gates Foundation Redemption, then the Bill & Melinda Gates Foundation will receive compensation equal to the excess of what it would have received in such transaction if it still held the stock redeemed or sold at the time of such sale transaction over what it actually received in the Gates Foundation Redemption. Additionally, if a specified default occurs, if we are unable or unwilling to continue the HIV program, TB program, vaccinal antibody program or, if applicable, the mutually agreed additional program (except for scientific or technical reasons), or if we institute bankruptcy or insolvency proceedings, then the Bill & Melinda Gates Foundation will have the right to exercise a non-exclusive, fully-paid license (with the right to sublicense) under our intellectual property to the extent necessary to use, make and sell products arising from such programs, in each case solely to the extent necessary to benefit people in the developing countries in furtherance of the Bill & Melinda Gates Foundation's charitable purpose.

In the event that we sell, exclusively license or transfer to a third party all or substantially all of our assets, the technology platform, or products arising from programs that are funded using the proceeds of the Bill & Melinda Gates Foundation's investment, such third party is required to assume our specified global access commitments on terms that are reasonably acceptable to the Bill & Melinda Gates Foundation. Additionally, we will not grant to any third party any rights or enter into any agreement with any third party that would restrict the Bill & Melinda Gates Foundation's rights with respect to our specified global access commitments unless such third party expressly assumes such commitments to the reasonable satisfaction of the Bill & Melinda Gates Foundation. Consistent with the foregoing restriction, we also specifically will not enter into any such agreement negotiated in connection with a decision by us not to pursue the technology platform controlled by us as a result of our acquisition of TomegaVax. The global access commitments will continue for as long as the Bill & Melinda Gates Foundation continues to be a charitable entity.

In connection with the purchase of $40.0 million of shares of our common stock in January 2022, we entered into a stock purchase agreement, or the Gates Stock Purchase Agreement, with the Bill & Melinda Gates Foundation. The Bill & Melinda Gates Foundation purchased the shares of our common stock at $45.38 price per share, which is the average of the volume weighted average price of a share of our common stock for the 30 trading day period prior to the date of the Gates Stock Purchase Agreement. We have agreed to register the shares for resale following expiration of the one-year lock-up period if Rule 144 under the Securities Act of 1933, as amended, is not available for such resale without any volume or manner of sale restrictions.

Separately, in January 2018, March 2018 and January 2022, we entered into three grant agreements with the Bill & Melinda Gates Foundation, pursuant to which the Bill & Melinda Gates Foundation agreed to grant additional funding to us for our HIV, TB and vaccinal antibody programs, respectively, through the award of three research grants totaling in the aggregate up to $12.2 million with respect to the HIV program, up to $14.9 million with respect to the TB program, and up to $10.0 million with respect to the vaccinal antibody program if we achieve all the specified research and development milestones or reporting deliverables under the grants. In February 2020, we amended the HIV grant agreement pursuant to which we were awarded with a supplemental grant of $8.6 million. In addition, the term of the HIV grant agreement was extended through October 31, 2022, and we entered another amendment in September 2022 to further extend the term through September 2023. The TB grant agreement remained in effect until March 31, 2022 and was amended to extend the term through December 31, 2023 and we entered another amendment in January 1, 2024 to further extend the term through September 30, 2024. As of December 31, 2023, we had received all funding with respect to the HIV, TB and vaccinal antibody programs.

In November 2021, we entered into a grant agreement with the Bill & Melinda Gates Foundation under which we were awarded a grant totaling up to $10.0 million to support the manufacturing and clinical activities of our HIV and TB vaccine programs. The grant agreement remained in effect until August 30, 2023 and was amended to extend the term through December 31, 2023 and we entered another amendment on January 1, 2024 to further extend the term through June 30, 2024. As of December 31, 2023, we had received all funding under this grant agreement.

In March 2023, we entered into a grant agreement with the Bill & Melinda Gates Foundation under which we were awarded a grant totaling up to $10.0 million to support the clinical activities of our HIV vaccine program. This grant agreement will remain in effect until June 30, 2027. As of December 31, 2023, we had received $3.5 million under this grant agreement.

In September 2023, we entered into a grant agreement with the Bill & Melinda Gates Foundation under which we were awarded a grant totaling up to $5.0 million to support the manufacturing activities of our HIV vaccine program. This grant agreement will remain in effect until December 31, 2025. As of December 31, 2023, we had received $1.9 million under this grant agreement.

The grant agreements may be terminated early by the Bill & Melinda Gates Foundation for our breach, failure to progress the applicable funded projects, in the event of our change of control, change in our tax status, or significant changes in our leadership that the Bill & Melinda Gates Foundation reasonably believes may threaten the success of the applicable project.

Biomedical Advanced Research and Development Authority

On September 28, 2022, Vir entered into a multi-year agreement under Other Transaction Authority (OTA) with the Biomedical Advanced Research and Development Authority (BARDA), part of the U.S. Department of Health and Human Services' (HHS) Administration for Strategic Preparedness and Response (ASPR), with the potential for up to $1.0 billion to advance the development of a full portfolio of innovative solutions to address influenza and potentially other infectious disease threats.

BARDA initially invested $55.0 million for the development of VIR-2482, an investigational prophylactic monoclonal antibody (mAb) designed to protect against seasonal and pandemic influenza, with the balance of the award subject to BARDA exercising up to 12 options in further support of the development of pre-exposure prophylactic antibodies including and beyond VIR-2482 for the prevention of influenza illness or possibly supporting medical countermeasures for other pathogens of pandemic potential. The BARDA agreement also outlines potential support for Vir's clinical development of additional future pandemic influenza mAbs, as well as the potential development of up to 10 emerging infectious disease or Chemical, Biological, Radiological, and Nuclear medical countermeasure candidates.

On September 28, 2023, BARDA awarded Vir approximately $50.1 million in new funding to advance the development of novel monoclonal antibody (mAb) candidates and delivery solutions to widen the applicability of mAbs in COVID-19 and in pandemic preparedness and response. The new funding will support research and development of novel alternative mAb delivery technologies that have the potential to revolutionize mAb delivery by increasing expression relative to existing technologies. Such delivery could widen the breadth of administration options and shorten development and manufacturing timelines.

This new investment falls under Vir's existing OTA. The balance of the potential remaining funding is subject to BARDA exercising up to 12 options in further support of the development of pre-exposure prophylactic antibodies for the prevention of influenza illness or supporting medical countermeasures for other pathogens of pandemic potential. $40 million of the total funds is part of 'Project NextGen,' an initiative by the HHS to advance a pipeline of new, innovative vaccines and therapeutics for COVID-19 and will support the development of VIR-7229 through Phase 1 in the context of developing alternative mAb delivery technologies. The Phase 1 trial is expected to be completed in the second half of 2025. $10.1 million of the total funds falls under support from the Division of Chemical, Biological, Radiological and Nuclear (CBRN) medical countermeasures of BARDA which will support the discovery of new mAbs against a second pathogen of pandemic potential in the context of further advancing alternative mAb delivery technologies.

Vir was also awarded approximately $11.0 million in additional BARDA funding that will be applied to wind down activities for the BARDA-supported Phase 2 PENINSULA trial evaluating the investigational prophylactic mAb VIR-2482 for the prevention of symptomatic influenza A illness. As of December 31, 2023, we have utilized a total of $59.8 million under this grant agreement.

Sales and Marketing

Given our stage of development, we have not yet established a commercial organization or distribution capabilities. We intend to build a commercial infrastructure to support sales of our product candidates. We expect to manage sales, marketing and distribution through internal resources and third-party relationships. While we may commit significant financial and management resources to commercial activities, we will also consider collaborating with one or more pharmaceutical companies to enhance our commercial capabilities.

Manufacturing

We manufacture product candidates for three therapeutic modalities: mAbs, T cells and siRNA. We have established our own internal process development, manufacturing, supply chain and quality capabilities organizations that work with our selected contract development and manufacturing organizations, or CDMOs, to develop, manufacture, test and supply our early- and late-stage product candidates developed with our proprietary and external technology platforms. Contract development and manufacturing of our antibody product candidates is supported by our San Francisco, California, laboratory for cell line development, process, analytical and formulation development, small-scale non-GMP manufacturing for preclinical studies and selected quality control testing. For our human cytomegalovirus (HCMV) product candidates, our in-house capabilities for early-stage process development and HCMV research viral seed stock production will be transferred to a CDMO upon closure of our Portland, Oregon laboratory in 2024.

We have established relationships with multiple CDMOs and have produced material to support preclinical studies and Phase 1, Phase 2 and Phase 3 clinical trials. Material for any Phase 3 clinical trials and commercial supply will generally require large-volume, low-cost-of-goods production. For example, for our COVID-19 product sotrovimab, we and our collaborator GSK executed manufacturing agreements with CDMOs having large-scale capacity to support future production and product supply, particularly for commercialization. However, there are no assurances that our manufacturing and supply chain infrastructure will remain uninterrupted and reliable, or that the third parties we rely on to manufacture our products will be able to satisfy demand in a timely manner or not have supply chain disruptions due to future COVID-19 or other pandemic-related shutdowns, stock-outs due to raw material shortages, extended lead times, and/or greater than anticipated demand or quality issues given the operational challenges and raw material shortages that had been experienced during the COVID-19 pandemic.

Manufacturing Technology Platforms

Antibody

We currently rely on the antibody process platforms and manufacturing facilities of our CDMOs and strategic collaborators for development, manufacturing and supply of all of our preclinical, clinical and future commercial mAb product candidates. These manufacturing platforms are based on mAb technology and industrial processes that have been optimized, standardized and well-established across the biopharmaceutical industry over the last 30 years to enable process portability between biomanufacturing facilities and manufacturing with high success rates at most biologic CDMOs, as well as the partnered use of excess capacity with other biopharmaceutical companies. Contract development and manufacturing of our antibody product candidates is supported by our San Francisco, California laboratory for analytical and formulation development, and selected quality control testing. In 2023, we completed the build-out of additional in-house capabilities in our San Francisco laboratory for mAb cell line development, Phase 1/2 process development, and small-scale drug substance and drug product manufacturing to produce non-GMP material for preclinical studies. Start-up of our new process development laboratory is anticipated in 2024.

T Cell Viral Vector

Our T cell based viral vector manufacturing platform is based on genetically engineered HCMV. We have attenuated the HCMV for the purpose of patient safety, but this attenuation also reduces its yield in production. We have established a reproducible current Good Manufacturing Practices, or cGMP, manufacturing process in support of Phase 1 and Phase 2 clinical trials with the support of the Bill & Melinda Gates Foundation that has been successfully transferred to and executed at CDMOs specializing viral vector-based manufacturing. We will rely on these CDMOs for manufacturing and supply of all clinical and future commercial HCMV product candidates. To further improve manufacturing efficiency and scale-up, we continue to make significant investments in process development, largely funded by the Bill & Melinda Gates Foundation. Our in-house capabilities for HCMV early-stage process development and research viral seed stock (RSS) production will be transferred to a CDMO upon closure of our Portland, Oregon laboratory expected in the third quarter of 2024.

Manufacturing Agreements

We have entered into the following manufacturing agreements to date in support of our COVID-19 and clinical programs:

COVID-19 - Letter Agreement, Assignment and Master Services Agreement with Samsung Biologics

In April 2020, we entered into a binding letter agreement with Samsung Biologics Co., Ltd. (“Samsung Biologics”) pursuant to which Samsung Biologics will perform process development and manufacturing services for our SARS-CoV-2 mAbs. Under the terms of the letter agreement, we had committed to purchase a firm and binding capacity reservation for a specified number of drug substance manufacturing slots in 2021 and 2022. Samsung Biologics will reserve such manufacturing slots on a non-cancellable, non-adjustable basis and will not offer such manufacturing slots under our capacity reservation to third parties. We were obligated to pay a total of approximately $362.0 million for such capacity reservation on a take-or-pay basis regardless of whether such manufacturing slots are utilized by us, subject to annual adjustment based on the Korean Consumer Price Index. The amounts were to be payable during 2021 and 2022 and invoiced on a per-batch basis, with shortfalls invoiced at the end of the year in which such shortfall occurs.

In August 2020, we entered into an Assignment and Novation Agreement with GlaxoSmithKline Trading Services Limited, or GSKTSL, and Samsung Biologics effective as of July 31, 2020 pursuant to which we assigned and transferred to GSKTSL all of our right, title, and interest in, to and under the letter agreement, and GSKTSL became our successor in interest in and to all of our rights, duties, and obligations in, to and under the letter agreement. On August 4, 2020, GSKTSL entered into a Master Services Agreement with Samsung Biologics effective as of July 31, 2020, or the Samsung Biologics MSA, thereby superseding the letter agreement, and pursuant to which, among other things, Samsung Biologics will perform technology transfer, development, and manufacturing services for clinical and commercial supply of antibody products under our SARS-CoV-2 antibody program.

GSKTSL entered into the Samsung Biologics MSA in connection with the performance of GSK and our obligations pursuant to the 2020 GSK Agreement. In accordance with the terms of the 2020 GSK Agreement, we will continue to be responsible for 72.5% of the costs under the Samsung Biologics MSA, and GSK will bear 27.5% of such costs under the Samsung Biologics MSA, subject to certain conditions and exceptions.

All outstanding amounts related to these agreements between Vir and GSK were settled and paid during 2023. As of August 8, 2022, Samsung Biologics has completed all planned technology transfer, development, and manufacturing services for clinical and commercial supply of the SARS-CoV-2 antibody under the terms of the Samsung Biologics MSA and GSKTSL.

COVID-19 - Development and Manufacturing Collaboration Agreement with WuXi Biologics

In February 2020, we entered into a development and manufacturing collaboration agreement with WuXi Biologics (Hong Kong) Limited ("WuXi Biologics"), or the WuXi Biologics Collaboration Agreement, for the clinical development, manufacturing, and commercialization of our proprietary antibodies developed for SARS-CoV-2. Under the WuXi Biologics Collaboration Agreement, WuXi Biologics conducted cell-line development, process and formulation development, and initial manufacturing for clinical development. WuXi Biologics had the right to commercialize products incorporating such SARS-CoV-2 antibodies in mainland China, Hong Kong, Macau and Taiwan pursuant to an exclusive license granted for the selected SARS-CoV-2 antibodies that were developed. We had the right to commercialize such products in all other markets worldwide.

On May 16, 2022, we and WuXi Biologics entered into a Termination Agreement, or the Termination Agreement, pursuant to which we and WuXi Biologics terminated the WuXi Biologics Collaboration Agreement. Other existing agreements between us and WuXi Biologics remain in effect. Under the terms of the Termination Agreement, all licenses granted under the WuXi Biologics Collaboration Agreement were terminated and all rights to the SARS-CoV-2 antibody products in mainland China, Hong Kong, Macau and Taiwan reverted to us. We made a one-time termination payment to WuXi Biologics of $7.0 million in consideration for WuXi Biologics' development activities under the WuXi Biologics Collaboration Agreement. Under the terms of the Termination Agreement, we are obligated to pay WuXi Biologics tiered royalties on net sales of sotrovimab in mainland China, Hong Kong, Macau and Taiwan ranging from low single digits to low double digits. Royalties are payable to WuXi Biologics for a specified royalty term and are subject to reduction in certain circumstances.

COVID-19 - Letter Agreement, Assignment and Master Services Agreement with WuXi Biologics

In June 2020, we entered into a binding letter of intent with WuXi Biologics, or WuXi Biologics Letter of Intent, pursuant to which WuXi Biologics performs certain development and manufacturing services for our SARS-CoV-2 antibody program. Under the terms of the WuXi Biologics Letter of Intent, we had committed to purchase a firm and binding capacity reservation for the manufacture of a specified number of batches of drug substance of our SARS-CoV-2 antibody in 2020 and 2021. In addition, we had the right to order an additional specified number of batches of drug substance, provided we make such election by a specified date in the fourth calendar quarter in 2020. WuXi Biologics is obligated to reserve such manufacturing slots on a non-cancellable basis, and will manufacture the agreed number of batches of drug substance in accordance with an agreed manufacturing schedule. We were obligated to pay a total of approximately $130.0 million for such capacity reservation, if all batches are manufactured, inclusive of estimated raw material costs, with between 70% and 80% of the batch production fees owed to WuXi Biologics on a take-or-pay basis regardless of whether we utilize such manufacturing slots. The amounts were to be payable during 2020 and 2021 and invoiced on a per-batch basis. The SARS-CoV-2 antibody drug substance contemplated to be manufactured in accordance with the terms of the WuXi Biologics Letter of Intent will be utilized in connection with progressing the development and commercialization of the SARS-CoV-2 antibody product under our collaboration with GSK.

In August 2020, we entered into an Assignment and Novation Agreement with GSKTSL and WuXi Biologics effective as of July 29, 2020 pursuant to which we assigned and transferred to GSKTSL all of our right, title, and interest in, to and under the WuXi Biologics Letter of Intent, and GSKTSL became our successor in interest in and to all of our rights, duties, and obligations in, to and under the WuXi Biologics Letter of Intent. On August 4, 2020, GSKTSL entered into a non-exclusive Master Services Agreement for Commercial Manufacture of Drug Substance with WuXi Biologics effective as of July 29, 2020, or the WuXi Biologics MSA, thereby superseding the WuXi Biologics Letter of Intent, and pursuant to which, among other things, WuXi Biologics will perform development and manufacturing services for clinical and commercial supply of antibody products under our SARS-CoV-2 antibody program.

GSKTSL entered into the WuXi Biologics MSA in connection with the performance of GSK and our obligations pursuant to the 2020 GSK Agreement. In accordance with the terms of the 2020 GSK Agreement, we will continue to be responsible for 72.5% of the costs under the WuXi Biologics MSA, and GSK will bear 27.5% of such costs under the WuXi Biologics MSA, subject to certain conditions and exceptions.

All material outstanding amounts related to these agreements between Vir and GSK were settled and paid during 2023. As of January 5, 2023, WuXi completed all planned manufacturing of the SARS-CoV-2 antibody.

Competition

The pharmaceutical industry is characterized by rapidly advancing technologies, intense competition and a strong emphasis on proprietary products. While we believe that our technology, the expertise of our executive and scientific team, research, clinical capabilities, development experience and scientific knowledge provide us with competitive advantages, we face increasing competition from many different sources, including pharmaceutical and biotechnology companies, academic institutions, governmental agencies and public and private research institutions. Product candidates that we successfully develop and commercialize may compete with existing therapies and new therapies that may become available in the future.

Many of our competitors, either alone or with their collaborators, have significantly greater financial resources, established presence in the market, expertise in research and development, manufacturing, preclinical and clinical testing, obtaining regulatory approvals and reimbursement and marketing approved products than we do. These competitors also compete with us in recruiting and retaining qualified scientific, sales, marketing and management personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or potentially necessary for, our programs. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. Additional mergers and acquisitions may result in even more resources being concentrated in our competitors.

Our commercial potential could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market or make our development more complicated. The key competitive factors affecting the success of all of our programs are likely to be efficacy, safety, convenience, and cost/access.

HDV

There are currently no FDA-approved treatments for chronic HDV infection. Gilead's bulevirtide is approved for use by the EMA. Gilead received a Complete Response Letter for bulevirtide from the FDA in October 2022 and has indicated that it remains in active discussions with the FDA to work toward FDA approval. Bulevirtide has not been shown to lead to HDV clearance, and requires daily injections to maintain viral suppression. There are a few small pharmaceutical companies developing programs with various mechanisms of actions including Bluejay Therapeutics, Huahui Health, and Assembly Biosciences (in partnership with Gilead).

HBV

Current FDA-approved treatments for chronic HBV infection are primarily oral antiviral agents such as NRTIs, marketed by Gilead and Bristol-Myers Squibb Company. These treatments do not lead to either a functional or a complete cure in the vast majority of patients, and in the case of NRTIs, require life-long therapy. Several large and small pharmaceutical companies are developing programs with various mechanisms of action, to be used alone or in combination, with the goal of achieving an HBV functional cure or complete cure. GSK is currently developing their lead asset, bepirovirsen, in a Phase 3 program. Companies with RNAi agents in clinical development include GSK, Roche and Arbutus Biopharma. In addition, several companies are developing antibodies against surface antigen including Roche, Bluejay Therapeutics & Huahui Health. Several companies, including Gilead, GSK, and Vaccitech plc have therapeutic vaccines in early clinical development.

HIV

No FDA-approved vaccine is currently available for the prevention of HIV. Moderna Inc is actively engaged in vaccine research and development in this area. There are also not for profit entities developing vaccines using viral vectors, nanoparticles, DNA, RNA, or formulations, with the goal of stimulating T cell-mediated and/or neutralizing antibody responses against HIV. To our knowledge, none are using a CMV-based vector. Clinical trials of these vaccines are ongoing with support from the NIH Vaccine Research Center, the Bill & Melinda Gates Foundation, the U.S. military, the International AIDS Vaccine Initiative, the European Vaccine Initiative, the South African AIDS Initiative, and their academic and industry partners.

We may also compete with oral or long-acting antiretroviral therapies for pre-exposure prophylaxis of HIV. Truvada and Descovy, marketed by Gilead, are once-daily therapies approved for this indication. ViiV recently received FDA approval for long-acting antiretroviral therapy, cabotegravir for pre-exposure prophylaxis of HIV. Gilead, Merck and ViiV have additional long-acting formulations in development.

COVID-19

There are limited treatments and prophylactic vaccines available for COVID-19 in the U.S. Currently there are two oral antiviral therapies including LAGEVRIO (molnupiravir) from Merck & Co, Inc., or Merck, and PAXLOVID (nirmatrelvir/ritonavir) from Pfizer Inc., or Pfizer, which are available under EUA and NDA respectively, in the mild to moderate early treatment setting. In terms of prevention, there are two vaccines available including Pfizer's COVID-19 vaccine, COMIRNATY® and Moderna, Inc.'s COVID-19 vaccine, SPIKEVAX®. There are currently no mAbs available in the U.S. for the treatment of COVID-19, as many have lost their activity against circulating variants and have been deauthorized, therefore there remains a significant unmet need for preventing and treating infection in immunocompromised patients.

Companies with antibodies in clinical development include Invivyd, Inc., or Invivyd, AstraZeneca and Regeneron Pharmaceuticals, Inc, and companies with new oral antivirals in clinical development include Shionogi Inc., Gilead, among others. The market however remains very dynamic and changes in epidemiology and the emergence of new variants may render current treatments, including sotrovimab, inferior or obsolete in the future.

Intellectual Property

Our intellectual property is critical to our business and we strive to protect it, including by obtaining and maintaining patent protection in the United States and internationally for our product candidates, new therapeutic approaches and potential indications, and other inventions that are important to our business. Our policy is to seek to protect our proprietary and intellectual property position by, among other methods, filing U.S. and foreign patent applications related to our proprietary technology, inventions and improvements that are important for the development and implementation of our business. We also rely on the skills, knowledge and experience of our scientific and technical personnel, as well as that of our advisors, consultants and other contractors. To help protect our proprietary know-how that is not patentable, we rely on confidentiality agreements to protect our interests. We require our employees, consultants and advisors to enter into confidentiality agreements prohibiting the disclosure of confidential information and requiring disclosure and assignment to us of the ideas, developments, discoveries and inventions important to our business.

Our patent portfolio includes patents and patent applications that are licensed from a number of collaborators and other third parties, including Alnylam, OHSU, MedImmune, the Institute for Research in Biomedicine, or IRB, Rockefeller and Xencor, and patents and patent applications that are owned by us. Our patent portfolio includes patents and patent applications that cover our product candidates sotrovimab (previously VIR-7831), VIR-7229, elebsiran, tobevibart, VIR-2482, VIR-1111 and VIR-1388, and the use of these candidates for therapeutic purposes. Our proprietary technology has been developed primarily through acquisitions, relationships with academic research centers and contract research organizations.

For our product candidates, we will, in general, initially pursue patent protection covering compositions of matter and methods of use. Throughout the development of our product candidates, we seek to identify additional means of obtaining patent protection that would potentially enhance commercial success, including through additional methods of use, process of making, formulation and dosing regimen-related claims.

In total, our patent portfolio, including patents licensed from our collaborators and other third parties, comprises over 150 different patent families as of December 31, 2023, filed in various jurisdictions worldwide. Our patent portfolio includes issued patents and patent applications in the United States and in many international countries. Our patent portfolio for our product candidates and technology platforms is outlined below.

Patents and Proprietary Rights

U.S. and European Patent Expiration

We have a number of U.S. and foreign patents, patent applications and rights to patents related to our molecules, products and technology, but we cannot be certain that issued patents will be enforceable or provide adequate protection or that pending patent applications will result in issued patents.

The following table shows the estimated expiration dates (including patent term extensions, supplementary protection certificates and/or pediatric exclusivity where granted) in the United States and the European Union for the primary patents for our key product candidates as described above. Dates in parentheses reflect the estimated expiration date of patents which may issue from currently pending applications. The estimated expiration dates do not include any potential additional exclusivity (e.g., patent term extension, supplementary protection certificates or pediatric exclusivity) that has not yet been granted.

Key Product Candidates	Patent Expiration	
	U.S.	E.U.
COVID 19		
Sotrovimab (VIR-7831)	2041	2041
VIR-7229	(2044)	(2044)
HBV/HDV		
elebsiran (VIR-2218)	2035	2035
tobevibart (VIR-3434)	2036	2036
HIV		
VIR-1388	2036	(2035)
RSV/MPV		
VIR-8190	(2044)	(2044)
Influenza		
VIR-2981	(2043)	(2043)
HPV		
VIR-1949	(2044)	(2044)

Patent Portfolio by Technology Platform

Antibody Platform

Licensed Patents

We have exclusively licensed a patent family from Rockefeller. The 20-year term of any patents issuing from the application in this family is presently estimated to expire in 2038, absent any available patent term adjustments or extensions.

We have exclusively licensed from IRB two patent families that relate to our antibody platform technology. The 20-year term of the issued patents and any patent issuing from the pending patent applications in these families is presently estimated to expire between 2024 and 2038, absent any available patent term adjustments or extensions.

In addition, we have non-exclusively licensed a group of patents and applications from Xencor. The 20-year term of these patents and applications if granted is presently estimated to expire between 2023 and 2028, absent any available patent term adjustments or extensions.

Patents Owned by Us

We also own, with our subsidiary Humabs, one patent family that includes, as of December 31, 2023, one pending PCT application and one patent application in Taiwan. These applications include composition of matter claims, pharmaceutical composition claims, method of treatment claims and composition for use in treatment claims. The 20-year term of any patents issuing from patent applications in this family is presently estimated to expire in 2042, absent any available patent term adjustments or extensions.

T Cell Platform

Licensed Patents

We have exclusively licensed from OHSU 10 different patent families related to our T cell portfolio.

The 20-year term of the issued patents in these families is presently estimated to expire between 2025 and 2040, absent any available patent term adjustments or extensions.

Patents Owned by Us

We own two patent families that include, as of December 31, 2023, two pending PCT applications and three patent applications in Argentina and Taiwan directed to composition of matter claims, pharmaceutical composition claims, method of treatment claims, composition for use in treating claims and process (method of producing) claims. The 20-year term of any patent issuing in these families is presently estimated to expire in 2042, absent any available patent term adjustments or extensions.

Patent Term and Term Extensions

Individual patents have terms for varying periods depending on the date of filing of the patent application or the date of patent issuance and the legal term of patents in the countries in which they are obtained. Generally, utility patents issued for applications filed in the United States are granted a term of 20 years from the earliest effective filing date of a non-provisional patent application. In addition, in certain instances, the term of a U.S. patent can be extended to recapture a portion of the U.S. Patent and Trademark Office's, or the USPTO, delay in issuing the patent as well as a portion of the term effectively lost as a result of the FDA regulatory review period. However, as to the FDA component, the restoration period cannot be longer than five years and the restoration period cannot extend the patent term beyond 14 years from FDA approval. In addition, only one patent applicable to an approved drug is eligible for the extension, and only those claims covering the approved drug, a method for using it, or a method of manufacturing may be extended. The duration of foreign patents varies in accordance with provisions of applicable local law, but typically is also 20 years from the earliest effective filing date. All taxes, annuities or maintenance fees for a patent, as required by the USPTO and various foreign jurisdictions, must be timely paid in order for the patent to remain in force during this period of time.

The actual protection afforded by a patent may vary on a product by product basis, from country to country, and can depend upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions and the availability of legal remedies in a particular country and the validity and enforceability of the patent.

Patent Protection and Certain Challenges

Patents and other proprietary rights are very important to our business. If we have a properly drafted and enforceable patent, it can be more difficult for our competitors to use our technology to create competitive products and more difficult for our competitors to obtain a patent that prevents us from using technology we create. As part of our business strategy, we actively seek patent protection both in the United States and internationally and file additional patent applications, when appropriate, to cover improvements in our molecules, products and technology.

Patents covering certain of our products are held by third parties. We acquired exclusive rights to these patents in the agreements we have with these parties.

We may obtain patents for certain products many years before marketing approval is obtained. Because patents have a limited life that may begin to run prior to the commercial sale of the related product, the commercial value of the patent may be limited. However, we may be able to apply for patent term extensions or supplementary protection certificates in some countries. For example, extensions for the patents or supplementary protection certificates on many of our products have been granted in the United States and in a number of European countries, compensating in part for delays in obtaining marketing approval. Similar patent term extensions may be available for other products we are developing, but we cannot be certain we will obtain them in some countries.

It is also important that we do not infringe the valid patents of third parties. If we infringe the valid patents of third parties, our reputation may be harmed and we may be required to pay significant monetary damages, we may be prevented from commercializing products or we may be required to obtain licenses from these third parties. We may not be able to obtain alternative technologies or any required license on reasonable terms or at all. If we fail to obtain these licenses or alternative technologies, we may be unable to develop or commercialize some or all of our products.

Because patent applications are confidential for a period of time until a patent is issued, we may not know if our competitors have filed patent applications for technology covered by our pending applications or if we were the first to invent or first to file an application directed toward the technology that is the subject of our patent applications. Competitors may have filed patent applications or received patents and proprietary rights that block or compete with our products. In addition, if competitors file patent applications covering our technology, we may have to participate in litigation, post-grant proceedings before the U.S. Patent and Trademark Office or other proceedings to determine the right to a patent or validity of any patent granted.

Future litigation or other proceedings regarding the enforcement or validity of our existing patents or any future patents could result in the invalidation of our patents or substantially reduce their protection.

Our pending patent applications and the patent applications filed by our collaborative partners may not result in the issuance of any patents or may result in patents that do not provide adequate protection. As a result, we may not be able to prevent third parties from developing compounds or products that are closely related to those which we have developed or are developing. In addition, certain countries do not provide effective enforcement of our patents, and third-party manufacturers may be able to sell generic versions of our products in those countries. For more information, see the section titled "Risk Factors—Risks Related to Our Intellectual Property."

Trademarks and Know-How

In connection with the ongoing development and advancement of our products and services in the United States and various international jurisdictions, we seek to create protection for our marks and enhance their value by pursuing trademarks and service marks where available and when appropriate. In addition to patent and trademark protection, we rely upon know-how and continuing technological innovation to develop and maintain our competitive position. We seek to protect our proprietary information, in part, by using confidentiality agreements with our commercial partners, collaborators, employees and consultants, and invention assignment agreements with our employees and consultants. These agreements are designed to protect our proprietary information and, in the case of the invention assignment agreements, to grant us ownership of technologies that are developed by our employees and through relationships with third parties. For more information, see the section titled "Risk Factors—Risks Related to Our Intellectual Property."

Government Regulation and Product Approval

The FDA and other regulatory authorities at federal, state and local levels, as well as in foreign countries, extensively regulate, among other things, the research, development, manufacture, quality control, import, export, safety, effectiveness, labeling, packaging, storage, distribution, approval, advertising, promotion, marketing, post-approval monitoring and post-approval reporting of drugs and biologics such as those we are developing.

In the United States, the FDA approves and regulates drugs under the Federal Food, Drug, and Cosmetic Act, or the FDCA. Biological products, or biologics, are licensed for marketing under the Public Health Service Act, or the PHSA, and regulated under the FDCA. A company, institution, or organization which takes responsibility for the initiation and management of a clinical development program for such products is typically referred to as a sponsor. We, along with third-party contractors, will be required to navigate the various preclinical, clinical and commercial approval requirements of the governing regulatory agencies of the countries in which we wish to conduct studies or trials or seek approval or licensure of our product candidates.

U.S. Biopharmaceuticals Regulation

The process required by the FDA before drug and biologic product candidates may be marketed in the United States generally involves the following:

- completion of extensive preclinical laboratory tests and animal trials performed in accordance with applicable regulations, including the FDA's Good Laboratory Practice, or GLP, regulations;
- design of a clinical protocol and submission to the FDA of an IND application which must become effective before clinical trials may begin;
- approval by an independent institutional review board or ethics committee at each clinical site before the trial is commenced;
- performance of adequate and well-controlled human clinical trials in accordance with FDA's Good Clinical Practice, or GCP, regulations to establish the safety and efficacy of a drug candidate, and compliance with cGMP to establish safety, purity and potency of a proposed biologic product candidate for its intended purpose;
- preparation of and submission to the FDA of a new drug application, or NDA, or biologics licensing application, or BLA, as applicable, after completion of all pivotal clinical trials;
- satisfactory completion of an FDA Advisory Committee review, if applicable;
- a determination by the FDA within 60 days of its receipt of an NDA or BLA to file the application for review;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities at which the proposed product is produced to assess compliance with cGMPs and of selected clinical investigation sites to assess compliance with GCPs;

- FDA review and approval of an NDA or BLA to permit commercial marketing of the product for particular indications for use in the United States; and
- completion of any post-approval requirements, including the potential requirement to implement a risk evaluation and mitigation strategy, or REMS, and any post-approval studies required by the FDA.

Preclinical and Clinical Development

Prior to beginning the first clinical trial with a product candidate, we must submit an IND to the FDA. An IND is a request for authorization from the FDA to administer an investigational new drug product to humans. The central focus of an IND submission is on the general investigational plan and the protocol or protocols for preclinical studies and clinical trials. An IND must become effective before human clinical trials may begin. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA, within the 30-day period, raises safety concerns or questions about the proposed clinical trial.

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with GCPs, which include the requirement that all research subjects provide their informed consent for their participation in any clinical study. Clinical trials are conducted under protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. Furthermore, an independent institutional review board for each site proposing to conduct the clinical trial must review and approve the plan for any clinical trial and its informed consent form before the clinical trial begins at that site, and must monitor the trial until completed.

Regulatory authorities, the institutional review board or the sponsor may suspend a clinical trial at any time on various grounds, including a finding that the subjects are being exposed to an unacceptable health risk or that the trial is unlikely to meet its stated objectives. Some trials also include oversight by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board, which provides authorization for whether or not a trial may move forward at designated check points based on access to certain data from the trial.

For purposes of biopharmaceutical development, human clinical trials are typically conducted in three sequential phases that may overlap or be combined:

- *Phase 1.* The investigational product is initially introduced into patients with the target disease or condition. These trials are designed to test the safety, dosage tolerance, absorption, metabolism and distribution of the investigational product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness.
- *Phase 2.* The investigational product is administered to a limited patient population to evaluate the preliminary efficacy, optimal dosages and dosing schedule and to identify possible adverse side effects and safety risks.
- *Phase 3.* The investigational product is administered to an expanded patient population to further evaluate dosage, to provide statistically significant evidence of clinical efficacy and to further test for safety, generally at multiple geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the investigational product and to provide an adequate basis for product approval.

In some cases, the FDA may require, or companies may voluntarily pursue, additional clinical trials after a product is approved to gain more information about the product. These so-called Phase 4 trials may be made a condition to approval of the application. Concurrent with clinical trials, companies must finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements.

Under the PHSA, sponsors of clinical trials are required to register and disclose certain clinical trial information on a public registry (clinicaltrials.gov) maintained by the NIH. In particular, information related to the product, patient population, phase of investigation, study sites and investigators and other aspects of the clinical trial is made public as part of the registration of the clinical trial.

NDA/BLA Submission and Review

Assuming successful completion of all required testing in accordance with all applicable regulatory requirements, the results of product development, nonclinical trials and clinical trials are submitted to the FDA as part of an NDA or BLA, as applicable, requesting approval to market the product for one or more indications.

Once an NDA or BLA has been accepted for filing, the FDA's goal is to review standard applications within 10 months after it accepts the application for filing, or, if the application qualifies for priority review, six months after the FDA accepts the application for filing. In both standard and priority reviews, the review process is often significantly extended by FDA requests for additional information or clarification. The FDA reviews an NDA to determine whether a drug is safe and effective for its intended use and a BLA to determine whether a biologic is safe, pure and potent. The FDA also reviews whether the facility in which the product is manufactured, processed, packed or held meets standards designed to assure and preserve the product's identity, safety, strength, quality, potency and purity. The FDA may convene an advisory committee to provide clinical insight on application review questions.

Before approving an NDA or BLA, the FDA will typically inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications.

After the FDA evaluates an application and conducts inspections of manufacturing facilities where the investigational product and/or its drug substance will be manufactured, the FDA may issue an approval letter or a Complete Response letter, or CRL. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A CRL will describe all of the deficiencies that the FDA has identified in the application, except that where the FDA determines that the data supporting the application are inadequate to support approval, the FDA may issue the CRL without first conducting required inspections, testing submitted product lots and/or reviewing proposed labeling.

If regulatory approval of a product is granted, such approval will be granted for particular indications and may entail limitations on the indicated uses for which such product may be marketed. For example, the FDA may approve the application with a risk evaluation and management strategy, or REMS, to ensure the benefits of the product outweigh its risks. A REMS could include medication guides, physician communication plans, or other elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Once approved, the FDA may withdraw the product approval if compliance with pre- and post-marketing requirements is not maintained or if problems occur after the product reaches the marketplace. The FDA may require one or more Phase 4 post-market trials and surveillance to further assess and monitor the product's safety and effectiveness after commercialization, and may limit further marketing of the product based on the results of these post-marketing trials.

Expedited Development and Review Programs

The FDA offers a number of expedited development and review programs for qualifying product candidates. The fast track program is intended to expedite or facilitate the process for reviewing new products that meet certain criteria. Specifically, new products are eligible for fast track designation if they are intended to treat a serious or life-threatening disease or condition and demonstrate the potential to address unmet medical needs for the disease or condition. Fast track designation applies to the combination of the product and the specific indication for which it is being studied. The sponsor of a fast track product has opportunities for frequent interactions with the review team during product development and, once an NDA or BLA is submitted, the product may be eligible for priority review. A fast track product may also be eligible for rolling review, where the FDA may consider for review sections of the NDA or BLA on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the application, the FDA agrees to accept sections of the application and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the application.

A product intended to treat a serious or life-threatening disease or condition may also be eligible for breakthrough therapy designation to expedite its development and review. A product can receive breakthrough therapy designation if preliminary clinical evidence indicates that the product, alone or in combination with one or more other drugs or biologics, may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. The designation includes all of the fast track program features, as well as more intensive FDA interaction and guidance beginning as early as Phase 1 and an organizational commitment to expedite the development and review of the product, including involvement of senior managers.

Any marketing application for a drug or biologic submitted to the FDA for approval, including a product with a fast track designation and/or breakthrough therapy designation, may be eligible for other types of FDA programs intended to expedite the FDA review and approval process, such as priority review and accelerated approval. A product is eligible for priority review if it has the potential to provide a significant improvement in the treatment, diagnosis or prevention of a serious disease or condition. Priority review designation means the FDA's goal is to take action on the marketing application within six months of the 60-day filing date.

Fast track designation, breakthrough therapy designation and priority review do not change the standards for approval but may expedite the development or approval process. Even if a product qualifies for one or more of these programs, the FDA may later decide that the product no longer meets the conditions for qualification or decide that the time period for FDA review or approval will not be shortened.

Emergency Use Authorization

In emergency situations, such as a pandemic, and with a declaration of a public health emergency by the Secretary of the U.S. Department of Health and Human Services, or HHS, the FDA has the authority to allow unapproved medical products or unapproved uses of cleared or approved medical products to be used to diagnose, treat or prevent serious or life-threatening diseases or conditions caused by chemical, biological, radiological or nuclear warfare threat agents when there are no adequate, approved, and available alternatives. Under this authority, the FDA may issue an EUA that allows the product to be distributed to patients prior to its formal approval.

Once granted, an EUA will remain in effect and generally terminate on the earlier of (1) the determination by the Secretary of HHS that the public health emergency has ceased or (2) a change in the approval status of the product such that the authorized use(s) of the product are no longer unapproved.

The FDA also may revise or revoke an EUA if the circumstances justifying its issuance no longer exist, the criteria for its issuance are no longer met, or other circumstances make a revision or revocation appropriate to protect public health or safety.

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biologic intended to treat a rare disease or condition, which is a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States for which there is no reasonable expectation that the cost of developing and making available in the United States a drug or biologic for this type of disease or condition will be recovered from sales in the United States for that drug or biologic.

If a product that has orphan drug designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusive approval (or exclusivity), which means that the FDA may not approve any other applications, including a full NDA or BLA, to market the same drug or biologic for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan drug exclusivity or if the FDA finds that the holder of the orphan drug exclusivity has not shown that it can assure the availability of sufficient quantities of the orphan drug to meet the needs of patients with the disease or condition for which the drug was designated. Orphan drug exclusivity does not prevent the FDA from approving a different drug or biologic for the same disease or condition, or the same drug or biologic for a different disease or condition.

Post-Approval Requirements

Any products manufactured or distributed by us pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to record-keeping, reporting of adverse experiences, periodic reporting, product sampling and distribution, manufacturing and advertising and promotion of the product. After approval, most changes to the approved product, such as adding new indications, manufacturing methods or amended labeling claims, are subject to prior FDA review and approval.

The FDA may withdraw approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market trials or clinical trials to assess new safety risks; or imposition of distribution restrictions or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of a product, complete withdrawal of the product from the market or product recalls;
- fines, warning or untitled letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of existing product approvals;
- product seizure or detention, or refusal of the FDA to permit the import or export of products;

- consent decrees, corporate integrity agreements, debarment or exclusion from federal healthcare programs;
- mandated modification of promotional materials and labeling and the issuance of corrective information;
- the issuance of safety alerts, Dear Healthcare Provider letters, press releases and other communications containing warnings or other safety information about the product; or
- injunctions or the imposition of civil or criminal penalties.

The FDA closely regulates the marketing, labeling, advertising and promotion of biopharmaceutical products. A company can make only those claims relating to safety and efficacy, purity and potency that are approved by the FDA and in accordance with the provisions of the approved label. However, companies may share truthful and not misleading information that is otherwise consistent with a product's FDA approved labeling.

The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses. Failure to comply with these requirements can result in, among other things, adverse publicity, warning letters, corrective advertising and potential civil and criminal penalties. Physicians may prescribe legally available products for uses that are not described in the product's labeling and that differ from those tested by us and approved by the FDA. Such off-label uses are common across medical specialties. Physicians may believe that such off-label uses are the best treatment for many patients in varied circumstances. The FDA does not regulate the behavior of physicians in their choice of treatments. The FDA does, however, restrict manufacturer's communications on the subject of off-label use of their products.

Biosimilars and Regulatory Exclusivity

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively the ACA, signed into law in 2010, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCIA, which created an abbreviated approval pathway for biological products that are biosimilar to or interchangeable with an FDA-licensed reference biological product. The FDA has since approved a number of biosimilars products.

Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity and potency, can be shown through analytical trials, animal trials and a clinical trial or trials. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product in any given patient and, for products that are administered multiple times to an individual, the biologic and the reference biologic may be alternated or switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic.

Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first licensed by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first licensed. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing that applicant's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of its product.

Generic Drugs and Regulatory Exclusivity

Section 505 of the FDCA provides a pathway for generic manufacturers to rely, in part, on the FDA's prior findings of safety and efficacy for an existing product, or published literature, in support of its application. Section 505(j) establishes an abbreviated approval process for a generic version of approved drug products through the submission of an Abbreviated New Drug Application, or ANDA. An ANDA provides for marketing of a generic drug product that has the same active ingredients, dosage form, strength, route of administration, labeling, performance characteristics and intended use, among other things, to a previously approved product. The generic version must deliver the same amount of active ingredient(s) in the same amount of time as the innovator drug and can often be substituted by pharmacists under prescriptions written for the reference listed drug.

Upon submission of an ANDA, an applicant must certify to the FDA that (1) no patent information on the drug product that is the subject of the application has been submitted to the FDA; (2) such patent has expired; (3) the date on which such patent expires; or (4) such patent is invalid or will not be infringed upon by the manufacture, use or sale of the drug product for which the application is submitted. Generally, the ANDA cannot be approved until all listed patents have expired, except where the ANDA applicant challenges a listed patent through the last type of certification, also known as a paragraph IV certification.

The filing of a patent infringement lawsuit within 45 days after the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earliest of 30 months after the receipt of the Paragraph IV notice, expiration of the patent and a decision in the infringement case that is favorable to the ANDA applicant. If the applicant does not challenge the listed patents, or indicates that it is not seeking approval of a patented method of use, the ANDA will not be approved until all of the listed patents claiming the referenced product have expired.

The FDA also cannot approve an ANDA until all applicable non-patent exclusivities listed in the Orange Book for the branded reference drug have expired. For example, a pharmaceutical manufacturer may obtain five years of non-patent exclusivity upon NDA approval.

Pediatric Exclusivity

Pediatric exclusivity is a type of non-patent marketing exclusivity in the United States that provides for an additional six months of exclusivity under certain conditions. The conditions for pediatric exclusivity include the FDA's determination that the use of a new product in the pediatric population may produce health benefits in that population, the FDA making a written request for pediatric clinical trials, and the sponsor agreeing to perform, and reporting on, the requested clinical trials within the statutory timeframe. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, additional protection is granted.

Patent Term Restoration and Extension

In the United States, a patent claiming a new product, its method of use or its method of manufacture may be eligible for a limited patent term extension under the Hatch-Waxman Act, which permits a patent extension of up to five years for patent term lost during product development and FDA regulatory review. The restoration period for a patent covering a product is typically one-half the time between the effective date of the IND involving human beings and the submission date of the NDA or BLA, plus the time between the submission date of the application and the ultimate approval date. Patent term restoration cannot be used to extend the remaining term of a patent past a total of 14 years from the product's approval date in the United States. Only one patent applicable to an approved product is eligible for the extension.

Federal and State Fraud and Abuse, and Transparency Laws and Regulations

In addition to strict FDA regulation of marketing of biopharmaceutical products, federal and state healthcare laws strictly regulate business practices in the biopharmaceutical industry. These laws may impact, among other things, our current and future business operations, including our clinical research activities, and proposed sales, marketing and education programs and constrain the business or financial arrangements and relationships with healthcare providers and other parties through which we market, sell and distribute our products for which we obtain marketing approval. These laws include anti-kickback and false claims laws and regulations, and transparency laws and regulations, including, without limitation, those laws described below.

The U.S. federal Anti-Kickback Statute prohibits any person or entity from, among other things, knowingly and willfully offering, paying, soliciting or receiving remuneration to induce or in return for purchasing, leasing, ordering or arranging for or recommending the purchase, lease or order of any item or service reimbursable under Medicare, Medicaid or other federal healthcare programs. The term "remuneration" has been broadly interpreted to include anything of value. The U.S. federal Anti-Kickback Statute has been interpreted to apply to, among others, arrangements between biopharmaceutical manufacturers on the one hand and prescribers, purchasers and formulary managers on the other. Although there are a number of statutory exceptions and regulatory safe harbors protecting some common arrangements and other activities from prosecution, the exceptions and safe harbors are drawn narrowly. Courts have interpreted the statute's intent requirement to mean that if any one purpose of an arrangement involving remuneration is to induce referrals of federal healthcare covered business, the statute has been violated.

Federal civil and criminal false claims laws, including the federal civil False Claims Act, which can be enforced by individuals through civil whistleblower and qui tam actions, and civil monetary penalties laws, prohibit any person or entity from, among other things, knowingly presenting, or causing to be presented, a false claim for payment to the federal government or knowingly making, using or causing to be made or used a false record or statement material to a false or fraudulent claim to the federal government. A claim includes "any request or demand" for money or property presented to the U.S. government. A number of biopharmaceutical and other healthcare companies have been prosecuted under these laws for allegedly providing payments or other items of value to customers with the expectation that the customers would bill federal programs for their products or services. Other companies have been prosecuted for causing false claims to be submitted because of the companies' marketing of products for unapproved, and thus non-reimbursable, uses.

The federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, created additional federal criminal statutes that prohibit, among other things, knowingly and willfully executing a scheme to defraud any healthcare benefit program, including private third-party payors and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Also, many states have similar fraud and abuse statutes or regulations that apply to items and services reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payor.

The federal Physician Payments Sunshine Act requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with specific exceptions, to report annually to the Centers for Medicare & Medicaid Services, or CMS, information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), and teaching hospitals, and applicable manufacturers and applicable group purchasing organizations to report annually to CMS ownership and investment interests held by physicians and their immediate family members. As of January 2022, applicable manufacturers are also required to report such information regarding its payments and other transfers of value to physician assistants, nurse practitioners, clinical nurse specialists, anesthesiologist assistants, certified registered nurse anesthetists and certified nurse midwives during the previous year. We may also be subject to similar state laws.

Because of the breadth of these laws and the narrowness of available statutory exceptions and regulatory safe harbors, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If our operations are found to be in violation of any of the federal and state laws described above or any other governmental regulations that apply to us, we may be subject to significant criminal, civil and administrative penalties including damages, fines, imprisonment, disgorgement, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, contractual damages, reputational harm, diminished profits and future earnings, exclusion from participation in government healthcare programs and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. To the extent that any of our products are sold in a foreign country, we may be subject to similar foreign laws and regulations.

Coverage and Reimbursement

The future commercial success of our product candidates, if approved, will depend in part on the extent to which third-party payors, such as governmental payor programs at the federal and state levels, including Medicare and Medicaid, private health insurers and other third-party payors, provide coverage of and establish adequate reimbursement levels for our product candidates. Third-party payors generally decide which products they will pay for and establish reimbursement levels for those products. In particular, in the United States, no uniform policy for coverage and reimbursement exists. Private health insurers and other third-party payors often provide coverage and reimbursement for products based on the level at which the government, through the Medicare program, provides coverage and reimbursement for such products, but also on their own methods and approval process apart from Medicare determinations. Therefore, coverage and reimbursement can differ significantly from payor to payor.

In the United States, the EU and other potentially significant markets for our product candidates, government authorities and third-party payors are increasingly attempting to limit or regulate the price of products, particularly for new and innovative products, which often has resulted in average selling prices lower than they would otherwise be. Further, the increased emphasis on managed healthcare in the United States and on country and regional pricing and reimbursement controls in the EU will put additional pressure on product pricing, reimbursement and usage. These pressures can arise from rules and practices of managed care groups, judicial decisions and laws and regulations related to Medicare, Medicaid and healthcare reform, biopharmaceutical coverage and reimbursement policies and pricing in general.

Third-party payors may limit coverage to specific products on an approved list, or formulary, which might not include all of the FDA-approved products for a particular indication. Similarly, because certain of our product candidates are physician-administered, separate reimbursement for the product itself may or may not be available. Instead, the administering physician may only be reimbursed for providing the treatment or procedure in which our product is used. Third-party payors are increasingly challenging the price and examining the medical necessity and cost-effectiveness of products, in addition to their safety and efficacy. We may need to conduct expensive pharmacoeconomic trials in order to demonstrate the medical necessity and cost-effectiveness of our product candidates. Adequate third-party payor reimbursement may not be available to enable us to realize an appropriate return on our investment in product development.

Healthcare Reform

The United States and some foreign jurisdictions are considering enacting or have enacted a number of additional legislative and regulatory proposals to change the healthcare system in ways that could affect our ability to sell our product candidates profitably, if approved. Among policy makers and payors in the United States and elsewhere, there is significant interest in promoting changes in healthcare systems with the stated goals of containing healthcare costs, improving quality and expanding access. In the United States, the biopharmaceutical industry has been a particular focus of these efforts, which include major legislative initiatives to reduce the cost of care through changes in the healthcare system, including limits on the pricing, coverage, and reimbursement of biopharmaceutical products, especially under government-funded healthcare programs, and increased governmental control of drug pricing.

Pharmaceutical Prices

On August 16, 2022, the Inflation Reduction Act of 2022, or IRA, was signed into law by President Biden. The new legislation has implications for Medicare Part D, which is a program available to individuals who are entitled to Medicare Part A or enrolled in Medicare Part B to give them the option of paying a monthly premium for outpatient prescription drug coverage. Among other things, the IRA requires manufacturers of certain drugs to engage in price negotiations with Medicare (beginning in 2026), with prices that can be negotiated subject to a cap; imposes rebates under Medicare Part B and Medicare Part D to penalize price increases that outpace inflation (first due in 2023); and replaces the Part D coverage gap discount program with a new discounting program (beginning in 2025). The IRA permits the Secretary of HHS to implement many of these provisions through guidance, as opposed to regulation, for the initial years.

These provisions of the IRA may also further heighten the risk that we would not be able to achieve the expected return on our drug products or full value of our patents protecting our products if prices are set after such products have been on the market for nine years.

The legislation also requires manufacturers to pay rebates for drugs in Medicare Part D whose price increases exceed inflation. The new law also caps Medicare out-of-pocket drug costs at an estimated $4,000 a year in 2024 and, thereafter, beginning in 2025, at $2,000 a year. Among other things, the IRA contains many provisions aimed at reducing this financial burden on individuals by reducing the co-insurance and co-payment costs, expanding eligibility for lower income subsidy plans, and price caps on annual out-of-pocket expenses, each of which could have potential pricing and reporting implications.

Accordingly, while it is currently unclear how the IRA will be effectuated, we cannot predict with certainty what impact any federal or state health reforms will have on us, but such changes could impose new or more stringent regulatory requirements on our activities or result in reduced reimbursement for our products, any of which could adversely affect our business, results of operations and financial condition.

At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control biopharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional healthcare authorities and individual hospitals are increasingly using bidding procedures to determine which drugs and suppliers will be included in their healthcare programs. A number of states, for example, require drug manufacturers and other entities in the drug supply chain, including health carriers, pharmacy benefit managers, and wholesale distributors, to disclose information about pricing of pharmaceuticals. Furthermore, there has been increased interest by third party payors and governmental authorities in reference pricing systems and publication of discounts and list prices. These measures could reduce future demand for our products or put pressure on our pricing.

Foreign Regulation

In order to market any product outside of the United States, we would need to comply with numerous and varying regulatory requirements of other countries regarding safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of our product candidates. For example, in the EU, we must obtain authorization of a clinical trial application in each member state in which we intend to conduct a clinical trial. The approval process varies from country to country and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country may negatively impact the regulatory process in others.

Privacy Laws

We, and our service providers, receive, process, store and use personal information and other data about our clinical trial participants, employees, collaborators and others. We are subject to numerous domestic and foreign laws and regulations regarding privacy and data security, the scope of which is changing, subject to differing applications and interpretations, and may be inconsistent among countries, or conflict with other rules.

At the federal level, HIPAA, imposes specific requirements on certain types of individuals and entities relating to the privacy, security and transmission of individually identifiable health information. Penalties for failure to comply with these requirements vary significantly, and include significant civil monetary penalties and, in certain circumstances, criminal penalties and/or imprisonment.

Various states, such as California, Colorado, Texas, Utah and Virginia have adopted privacy laws, including laws and regulations similar to HIPAA, that impose restrictive requirements regulating the use and disclosure of health information and other types of personal information. Where state laws are more protective, we have to comply with the stricter provisions. In addition to fines and penalties imposed upon violators, some of these state laws also afford private rights of action to individuals who believe their personal information has been misused.

Regulation of privacy, data protection and data security has also become more stringent in foreign jurisdictions. For example, the EU adopted the GDPR, which imposes onerous and comprehensive privacy, data protection, and data security obligations onto data controllers and processors, including, as applicable, contractual privacy, data protection, and data security commitments, expanded disclosures to data subjects about how their personal information is used, honoring individuals' data protection rights, limitations on retention of personal information, additional requirements pertaining to sensitive information (such as health data) and pseudonymized (i.e., key-coded) data, data breach notification requirements, and higher standards for obtaining consent from data subjects. Penalties for non-compliance with the GDPR can be significant. Assisting parties with whom we exchange personal data in complying with the GDPR, or complying with the GDPR ourselves, may cause us to incur substantial operational costs or require us to change our business practices.

Furthermore, European privacy, data protection, and data security laws, including the GDPR, generally restrict the transfer of personal information from the U.K., European Economic Area, or EEA, and Switzerland to the United States and most other countries unless the parties to the transfer have implemented specific safeguards to protect the transferred personal information. There is uncertainty as to how to implement such safeguards and how to conduct such transfers in compliance with the GDPR, and certain safeguards may not be available or applicable with respect to some or all the personal information processing activities necessary to research, develop and market our products and services. EU regulators have recently adopted a new set of Standard Contractual Clauses, which impose additional obligations and requirements with respect to the transfer of EU personal data to other jurisdictions and may increase the legal risks and liabilities under the GDPR and local EU laws associated with cross-border data transfers, and result in material increased compliance and operational costs. If we are unable to implement a valid mechanism for personal information transfers to the United States and other countries, we may face increased exposure to regulatory actions, substantial fines, and injunctions against processing or transferring personal information from Europe, and we may be required to increase our data processing capabilities in Europe at significant expense. Inability to import personal information from Europe to the United States or other countries may limit our ability to conduct clinical trials in Europe and collaborate with other entities subject to European data protection laws. At present, there are few, if any, viable alternatives to the Standard Contractual Clauses. Other countries outside of Europe have enacted or are considering enacting similar cross-border data transfer restrictions and laws requiring local data residency, which could increase the cost and complexity of delivering our services and operating our business.

We may rely on others, such as health care providers, to obtain valid and appropriate consents from data subjects whose data we process. The failure of third parties to obtain consents that are valid under applicable law could result in our own non-compliance with privacy laws. Such failure to comply with U.S. and foreign privacy, data protection, and data security laws and regulations could result in government enforcement actions (which could include civil or criminal penalties), private litigation and/or adverse publicity and could negatively affect our operating results and business.

Claims that we have violated individuals' privacy rights, failed to comply with privacy, data protection, and data security laws, or breached our contractual obligations, even if we are not found liable, could be expensive and time consuming to defend, could result in adverse publicity and could have a material adverse effect on our business, financial condition, and results of operations.

Human Capital Management

Employees

Our inclusive, patient-centric culture is critical to delivering on our mission to transform patients' lives. Our human capital programs are aimed at fostering engagement, innovation and community.

As of December 31, 2023, we had 587 full-time employees, 435 of whom were primarily engaged in research and development activities. As a result of the COVID-19 pandemic, in March 2020, we implemented work-from-home policies for most of our employees. To the extent possible, we offer our employees the choice of working full-time in the office, a hybrid approach, or full-time remote. Our employees who work full-time in the office are predominantly located in San Francisco, California; St. Louis, Missouri; Portland, Oregon; and Bellinzona, Switzerland. Our St. Louis, Missouri, and Portland Oregon offices will be closing in 2024. None of our employees are represented by a labor union and we consider our employee relations to be good.

The principal purpose of our equity incentive plan is to attract, retain, and motivate our employees, non-employee directors, and consultants through the granting of stock-based compensation and performance cash awards.

In addition to highly competitive base compensation, bonus structure and awards granted pursuant to our equity incentive plan, we offer numerous benefits to employees on a country-by-country basis, including a 401(k) plan with matching, health (medical, dental and vision) insurance, life insurance, paid time off, paid parental leave and short-term and long-term disability. To drive further engagement and individual ownership of the Company, we also maintain an employee stock purchase plan, which provides eligible employees an opportunity to purchase additional VIR stock at a discounted price.

Equity, Inclusion and Development

Vir takes a proactive approach to promoting equity and inclusion. In addition to being an equal opportunity employer, we proactively use a specialized software tool to reduce bias in our job postings to ensure that we utilize inclusive language to reach the broadest range of applicants. We support formalized employee resource groups and initiatives such as heritage and inclusivity focused events, open forum discussions, ongoing mentoring, and networking for our employees. To ensure pay equity at all levels, we use a leading independent third party pay equity firm to perform an annual independent audit of our pay practices.

Vir offers ongoing, targeted inclusive developmental training for employees and leaders. We cultivate an environment where all employees can develop personally and professionally. Within this, we focus on individual opportunities for growth, developing people managers' skills and cultivating our leaders' capabilities to align the organization in service of our mission.

Additionally**,** Vir values the diversity of its leaders, with female and minority directors comprising over 45% of our current board of directors and women comprising 70% of Vir's management team.

Our Corporate Information

We were incorporated under the laws of the State of Delaware on April 7, 2016. Our principal executive offices are located at 1800 Owens Street, Suite 900, San Francisco, California 94158, and our telephone number is (415) 906-4324. Our corporate website address is www.vir.bio. Information contained on, or accessible through, our website shall not be deemed incorporated into and is not a part of this Annual Report on Form 10-K, and the inclusion of our website address in this report is an inactive textual reference only. We make available free of charge through our website our Annual Report on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act. We make these reports available through our website as soon as reasonably practicable after we electronically file such reports with, or furnish such reports to, the SEC. We may use our website as a means of disclosing material non-public information and for complying with our disclosure obligations under Regulation Fair Disclosure promulgated by the SEC. These disclosures will be included on our website under the "Investors" section.

Item 1A. Risk Factors.

An investment in shares of our common stock involves a high degree of risk. You should carefully consider the following risk factors as well as the other information in this Annual Report on Form 10-K, including our unaudited condensed consolidated financial statements and the related notes and "Management's Discussion and Analysis of Financial Condition and Results of Operations," before deciding whether to invest in our common stock. The occurrence of any of the events or developments described below could harm our business, financial condition, results of operations and/or prospects or cause our actual results to differ materially from those contained in forward-looking statements we have made in this Annual Report on Form 10-K and those we may make from time to time. In such an event, the market price of our common stock could decline, and you may lose all or part of your investment. You should consider all of the risk factors described when evaluating our business.

Risk Factors Summary

Our business is subject to a number of risks of which you should be aware before making a decision to invest in our common stock. These risks include, among others, the following:

- We have incurred net losses and anticipate that we will continue to incur net losses in the foreseeable future.
- We do not expect meaningful future revenue from the sale of sotrovimab for the treatment of COVID-19, even if it were reauthorized by the FDA. If the FDA were to revise or revoke our EUA, our business could be adversely impacted.
- Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.
- We may require substantial additional funding to finance our operations. If we are unable to raise capital when needed, we could be forced to delay, reduce or terminate certain of our development programs or other operations.
- Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our product candidates.
- Our future success is substantially dependent on the successful clinical development, regulatory approval and commercialization of our product candidates in a timely manner. If we are not able to obtain required regulatory approvals, we will not be able to commercialize our product candidates and our ability to generate product revenue will be adversely affected.
- The development of additional product candidates is risky and uncertain, and we can provide no assurances that we will be able to replicate our approach for other diseases.
- Success in preclinical studies or earlier clinical trials may not be indicative of results in future clinical trials and we cannot assure you that any ongoing, planned or future clinical trials will lead to results sufficient for the necessary regulatory approvals and marketing authorizations. We have and may continue to commit substantial financial resources with respect to clinical trials that may not be successful, and we may not be able to recoup those investments.
- Enrollment and retention of patients in clinical trials is an expensive and time-consuming process and could be delayed, made more difficult or rendered impossible by multiple factors outside our control.
- We are a party to strategic collaboration and license agreements pursuant to which we are obligated to make substantial payments upon achievement of milestone events and, in certain cases, have relinquished important rights over the development and commercialization of certain current and future product candidates. We also intend to explore additional strategic collaborations, which may never materialize or may require that we spend significant additional capital or that we relinquish rights to and control over the development and commercialization of our product candidates.
- The deployment of artificial intelligence in our, or our collaborators', efforts to discover and develop next-generation antibodies or other investigational products, could adversely affect our business, reputation, or financial results.
- Even if any of our product candidates receive marketing approval, they may fail to achieve adoption by physicians, patients, third-party payors or others in the medical community necessary for commercial success.
- We rely on third parties to produce clinical and commercial supplies of our product candidates.

- We rely on third parties to conduct, supervise and monitor our preclinical studies and clinical trials, and if those third parties perform in an unsatisfactory manner, it may harm our business.
- If we breach our license agreements or any of the other agreements under which we acquired, or will acquire, the intellectual property rights to our product candidates, we could lose the ability to continue the development and commercialization of the related product candidates.
- If we are unable to obtain and maintain patent protection for our product candidates and technology, or if the scope of the patent protection obtained is not sufficiently broad or robust, our competitors could develop and commercialize products and technology similar or identical to ours, and our ability to successfully commercialize our product candidates and technology may be adversely affected.
- The exercise by the Bill & Melinda Gates Foundation of its licenses to certain of our intellectual property and its development and commercialization of products that we are also developing and commercializing could have an adverse impact on our market position.
- We are highly dependent on our key personnel, and if we are not able to retain these members of our management team or recruit and retain additional management, clinical and scientific personnel, our business will be harmed.
- We have experienced significant growth in our organization in recent years and expect to continue to expand, and we may experience difficulties in managing this growth, which could disrupt our operations.
- If our information systems, or those maintained on our behalf, fail or suffer security breaches, such events could result in, without limitation, the following: a significant disruption of our product development programs; an inability to operate our business effectively; unauthorized access to or disclosure of the personal information we process; and other adverse effects on our business, financial condition, results of operations and prospects.
- The market price of our common stock has been, and in the future, may be, volatile and fluctuate substantially, which could result in substantial losses for purchasers of our common stock.

Risks Related to Our Financial Position and Capital Needs

We have incurred net losses and anticipate that we will continue to incur net losses in the foreseeable future.

Although we recorded net income for the years ended December 31, 2022, and 2021, we have otherwise incurred net losses since inception in April 2016. We had net loss of $615.1 million and net income of $515.8 million for the years ended December 31, 2023 and 2022, respectively. As of December 31, 2023, we had an accumulated deficit of $237.8 million.

We expect to continue to incur significant expenses and will continue to incur net losses in the foreseeable future. Since inception, we have devoted substantially all of our efforts to identifying, researching and conducting preclinical and clinical activities of our product candidates, acquiring and developing our technology platforms and product candidates, organizing and staffing our company, business planning, raising capital and establishing our intellectual property portfolio.

It could be several years, if ever, before we are able to commercialize any of our product candidates. Any net losses we incur may fluctuate significantly from quarter to quarter and year to year. To become profitable, we must succeed in developing and eventually commercializing products that generate significant revenue. This will require us to be successful in a range of challenging activities, including completing preclinical studies and clinical trials of our current and future product candidates, obtaining regulatory approval, procuring commercial-scale manufacturing and marketing and selling any products for which we obtain regulatory approval (including through third parties), as well as discovering or acquiring and developing additional product candidates. We are only in the preliminary stages of most of these activities. We may never succeed in these activities and, even if we do, may not be able to continue to generate revenue that is sufficient to offset our expenses and maintain profitability.

Because of the numerous risks and uncertainties associated with biopharmaceutical product development, we are unable to accurately predict the timing or amount of expenses, or if we will be able to return to profitability. If we are required by regulatory authorities to perform studies and trials in addition to those currently expected, or if there are any delays in the initiation and completion of our clinical trials or the development of any of our product candidates, our expenses could increase.

Our failure to return to being profitable would decrease the value of our company and could impair our ability to raise capital, maintain our research and development efforts, expand our business or continue our operations.

We do not expect meaningful future revenue from the sale of sotrovimab for the treatment of COVID-19, even if it were reauthorized by the FDA. If the FDA were to revise or revoke our EUA, our business could be adversely impacted.

In May 2021, we, along with our partner GSK, received an Emergency Use Authorization, or EUA, from the U.S. Food and Drug Administration, or FDA, for the sale of sotrovimab for the treatment of COVID-19. In March and April 2022, the FDA amended the EUA fact sheet to exclude sotrovimab use in geographic regions where infection is likely to have been caused by a non-susceptible SARS-CoV-2 variant based on available information, including variant susceptibility to these drugs and regional variant frequency. With this EUA revision, sotrovimab is not currently authorized for use in any U.S. region, and we cannot predict whether (if at all) or to what extent sotrovimab may be reauthorized for use by the FDA in any U.S. region in the future. In addition, there can be no assurance with respect to how long the EUA will remain in effect or whether the EUA will be further revised or revoked by the FDA following the termination of the underlying public health emergency declaration on May 11, 2023 or for other reasons. Furthermore, due to the evolving COVID-19 landscape and based on discussions with the FDA, we and Glaxo Wellcome UK Limited and GlaxoSmithKline Biologicals S.A. (individually and collectively referred to as GSK) do not plan to file a Biologics License Application, or BLA, for sotrovimab at this time.

In May 2021, we and our partner GSK also received a positive scientific opinion from the Committee for Human Medicinal Products, or CHMP, in the European Union, or EU, for sotrovimab and to date, sotrovimab has obtained emergency authorization, temporary authorization or marketing approval (under the brand name Xevudy®) for early treatment of COVID-19, and has been supplied in more than 30 countries. However, foreign regulatory authorities may impose similar limitations to the FDA on the use of sotrovimab in jurisdictions where sotrovimab has been granted EUA, temporary authorization or marketing approval. For example, although certain countries outside the U.S. continue to maintain access to 500 mg IV while noting that the clinical efficacy is unknown or uncertain against existing and emerging Omicron variants, we cannot predict whether other countries will further limit the use of sotrovimab.

Furthermore, based on the evolving COVID-19 landscape and our expectations for future sales in light of these factors, there are no assurances that we will secure future supply commitments from governments. In addition, COVID-19 treatment standards are susceptible to rapid changes in epidemiology and the emergence of new variants or subvariants, which may render sotrovimab inferior or obsolete in the future.

In addition, there can be no assurance with respect to how long the EUA will remain in effect or whether the EUA will be further revised or revoked by the FDA following the termination of the underlying public health emergency declaration on May 11, 2023, or for other reasons. Any such revision or revocation of our EUA by the FDA could adversely impact our business in a variety of ways, including having to absorb related manufacturing and overhead costs as well as potential inventory write-offs. Furthermore, if we or our collaborators experience inventory revaluation adjustments, lower of cost or market inventory adjustments, and excess inventory, it may be necessary to write down or write-off inventory or incur an impairment charge with respect to the facility where such product is manufactured, which could adversely affect our operating results. For example, during the year ended December 31, 2023, we released approximately $35.7 million of constraint related to sotrovimab due to changes in estimated allowable manufacturing expenses as agreed to with GSK.

Due to the evolving COVID-19 landscape and based on discussions with the FDA, we and GSK do not plan to file a BLA for sotrovimab at this time. Furthermore, foreign regulatory authorities may impose similar limitations to the FDA on the use of sotrovimab in jurisdictions where sotrovimab has been granted EUA, temporary authorization or marketing approval. Although certain countries outside the U.S. continue to maintain access to 500 mg IV while noting that the clinical efficacy is unknown or uncertain against existing and emerging Omicron variants, we cannot predict whether other countries will limit the use of sotrovimab.

Even if we were to file a BLA or marketing applications in other jurisdictions, it is possible that the FDA and other regulatory authorities may not grant sotrovimab full marketing approval for the treatment of COVID-19, or that any such marketing approvals, if granted, may have similar or other significant limitations on its use. If the FDA does not reauthorize the use of sotrovimab in the U.S., and/or if countries outside of the U.S. continue to limit its use, we may be unable to sell sotrovimab in or outside of the U.S.

The FDA may revise or revoke an EUA if the circumstances justifying its issuance no longer exist, the criteria for its issuance are no longer met, or other circumstances make a revision or revocation appropriate to protect public health or safety. An EUA may also be terminated upon a declaration by the Secretary of HHS that the public health emergency has ended. The public health emergency declarations related to COVID-19 ended on May 11, 2023.

At this point, it is unclear how, if at all, these developments will impact our EUA. We, therefore, cannot predict how long our EUA will remain in effect, and we may not receive advance notice from the FDA regarding revocation of our EUA. If our EUA is terminated or revoked, sotrovimab cannot be reauthorized by the FDA in the U.S. unless and until we have obtained FDA approval of a BLA for the product. Changing policies and regulatory requirements could limit, delay or prevent further commercialization of sotrovimab and could adversely impact our business, financial condition, results of operations and prospects.

For all of these reasons, we do not currently expect meaningful future revenue from sotrovimab for the treatment of COVID-19.

Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

We are a company founded in April 2016 and our operations to date have been largely focused on identifying, researching and conducting preclinical and clinical activities of our product candidates, acquiring and developing our technology platforms and product candidates, organizing and staffing our company, business planning, raising capital and establishing our intellectual property portfolio.

As an organization, beyond sotrovimab for COVID-19, we have not yet demonstrated an ability to successfully manufacture a BLA-approved, commercial-scale product or conduct sales and marketing activities necessary for successful commercialization. Consequently, any predictions about our future success or viability may not be as accurate as they could be if we had a longer operating history. We may encounter unforeseen expenses, difficulties, complications, delays and other known or unknown factors in achieving our business objectives, including with respect to our technology platforms and product candidates.

We may require substantial additional funding to finance our operations. If we are unable to raise capital when needed, we could be forced to delay, reduce or terminate certain of our development programs or other operations.

As of December 31, 2023, we had cash, cash equivalents and investments of $1.63 billion. Based upon our current operating plan, we believe that the $1.63 billion as of December 31, 2023 will fund our current operating plans for at least the next 12 months. However, our operating plan may change as a result of many factors currently unknown to us, and we may need to seek additional financing to fund our long-term operations sooner than planned. Moreover, it is particularly difficult to estimate with certainty our future revenue and expenses given the dynamic and rapidly evolving nature of our business. We may also need to raise additional capital to complete the development and commercialization of our product candidates and fund certain of our existing manufacturing and other commitments. Other unanticipated costs may also arise. Because the design and outcome of our clinical trials are highly uncertain, we cannot reasonably estimate the actual amount of resources and funding that will be necessary to successfully complete the development and commercialization of our product candidates or any future product candidates that we develop.

We expect to finance our cash needs through public or private equity or debt financings, third-party (including government) funding and marketing and distribution arrangements, as well as other collaborations, strategic alliances and licensing arrangements, or any combination of these approaches. Our future capital requirements will depend on many factors, including:

- the timing, progress and results of our ongoing preclinical studies and clinical trials of our product candidates;
- the scope, progress, results and costs of preclinical development, laboratory testing and clinical trials of other product candidates that we may pursue;
- our ability to establish and maintain collaboration, license, grant and other similar arrangements, and the opt-in mechanisms contained in, and the financial terms of, any such arrangements, including timing and amount of any future milestones, royalty or other payments due thereunder;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs and timing of commercialization activities, including product manufacturing, marketing, sales and distribution, for our product candidates for which we receive marketing approval;
- the amount of revenue received from commercial sales of any product candidates for which we receive marketing approval;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims;
- any expenses needed to attract, hire and retain skilled personnel;

- the costs of operating as a public company; and
- the extent to which we acquire or in-license other companies' product candidates and technologies.

General economic conditions, both inside and outside the U.S., including heightened inflation, capital market volatility, interest rate and currency rate fluctuations, and economic slowdown or recession, including the evolution of new and existing variants of COVID-19, and geopolitical events, including civil or political unrest (such as the ongoing war between Israel and Hamas and Ukraine and Russia), have resulted in a significant disruption of global financial markets. If the disruption persists and deepens, we could experience an inability to access additional capital, which could in the future negatively affect our capacity for certain corporate development transactions or our ability to make other important, opportunistic investments.

In addition, market volatility, high levels of inflation and interest rate fluctuations may increase our cost of financing or restrict our access to potential sources of future liquidity. Adequate additional financing may not be available to us on acceptable terms, or at all. If we are unable to raise capital when needed or on attractive terms, we could be forced to delay, reduce or altogether terminate our research and development programs or commercialization efforts, which may adversely affect our business, financial condition, results of operations and prospects. In addition, we may seek additional capital due to favorable market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans.

Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our product candidates.

Until such time, if ever, as we can generate substantial product revenue, we expect to finance our cash needs through public or private equity or debt financings, third-party (including government) funding and marketing and distribution arrangements, as well as other collaborations, strategic alliances and licensing arrangements, or any combination of these approaches. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest in our company may be diluted and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a stockholder. Debt and equity financings, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as redeeming our shares, making investments, incurring additional debt, making capital expenditures, declaring dividends or placing limitations on our ability to acquire, sell or license intellectual property rights.

If we raise additional capital through future collaborations, strategic alliances or licensing arrangements, we may have to relinquish valuable rights to our intellectual property, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional capital when needed, we may be required to delay, limit, reduce or terminate our product development or commercialization efforts or grant rights to develop and market product candidates that we would otherwise develop and market ourselves.

Adverse developments affecting the financial services industry, including events or concerns involving liquidity, defaults or nonperformance by financial institutions, could adversely affect our business, financial condition or results of operations.

We hold our cash, cash equivalents and investments that we use to meet our working capital and operating expense needs in accounts at multiple financial institutions. The balance held in these accounts typically exceeds the Federal Deposit Insurance Corporation, or FDIC, standard deposit insurance limit of $250,000. Should events, including limited liquidity, defaults, nonperformance or other adverse developments, occur with respect to the banks or other financial institutions that hold our funds, or that affect financial institutions or the financial services industry generally, or concerns or rumors arise about any events of these kinds or other similar risks, we could be subject to a risk of loss of all or a portion of such uninsured funds or be subject to a delay in accessing all or a portion of such uninsured funds. Any such loss or lack of access to these funds could adversely impact our short-term liquidity and ability to meet our operating expense obligations.

For example, in March 2023 Silicon Valley Bank, or SVB, and Signature Bank were each closed by state regulators and the FDIC was appointed receiver for each bank. Prior to such events, we held cash deposits at SVB in excess of government insured limits. The FDIC created successor bridge banks and all deposits of SVB and Signature Bank were transferred to bridge banks under a systemic risk exception approved by the United States Department of the Treasury, the Federal Reserve and the FDIC. If financial institutions in which we hold funds for working capital and operating expenses were to fail, we cannot provide any assurances that such governmental agencies would take action to protect our uninsured deposits in a similar manner.

In addition, investor concerns regarding the U.S. or international financial systems could result in less favorable commercial financing terms, including higher interest rates or costs and tighter financial and operating covenants, or systemic limitations on access to credit and liquidity sources, thereby making it more difficult for us to acquire financing on terms favorable to us, or at all, and could have a material adverse effect on our liquidity, our business, financial condition or results of operations.

Risks Related to Development and Commercialization

Our future success is substantially dependent on the successful clinical development, regulatory approval and commercialization of our product candidates in a timely manner. If we are not able to obtain required regulatory approvals, we will not be able to commercialize our product candidates and our ability to generate product revenue will be adversely affected.

We have invested a significant portion of our time and financial resources in the development of our product candidates and have initiated clinical trials for multiple product candidates. Our business is dependent on our ability to successfully complete development of, obtain regulatory approval for, and successfully commercialize our product candidates, if approved, in a timely manner. We may face unforeseen challenges in our product development strategy, and we can provide no assurances that our product candidates will be successful in clinical trials or will ultimately receive regulatory approval.

Prior to obtaining approval to commercialize any product candidate in the United States or abroad, we must demonstrate with substantial evidence from well-controlled clinical trials, and to the satisfaction of the FDA or comparable foreign regulatory authorities, that such product candidate is safe and effective for its intended uses. Results from preclinical studies and clinical trials can be interpreted in different ways. Even if we believe that the preclinical or clinical data for our product candidates are promising, such data may not be sufficient to support approval for further development, manufacturing or commercialization of our product candidates by the FDA and other regulatory authorities. The FDA or other regulatory authorities may also require us to conduct additional preclinical studies or clinical trials for our product candidates either prior to or post-approval, or it may object to elements of our clinical development program, requiring their alteration.

Even if we eventually complete clinical testing and receive approval of a new drug application, or NDA, BLA, or foreign marketing application for our product candidates, the FDA or the comparable foreign regulatory authorities may grant approval or other marketing authorization contingent on the performance of costly additional clinical trials, including post-market clinical trials. The FDA or the comparable foreign regulatory authorities also may approve or authorize for marketing a product candidate for a more limited indication or patient population than we originally request, and the FDA or comparable foreign regulatory authorities may not approve or authorize the labeling that we believe is necessary or desirable for the successful commercialization of a product candidate.

Any delay in obtaining, or inability to obtain, applicable regulatory approval or other marketing authorization would delay or prevent commercialization of that product candidate and would adversely impact our business and prospects.

In addition, the FDA or comparable foreign regulatory authorities may change their policies, adopt additional regulations or revise existing regulations or take other actions, which may prevent or delay approval of our future product candidates under development on a timely basis. Such policy or regulatory changes could impose additional requirements upon us that could delay our ability to obtain applicable regulatory approvals, increase the costs of compliance or restrict our ability to maintain any marketing authorizations we may have obtained.

For example, in December 2022, with the passage of Food and Drug Omnibus Reform Act, Congress required sponsors to develop and submit a diversity action plan for each Phase 3 clinical trial or any other "pivotal study" of a new drug or biological product. These plans are meant to encourage the enrollment of more diverse patient populations in late-stage clinical trials of FDA-regulated products. Specifically, actions plans must include the sponsor's goals for enrollment, the underlying rationale for those goals, and an explanation of how the sponsor intends to meet them. In addition to these requirements, the legislation directs the FDA to issue new guidance on diversity action plans. If we are slow or unable to adapt to changes in existing requirements or the adoption of new requirements or policies governing clinical trials, our development plans may be impacted.

Furthermore, even if we obtain regulatory approval for our product candidates, we may still need to develop a commercial organization, establish a commercially viable pricing structure and obtain approval for coverage and adequate reimbursement from third-party and government payors, including government health administration authorities. As a company, we have no prior experience in these areas. If we are unable to successfully commercialize our product candidates or if there is an insufficient demand for our product candidates, we may not be able to generate sufficient revenue to continue our business.

The development of additional product candidates is risky and uncertain, and we can provide no assurances that we will be able to replicate our approach for other diseases.

A core element of our business strategy is to expand our product candidate pipeline. Efforts to identify, acquire or in-license, and then develop product candidates require substantial technical, financial and human resources, whether or not any product candidates are ultimately identified. Our efforts may initially show promise in identifying potential product candidates, yet fail to yield product candidates for clinical development, approved products or commercial revenue for many reasons.

We have limited financial and management resources and, as a result, we may forego or delay pursuit of opportunities with other product candidates or for other indications that later prove to have greater market potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, strategic alliances, licensing or other royalty arrangements in circumstances under which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate. In addition, we may not be successful in replicating our approach to development for other disease indications. If we are unsuccessful in identifying and developing additional product candidates or are unable to do so, our business may be harmed.

Furthermore, we intend to seek approval to market our product candidates outside of the U.S., and may also do so for future product candidates. If we market approved products outside of the U.S., we expect that we will be subject to additional risks in commercialization. As a company, we have no prior experience in these areas. In addition, there are complex regulatory, tax, labor and other legal requirements imposed by many of the individual countries in which we may operate, with which we will need to comply. Many biopharmaceutical companies have found the process of marketing their products in foreign countries to be challenging.

We are developing, and in the future may develop, other product candidates in combination with other therapies, which exposes us to additional risks.

We are developing elebsiran and tobevibart for the functional cure of hepatitis B virus, or HBV, and for the chronic treatment of hepatitis delta virus, or HDV. Each of these product candidates has the potential to stimulate an effective immune response and has direct antiviral activity against HBV. We believe that a functional cure for HBV will require an effective immune response, in addition to antiviral activity, based on the observation that severe immunosuppression can reactivate HBV disease. Monotherapy with each of these agents may provide a functional cure in some patients, while combination therapy may be necessary for others. We have an ongoing Phase 2 clinical trial that combines elebsiran with pegylated interferon-alpha and a Phase 2 clinical trial that combines elebsiran with tobevibart. We are also evaluating additional combinations with other immunotherapy agents and direct acting antiviral agents. We also have a Phase 2 clinical trial evaluating elebsiran and tobevibart as a monotherapy or in combination for the treatment of chronic HDV. Even if any product candidate we develop were to receive marketing approval or be commercialized for use in combination with other existing therapies, we would continue to be subject to the risks that the FDA or comparable foreign regulatory authorities could revoke approval of the therapy used in combination with our product candidate. There is also a risk that safety, efficacy, manufacturing or supply issues could arise with these other existing therapies. For example, the other therapies may lead to toxicities that are improperly attributed to our product candidates or the combination of our product candidates with other therapies may result in toxicities that the product candidate or other therapy does not produce when used alone. This could result in our own products being removed from the market or being less successful commercially.

We may also evaluate our future product candidates in combination with one or more other therapies that have not yet been approved for marketing by the FDA or comparable foreign regulatory authorities. We will not be able to market any product candidate we develop in combination with any such unapproved therapies that do not ultimately obtain marketing approval.

If the FDA or comparable foreign regulatory authorities do not approve these other drugs or revoke their approval of, or if safety, efficacy, manufacturing or supply issues arise with, the drugs we choose to evaluate in combination with any product candidate we develop, we may be unable to obtain approval.

Success in preclinical studies or earlier clinical trials may not be indicative of results in future clinical trials and we cannot assure you that any ongoing, planned or future clinical trials will lead to results sufficient for the necessary regulatory approvals and market authorizations. We have and may continue to commit substantial financial resources with respect to clinical trials that may not be successful, and may not be able to recoup those investments.

Success in preclinical testing and earlier clinical trials does not ensure that later clinical trials will generate the same results or otherwise provide adequate data to demonstrate the efficacy and safety of a product candidate. Success in preclinical studies and earlier clinical trials does not ensure that later efficacy trials will be successful, nor does it predict final results. Our product candidates may fail to show the desired characteristics in clinical development sufficient to obtain regulatory approval, despite positive results in preclinical studies or having successfully advanced through earlier clinical trials. We have and may continue to commit substantial financial resources with respect to clinical trials that may not be successful, and we may not be able to recoup those investments.

For example, in July 2023, we announced that our Phase 2 clinical trial of VIR-2482 for the prevention of symptomatic influenza A illness did not meet primary or secondary efficacy endpoints. We committed substantial financial resources and made substantial capital commitments with third party contract development manufacturing organizations, or CDMOs, with respect to the raw materials and manufacturing in connection with VIR-2482.

As an organization, we have limited experience designing clinical trials and may be unable to design and execute a clinical trial to support regulatory approval, which could mean we will suffer setbacks. Any such setbacks could negatively impact our business, financial condition, results of operations and prospects.

Interim, "top-line" and preliminary data from our clinical trials that we announce or publish from time to time may change as more patient data become available and are subject to audit and verification procedures that could result in material changes in the final data.

From time to time, we may publish interim, "top-line" or preliminary data from our clinical trials. Interim data from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as patient enrollment continues and more patient data become available. Preliminary or "top-line" data also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data is available. Differences between preliminary or interim data and final data could significantly harm our business prospects and may cause the trading price of our common stock to fluctuate significantly.

Clinical product development involves a lengthy and expensive process. We may incur additional costs and encounter substantial delays or difficulties in our clinical trials.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must complete preclinical development and then conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. Clinical testing is expensive, is difficult to design and implement, can take many years to complete and is inherently uncertain as to outcome. We do not know whether our planned clinical trials will begin or enroll on time, will be conducted as planned, will need to be redesigned or will be completed on schedule, if at all. For example, the availability of superior or competitive therapies coupled with changing standards of care could limit our ability to perform placebo-controlled trials and/or require us to enroll a larger number of subjects to address competing treatments. A failure or significant delay of one or more clinical trials can occur at any stage of testing. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. We may experience numerous unforeseen events prior to, during, or as a result of clinical trials that could delay or prevent our ability to receive marketing approval or commercialize our product candidates.

Any inability to successfully complete preclinical and clinical development could result in additional costs to us or impair our ability to generate revenue from future product sales or other sources. In addition, if we make manufacturing or formulation changes to our product candidates, we may need to conduct additional testing to bridge our modified product candidate to earlier versions. Clinical trial delays could also shorten any periods during which we may have the exclusive right to commercialize our product candidates, if approved, or allow our competitors to bring competing products to market before we do, which could impair our ability to successfully commercialize our product candidates and may harm our business, financial condition, results of operations and prospects.

Additionally, if the results of our clinical trials are inconclusive or if there are safety concerns or serious adverse events associated with our product candidates, we may:

- be delayed in obtaining marketing approval, or not obtain marketing approval at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- be subject to additional post-marketing testing requirements;
- be required to perform additional clinical trials to support approval or be subject to additional post-marketing testing requirements;
- have regulatory authorities withdraw, or suspend, their approval of the product or impose restrictions on its distribution in the form of a risk evaluation and mitigation strategy, or REMS;
- be subject to the addition of labeling statements, such as warnings or contraindications;
- be sued; or
- experience damage to our reputation.

Our product development costs may be greater than anticipated or may increase if we experience delays in testing or obtaining marketing approvals. We do not know whether any of our preclinical studies or clinical trials will begin as planned, will be conducted as planned, will need to be restructured or will be completed on schedule, if at all. For example, enrollment and retention of patients in clinical trials could be disrupted by geopolitical events, including civil or political unrest, terrorism, insurrection or war (such as the ongoing war between Israel and Hamas and Ukraine and Russia), man-made or natural disasters, or public health pandemics or epidemics or other business interruptions, including the COVID-19 pandemic and future outbreaks of the disease.

Furthermore, our product candidates are based on certain innovative technology platforms, which makes it even more difficult to predict the time and cost of product candidate development and obtaining necessary regulatory approvals, particularly for our cytomegalovirus, or CMV, vector technologies. In addition, the compounds we are developing may not demonstrate in patients the chemical and pharmacological properties ascribed to them in preclinical studies, and they may interact with human biological systems in unforeseen, ineffective or harmful ways.

As part of our T cell platform, our approach is to use human CMV, or HCMV, as a vaccine vector to potentially treat and prevent pathogens refractory to current vaccine technologies because HCMV may induce potent and long-lasting T cell responses to a broader range of epitopes than observed for other viral vaccines. Also, because our HCMV-vector technology is novel, regulatory agencies may lack experience with product candidates such as VIR-1388, which may lengthen the regulatory review process, increase our development costs and delay or prevent commercialization of our product candidates. In addition, our HCMV-vector technology utilizes live-attenuated, genetically-modified organisms for which the FDA, the European Medicines Agency, or EMA, and other comparable foreign regulatory authorities and other public health authorities, such as the Centers for Disease Control and Prevention and hospitals involved in clinical trials, have established additional safety and contagion rules and procedures, which could establish additional hurdles for the development, manufacture or use of our vectors. These hurdles may lead to delays in the conduct of clinical trials or in obtaining regulatory approvals for further development, manufacturing or commercialization of our product candidates.

Further, we, the FDA, a foreign regulatory authority or an institutional review board may place a full or partial hold on our clinical trials at any time if it appears that we or our collaborators are failing to conduct a trial in accordance with regulatory requirements, including the FDA's current Good Clinical Practice, or GCP, regulations, that we are exposing participants to unacceptable health risks, or if the FDA or foreign regulatory authority finds deficiencies in our IND applications or clinical trial applications, respectively, or the conduct of these trials. Moreover, we may not be able to file INDs to commence additional clinical trials on the timelines we expect because our filing schedule is dependent on further preclinical and manufacturing progress. Therefore, we cannot predict with any certainty the schedule for commencement and completion of future clinical trials. If we experience delays in the commencement or completion of our clinical trials, or if we terminate a clinical trial prior to completion, the commercial prospects of our product candidates could be negatively impacted, and our ability to generate revenue from our product candidates may be delayed.

Our inability to bring a product to market or a significant delay in the expected approval and related launch date of a new product for any of the reasons discussed above could have a negative effect on our stock price and related market capitalization and could result in a significant impairment of goodwill, other intangible assets and long-lived assets.

Enrollment and retention of patients in clinical trials is an expensive and time-consuming process and could be delayed, made more difficult or rendered impossible by multiple factors outside our control.

Identifying and qualifying patients to participate in our clinical trials is critical to our success. In particular, clinical trials for prophylaxis are impacted by many factors including competing therapies that tend to require enrollment of a larger number of subjects than clinical trials for treatments. We may encounter difficulties in enrolling patients in our clinical trials, thereby delaying or preventing development and approval of our product candidates. Even once enrolled, we may be unable to retain a sufficient number of patients to complete any of our trials. Patient enrollment and retention in clinical trials depend on many factors, including the size of the patient population, the nature of the trial protocol, the existing body of safety and efficacy data, changing standards of care, the number and nature of competing treatments and ongoing clinical trials of competing therapies for the same indication, the proximity of patients to clinical sites and the eligibility criteria for the trial. The enrollment and retention of patients in our clinical trials may be disrupted or delayed as a result of, for example, regulatory feedback, clinicians' and patients' perceptions as to the potential advantages of therapies in development in relation to other available therapies, including products that have been recently authorized under EUAs or approved and licensed through NDAs and BLAs. In addition, enrollment and retention of patients in clinical trials could be disrupted by geopolitical events, including civil or political unrest, terrorism, insurrection or war (such as the ongoing war between Israel and Hamas and Ukraine and Russia), man-made or natural disasters, or public health pandemics or epidemics or other business interruptions, including, the current COVID-19 pandemic and future outbreaks of the disease.

Our efforts to build relationships with patient communities may not succeed, which could result in delays in patient enrollment in our clinical trials. Any negative results we may report in clinical trials of our product candidates may make it difficult or impossible to recruit and retain patients in other clinical trials of that same product candidate. Delays or failures in planned patient enrollment or retention may result in increased costs, program delays or both, which could have a harmful effect on our ability to develop our product candidates or could render further development impossible. In addition, we may rely on contract research organizations, or CROs, and clinical trial sites to ensure proper and timely conduct of our future clinical trials and, while we intend to enter into agreements governing their services, we will be limited in our ability to ensure their actual performance.

Our product candidates may cause undesirable side effects or have other properties that could delay or prevent their regulatory approval, limit their commercial potential or result in significant negative consequences following any potential marketing approval.

During the conduct of clinical trials, patients report changes in their health, including illnesses, injuries and discomforts, to their doctor. Often, it is not possible to determine whether or not the product candidate being studied caused these conditions. Regulatory authorities may draw different conclusions and may require us to pause our clinical trials or require additional testing to confirm these determinations, if they occur.

In addition, it is possible that as we test our product candidates in larger, longer and more extensive clinical trials, or as use of these product candidates becomes more widespread if they receive regulatory approval, illnesses, injuries, discomforts and other adverse events that were not observed in earlier trials, as well as conditions that did not occur or went undetected in previous trials, will be reported by subjects or patients. Many times, side effects are only detectable after investigational products are tested in large-scale pivotal trials or, in some cases, after they are made available to patients on a commercial scale after approval. If additional clinical experience indicates that any of our product candidates have side effects or cause serious or life-threatening side effects, the development of the product candidate may fail or be delayed, or, if the product candidate has received regulatory approval, such approval may be revoked, which would harm our business, financial condition, results of operations and prospects.

We are a party to strategic collaboration and license agreements pursuant to which we are obligated to make substantial payments upon achievement of milestone events and, in certain cases, have relinquished important rights over the development and commercialization of certain current and future product candidates. We also intend to explore additional strategic collaborations, which may never materialize or may require that we spend significant additional capital or that we relinquish rights to and control over the development and commercialization of our product candidates.

We are a party to various strategic collaboration and license agreements that are important to our business and to our current and future product candidates pursuant to which we license a number of technologies to form our technology platforms. These agreements contain obligations that require us to make substantial payments in the event certain milestone events are achieved. For additional information regarding these and other collaboration, license and grant agreements, see the section titled "Business—Our Collaboration, License and Grant Agreements".

A core element of our business strategy includes continuing to acquire or in-license additional technologies or product candidates for the treatment and prevention of serious infectious diseases and other serious conditions. As a result, we intend to periodically explore a variety of possible strategic collaborations or licenses in an effort to gain access to additional product candidates, technologies or resources.

At this time, we cannot predict what form such strategic collaborations or licenses might take. We are likely to face significant competition in seeking appropriate strategic collaborators, strategic collaborations and licenses can be complicated and we may not be able to negotiate strategic collaborations on acceptable terms, or at all. If we are unable to enter into new strategic collaborations or licenses related to our product candidates in certain geographies for certain indications, we may not be able to develop and commercialize certain of our product candidates which would harm our business prospects, financial condition and results of operations.

Our current and future strategic collaborations and licenses could subject us to a number of risks, including the following:

- we may be required to assume substantial actual or contingent liabilities;
- we may not be able to control the amount and timing of resources that our strategic collaborators devote to the development or commercialization of our product candidates;
- strategic collaborators may select dosages or indications, or design clinical trials, in a way that may be less successful than if we were doing so or in a way that may differ from our strategy, which could negatively impact our development, manufacturing and commercialization of the same or a similar product candidate;
- strategic collaborators may not pursue further development and commercialization of products resulting from the strategic collaboration arrangement due to development programs based on data readouts, changes in their strategic focus as a result of an acquisition of competitive products or other internal pipeline advancements, availability of funding or other external factors, that diverts resources or creates competing priorities;
- disputes may arise between us and our strategic collaborators that result in costly litigation or arbitration that diverts management's attention and consumes resources;
- strategic collaborators may experience financial difficulties;
- strategic collaborators may not properly maintain, enforce or defend our intellectual property rights or may use our proprietary information in a manner that could jeopardize or invalidate our proprietary information or expose us to potential litigation; and
- strategic collaborators could terminate the arrangement or not exercise their opt-in rights, which may delay the development, may increase the cost of developing our product candidates and result in a need for additional capital to pursue further development or commercialization of the applicable product candidates.

Furthermore, license agreements we enter into in the future may not provide exclusive rights to use intellectual property and technology in all relevant fields of use and in all territories in which we may wish to develop or commercialize our technology and products. As a result, we may not be able to prevent competitors from developing and commercializing competitive products in territories included in all of our licenses.

The deployment of artificial intelligence in our, or our collaborators', efforts to discover, develop, and engineer next-generation antibodies or other investigational products, could adversely affect our business, reputation, or financial results.

We integrate artificial intelligence and machine learning, or AI, in our efforts to develop and engineer next-generation antibodies, and we might utilize AI in the future in connection with drug discovery activities. AI may be difficult to deploy successfully due to operational and technical issues inherent in such methods. In particular, AI algorithms might utilize machine learning and predictive analytics which may lead to flawed, biased or inaccurate results, which could lead to ineffective product or target candidates and exposure to competitive and reputational harm. In addition, perceived or actual technical, legal, compliance, privacy, security, ethical or other issues relating to the use of AI may cause regulators' or the public's confidence in AI to be undermined, which could impede our ability to develop products using AI. In addition, any latency, disruption, or failure in our AI operations or infrastructure could result in failures, delays or errors in our discovery and development of next-generation antibodies or other investigational products. Developing, testing and deploying resource-intensive AI systems may also require additional investment and increase our costs, and there is no guarantee that our investment in such systems will lead to more effective or efficient discovery or development of antibodies or other investigational products, or lead to eventual regulatory approval or commercialization of any new products.

If the market opportunities for our product candidates are smaller than we believe they are or any approval we obtain is based on a narrower definition of the patient population, our business may suffer.

We currently focus our product development on product candidates for the treatment and prevention of serious infectious diseases and other serious conditions. Our eligible patient population, pricing estimates and available coverage and reimbursement may differ significantly from the actual market addressable by our product candidates. Our estimates of the number of people who have these diseases, the subset of people with these diseases who have the potential to benefit from treatment with our product candidates, and the market demand for our product candidates are based on our beliefs and analyses. These estimates have been derived from a variety of sources, including the scientific literature, patient foundations or market research, and may prove to be incorrect. Further, new trials may change the estimated incidence or prevalence of the diseases we are targeting. Additionally, the availability of superior or competitive therapies from our competitors could negatively impact or eliminate market demand for our product candidates. If the market opportunities for our product candidates are smaller than we estimate, it could have an adverse effect on our business, financial condition, results of operations and prospects.

We face substantial competition, which may result in others developing or commercializing products before or more successfully than we do.

The biopharmaceutical industry is characterized by rapidly advancing technologies, intense competition and an emphasis on proprietary products. We face potential competition from many different sources, including pharmaceutical and biotechnology companies, academic institutions, governmental agencies and public and private research institutions.

Our commercialization potential could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than products that we may develop. The key competitive factors affecting the success of all our programs are likely to be efficacy, safety, convenience and timing. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market.

In addition, regulatory incentives to develop products for treatment of infectious diseases have increased interest and activity in this area and may lead to increased competition for clinical investigators and clinical trial subjects, as well as for future prescriptions, if any of our product candidates are successfully developed and approved.

Our competitors may have significantly greater financial resources, established presence in the market, and expertise in research and development, manufacturing, preclinical and clinical testing, obtaining regulatory approvals and reimbursement and marketing approved products than we do. These competitors also compete with us in acquiring third-party contract manufacturing capacity and raw materials, recruiting and retaining qualified scientific, sales, marketing and management personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. Additional mergers and acquisitions may result in even more resources being concentrated in our competitors.

Our success is also subject to the risk of current and future disruptive technologies, such as AI. The failure to successfully develop and apply AI may impact our ability to increase the efficiency of, and reduce costs associated with, the discovery and development of next-generation antibodies and other investigational products, and to eventually receive regulatory approval for, and commercialize, new products. If our competitors are able to more effectively utilize any such new technologies, including but not limited to those that may involve AI or be created using AI, to discover, develop and commercialize products that compete with any of our investigational or commercial products, such technologies could adversely impact our ability to compete and could adversely affect our business, operating results, or financial condition.

As a result of these factors, our competitors may achieve patent protection or obtain regulatory approval or authorization of their products before we are able to, which may limit our ability to develop or commercialize our product candidates. Our competitors may also develop therapies that are safer, more effective, more widely accepted or less expensive than ours, and may also be more successful than we are in manufacturing and marketing their products. These advantages could render our product candidates obsolete or non-competitive before we can recover the costs of such product candidates' development and commercialization. For additional information regarding our competitors, see the section titled "Business—Competition".

Even if any of our product candidates receive marketing approval, they may fail to achieve adoption by physicians, patients, third-party payors or others in the medical community necessary for commercial success.

Even if any of our product candidates receive marketing approval, they may fail to achieve adoption by physicians, patients, third-party payors and others in the medical community. If such product candidates do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable. The degree of market acceptance of any product candidate, if approved for commercial sale, will depend on a number of factors, including but not limited to:

- the convenience and ease of administration compared to alternative treatments and therapies;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the efficacy and potential advantages compared to alternative treatments and therapies;
- the effectiveness of sales and marketing efforts;
- acceptance in the medical and patient communities of our product candidates as a safe and effective treatments;
- the cost of treatment in relation to alternative treatments and therapies, including any similar generic treatments;
- our ability to offer such product for sale at competitive prices;
- the strength of marketing and distribution support;
- the availability of third-party coverage and adequate reimbursement, and patients' willingness to pay out-of-pocket in the absence of third-party coverage or adequate reimbursement;
- the products' safety profile; and
- any restrictions on the use of the product together with other medications.

If any of our product candidates are approved but fail to achieve market acceptance among physicians, patients, third-party payors and others in the medical community, we will not be able to generate significant revenue, which would compromise our ability to become profitable.

Even if we obtain regulatory approvals for our product candidates, they will remain subject to ongoing regulatory oversight and potential enforcement actions.

Even if we obtain regulatory approval in a jurisdiction, the regulatory authority may still impose significant restrictions on the indicated uses or marketing of our product candidates, or impose ongoing requirements for potentially costly post-approval trials, post-market surveillance or patient or drug restrictions. Additionally, the holder of an approved BLA is required to comply with FDA rules and is subject to FDA review and periodic inspections, in addition to other potentially applicable federal and state laws, to ensure compliance with current good manufacturing practices, or cGMP, and adherence to commitments made in the BLA.

If we or a regulatory agency discovers previously unknown problems with a product such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, a regulatory agency may impose restrictions relative to that product or the manufacturing facility, including requiring recall or withdrawal of the product from the market or suspension of manufacturing. Moreover, product labeling, advertising and promotion for any approved product will be subject to regulatory requirements, continuing regulatory review and review by other government agencies and third parties. For example, a company may not promote "off-label" uses for its drug products. An off-label use is the use of a product for an indication that is not described in the product's FDA-approved or authorized label in the United States or for uses in other jurisdictions that differ from those approved by the applicable regulatory agencies. Physicians, on the other hand, may prescribe products for off-label uses. Although the FDA and comparable foreign regulatory agencies do not regulate a physician's choice of drug treatment made in the physician's independent medical judgment, they do restrict promotional communications from companies or their sales force with respect to off-label uses of products for which marketing clearance has not been issued.

Failure to comply with such requirements, when and if applicable, could subject us to a number of actions ranging from warning letters to product seizures or significant fines or monetary penalties, among other actions. The FDA and other agencies, including the Department of Justice, or the DOJ, closely regulate and monitor the marketing and promotion of products to ensure that they are marketed and distributed only for the approved indications and in accordance with the provisions of the approved labeling. The FDA imposes stringent restrictions on manufacturers' communications regarding off-label use and if we market our medicines for uses other than their respective approved indications, we may be subject to DOJ-led enforcement actions for off-label marketing. Violations of the Food, Drug, and Cosmetic Act and other statutes, including the False Claims Act, relating to the promotion and advertising of prescription drugs may lead to investigations and enforcement actions alleging violations of federal and state health care fraud and abuse laws, as well as state consumer protection laws, which violations may result in the imposition of significant administrative, civil and criminal penalties. Any government investigation of alleged violations of laws or regulations could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our ability to commercialize our product candidates and generate revenue. For additional information regarding regulatory approval and ongoing regulatory oversight, see the section titled "Business—Government Regulation and Product Approval".

Even if we obtain and maintain approval for our product candidates from the FDA, we may never obtain approval outside of the United States, which would limit our market opportunities.

Approval of a product candidate in the United States by the FDA does not ensure approval of such product candidate by regulatory authorities in other countries or jurisdictions, and approval by one foreign regulatory authority does not ensure approval by regulatory authorities in other foreign countries or by the FDA. Sales of our product candidates outside of the United States will be subject to foreign regulatory requirements governing clinical trials and marketing approval. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from, and more onerous than, those in the United States, including additional preclinical studies or clinical trials. In many countries outside of the United States, a product candidate must be approved for reimbursement before it can be approved for sale in that country. In some cases, the price that we intend to charge for any product candidates, if approved, is also subject to approval. Obtaining approval for our product candidates in the EU from the European Commission following the opinion of the EMA if we choose to submit a marketing authorization application there, would be a lengthy and expensive process. Even if a product candidate is approved, the EMA may limit the indications for which the product may be marketed, require extensive warnings on the product labeling or require expensive and time-consuming additional clinical trials or reporting as conditions of approval. Approval of certain product candidates outside of the United States, particularly those that target diseases that are more prevalent outside of the United States will be particularly important to the commercial success of such product candidates. Obtaining foreign regulatory approvals and compliance with foreign regulatory requirements could result in significant delays, difficulties and costs for us and could delay or prevent the introduction of our product candidates in certain countries.

Negative developments and negative public opinion of new technologies on which we rely may damage public perception of our product candidates or adversely affect our ability to conduct our business or obtain regulatory approvals for our product candidates.

The clinical and commercial success of our product candidates will depend in part on public acceptance of the use of new technologies for the prevention or treatment of human diseases. For example, we use CMV, a commonly occurring virus in humans, as a vaccine vector to prevent and treat pathogens refractory to current vaccine technologies. We also use CRISPR gene-editing technology as a research tool to systematically identify human genes that control infection.

Public perception may be influenced by claims that CMV technology is unsafe and products incorporating this technology may not gain the acceptance of the public or the medical community, or that CRISPR gene-editing technology is unethical or immoral. Adverse public attitudes may adversely impact our ability to enroll clinical trials. Moreover, our success will depend upon physicians specializing in our targeted diseases prescribing, and their patients being willing to receive, our product candidates as treatments in lieu of, or in addition to, existing, more familiar, treatments for which greater clinical data may be available. Any increase in negative perceptions of the technologies that we rely on may result in fewer physicians prescribing our products or may reduce the willingness of patients to utilize our products or participate in clinical trials for our product candidates.

Increased negative public opinion or more restrictive government regulations in response thereto, would have a negative effect on our business, financial condition, results of operations or prospects and may delay or impair the development and commercialization of our product candidates or demand for such product candidates. Adverse events in our preclinical studies or clinical trials or those of our competitors or of academic researchers utilizing similar technologies, even if not ultimately attributable to product candidates we may discover and develop, and the resulting publicity could result in increased governmental regulation, unfavorable public perception, potential regulatory delays in the testing or approval of potential product candidates we may identify and develop, stricter labeling requirements for those product candidates that are approved, a decrease in demand for any such product candidates and a suspension or withdrawal of approval by regulatory authorities of our product candidates.

Product liability lawsuits against us could cause us to incur substantial liabilities and could limit commercialization of any product candidate that we may develop. In addition, our insurance policies may be inadequate and potentially expose us to unrecoverable risks.

We face an inherent risk of product liability exposure related to the testing of our product candidates in clinical trials and may face an even greater risk if we commercialize any product candidate that we may develop. If we cannot successfully defend ourselves against claims that any such product candidates caused injuries, we could incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidate that we may develop;
- loss of revenue;
- substantial monetary awards to trial participants or patients;
- significant time and costs to defend the related litigation;
- withdrawal of clinical trial participants;
- increased insurance costs;
- the inability to commercialize any product candidate that we may develop; and
- injury to our reputation and significant negative media attention.

Any such outcomes could negatively impact our business, financial condition, results of operations and prospects. Furthermore, although we maintain product liability insurance coverage, such insurance may not be adequate to cover all liabilities that we may incur. We anticipate that we will need to increase our insurance coverage each time we commence a clinical trial and if we successfully commercialize any product candidate. Insurance availability, coverage terms and pricing continue to vary with market conditions. We endeavor to obtain appropriate insurance coverage for insurable risks that we identify such as cybersecurity-related issues; however, we may fail to correctly anticipate or quantify insurable risks, we may not be able to obtain appropriate insurance coverage and insurers may not respond as we intend to cover insurable events that may occur. Conditions in the insurance markets relating to nearly all areas of traditional corporate insurance change rapidly and may result in higher premium costs, higher policy deductibles and lower coverage limits. For some risks, we may not have or maintain insurance coverage because of cost or availability.

Risks Related to Regulatory Compliance

Any biologic product candidates for which we intend to seek approval may face competition sooner than anticipated.

If we are successful in achieving regulatory approval to commercialize any biologic product candidate faster than our competitors, such product candidates may face competition from biosimilar products. In the United States, biologic product candidates are subject to approval and licensure under the BLA pathway. The Biologics Price Competition and Innovation Act of 2009, or BPCIA, creates an abbreviated pathway for the approval of biosimilar and interchangeable biologic products following the approval of an original BLA. For additional information regarding biosimilars and exclusivity, see the section titled “Business—Government Regulation and Product Approval—Biosimilars and Regulatory Exclusivity”. If competitors are able to obtain marketing approval for biosimilars referencing our licensed biologic products after the expiration of applicable periods of regulatory exclusivity, our products may become subject to competition from such biosimilars, with the attendant competitive pressure and potential adverse consequences. Such competitive products may be able to immediately compete with us in each indication for which our product candidates may have received approval. In addition, the extent to which any regulatory exclusivity may apply to competing products authorized under an EUA is unclear and may not apply. For additional information regarding competition, see the section titled “Business—Competition”.

Our relationships with customers, physicians, and third-party payors are subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws, and other healthcare laws and regulations. If we are unable to comply, or have not fully complied, with such laws, we could face substantial penalties.

Healthcare providers, physicians and third-party payors in the United States and elsewhere play a primary role in the recommendation and prescription of any product candidates for which we obtain marketing approval. Our current and future arrangements with healthcare professionals, principal investigators, consultants, customers and third-party payors subject us to various federal and state fraud and abuse laws and other healthcare laws, such as the U.S. federal Anti-Kickback Statute, federal civil and criminal false claims laws, the healthcare fraud provisions of the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, and the Physician Payments Sunshine Act.

These laws may impact the business or financial arrangements and relationships through which we conduct our operations, including how we research, market, sell and distribute any product candidates, if approved. For additional information regarding these laws, see the section titled "Business—Government Regulation and Product Approval". Ensuring that our internal operations and business arrangements with third parties comply with applicable healthcare laws and regulations will likely continue to be costly. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, exclusion from participating in government-funded healthcare programs, such as Medicare and Medicaid, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of noncompliance with these laws, contractual damages, reputational harm and the curtailment or restructuring of our operations.

If the physicians or other providers or entities with whom we expect to do business are found not to be in compliance with applicable laws, they may be subject to significant civil, criminal or administrative sanctions, including exclusions from government-funded healthcare programs. Even if resolved in our favor, litigation or other legal proceedings relating to healthcare laws and regulations may cause us to incur significant expenses and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development, manufacturing, sales, marketing or distribution activities. Uncertainties resulting from the initiation and continuation of litigation or other proceedings relating to applicable healthcare laws and regulations could have an adverse effect on our ability to compete in the marketplace.

If we obtain regulatory approval in the United States, coverage and adequate reimbursement may not be available for any product candidates that we commercialize, which could make it difficult for us to sell profitably.

Even if we obtain regulatory approval in the United States, market acceptance and sales of any product candidates that we commercialize may depend in part on the extent to which reimbursement for these product and related treatments will be available from third-party payors, including government health administration authorities, managed care organizations and other private health insurers. Third-party payors decide which therapies they will pay for and establish reimbursement levels. While no uniform policy for coverage and reimbursement exists in the United States, third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own coverage and reimbursement policies. However, decisions regarding the extent of coverage and amount of reimbursement to be provided for any product candidates that we develop will be made on a payor-by-payor basis. Therefore, one payor's determination to provide coverage for a product does not assure that other payors will also provide coverage, and adequate reimbursement, for the product. Additionally, a third-party payor's decision to provide coverage for a therapy does not imply that an adequate reimbursement rate will be approved. The position on a payor's list of covered drugs and biological products, or formulary, generally determines the co-payment that a patient will need to make to obtain the therapy and can strongly influence the adoption of such therapy by patients and physicians. Patients who are prescribed treatments for their conditions and providers prescribing such services generally rely on third-party payors to reimburse all or part of the associated healthcare costs. Patients are unlikely to use our products unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of our products. In addition, because certain of our product candidates are physician-administered, separate reimbursement for the product itself may or may not be available. Instead, the administering physician may only be reimbursed for providing the treatment or procedure in which our product is used.

Third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. We cannot be sure that coverage and reimbursement will be available for any product that we commercialize and, if reimbursement is available, what the level of reimbursement will be. Inadequate coverage and reimbursement may impact the demand for, or the price of, any product for which we obtain marketing approval. If coverage and adequate reimbursement are not available, or are available only at limited levels, we may not be able to successfully commercialize any product candidates that we develop.

Healthcare legislative reform measures may have a negative impact on our business, financial condition, results of operations and prospects.

In the United States and some foreign jurisdictions, there have been, and we expect there will continue to be, several legislative and regulatory changes and proposed changes regarding the healthcare system that could prevent or delay marketing approval of product candidates, restrict or regulate post-approval activities and affect our ability to profitably sell any product candidates for which we obtain marketing approval. In particular, there have been and continue to be a number of initiatives at the U.S. federal and state levels that seek to reduce healthcare costs and improve the quality of healthcare.

We expect that additional U.S. federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that the U.S. federal government will pay for healthcare products and services, which could result in reduced demand for our current or any future product candidates or additional pricing pressures. For example, in August 2022, the Inflation Reduction Act, or IRA, was signed into law by President Biden. The new legislation has implications for Medicare Part D, which is a program available to individuals who are entitled to Medicare Part A or enrolled in Medicare Part B, to give them the option of paying a monthly premium for outpatient prescription drug coverage. Among other things, the IRA requires manufacturers of certain drugs to engage in price negotiations with Medicare (beginning in 2026), with prices that can be negotiated subject to a cap; imposes rebates under Medicare Part B and Medicare Part D to penalize price increases that outpace inflation (first due in 2023); and replaces the Part D coverage gap discount program with a new discounting program (beginning in 2025). The IRA permits the Secretary of the HHS to implement many of these provisions through guidance, as opposed to regulation, for the initial years.

While it is currently unclear how the IRA will be effectuated, we cannot predict with certainty what impact any federal or state health reforms will have on us, but such changes could impose new or more stringent regulatory requirements on our activities or result in reduced reimbursement for our products, any of which could adversely affect our business, results of operations and financial condition. For additional information regarding other healthcare legislative reform measures, see the section titled “Business—Government Regulation and Product Approval—Healthcare Reform”.

Should we seek and obtain regulatory approval in the United States, we expect that these and other healthcare reform measures that may be adopted in the future may result in more rigorous coverage criteria and in additional downward pressure on the price that we receive for any approved product, which could have an adverse effect on demand for our product candidates. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability or commercialize our products.

We are subject to anti-corruption, anti-bribery, anti-money laundering, and similar laws, and non-compliance with such laws can subject us to criminal and/or civil liability and harm our business.

We are subject to anti-bribery and anti-money laundering laws in the countries in which we conduct activities. Anti-corruption and anti-bribery laws have been enforced aggressively in recent years and are interpreted broadly to generally prohibit companies and their employees and third-party intermediaries from authorizing, offering or providing, directly or indirectly, improper payments or benefits to recipients in the public or private sector. We interact with officials and employees of government agencies and government-affiliated hospitals, universities and other organizations. In addition, we may engage third-party intermediaries to promote our clinical research activities abroad or to obtain necessary permits, licenses and other regulatory approvals. We can be held liable for the corrupt or other illegal activities of these third-party intermediaries, our employees, representatives, contractors, collaborators and agents, even if we do not explicitly authorize such activities.

While we have policies and procedures to address compliance with such laws in the United States, we cannot assure you that all of our employees and agents will not take actions in violation of our policies and applicable law, for which we may be ultimately held responsible. Detecting, investigating and resolving actual or alleged violations can require a significant diversion of time, resources and attention from senior management.

In addition, noncompliance with anti-corruption, anti-bribery or anti-money laundering laws could subject us to whistleblower complaints, investigations, sanctions, settlements, prosecution, other enforcement actions, disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, suspension and/or debarment from contracting with certain persons, the loss of export privileges, reputational harm, adverse media coverage and other collateral consequences. If any subpoenas or investigations are launched, or governmental or other sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, financial condition, results of operations and prospects could be materially harmed. In addition, responding to any action will likely result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees. Enforcement actions and sanctions could further harm our business, reputation, financial condition, results of operations and prospects.

Risks Related to Our Dependence on Third Parties

We rely on third parties to produce clinical and commercial supplies of our product candidates.

We are currently conducting process development and manufacturing material for product candidates of three different therapeutic modalities: mAbs, HCMV-based vaccines and siRNAs. Except for limited early-clinical phase process, analytical and formulation development, cell line development, small-scale non-GMP manufacturing for preclinical studies, and quality control testing capabilities in certain of our facilities that is either established or is currently being built, we do not own or operate facilities for full process development or product manufacturing, storage and distribution, or testing. We are dependent on third parties, including strategic collaborators and contract development and manufacturing organizations, or CDMOs, to develop the manufacturing process and manufacture the clinical supplies of our current and any future product candidates. We have established relationships with multiple third parties that have developed the manufacturing processes and produced material to support our preclinical, Phase 1, 2, and 3 clinical trials. We do not yet have sufficient information to reliably estimate the cost of the commercial manufacturing of our future product candidates. Certain of our product candidates may have to compete with existing and future products, such as the annual flu vaccine, that may have a lower price point. The actual cost to manufacture our product candidates could materially and adversely affect the commercial viability of our product candidates.

The facilities used by our third party manufacturers to develop and manufacture our product candidates must be approved by the FDA or other regulatory authorities pursuant to inspections that will be conducted after we submit our EUA, NDA or BLA to the FDA or foreign marketing application to the appropriate regulatory authority. We do not control the manufacturing process of, and are completely dependent on, our third party manufacturers for compliance with cGMP requirements. If our third party manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, we will not be able to secure and/or maintain regulatory approval for our product candidates. In addition, we have no control over the ability of our third party manufacturers to maintain adequate quality control, quality assurance, qualified personnel or oversight of their subcontractors. If the FDA or a comparable foreign regulatory authority does not approve our third party's facilities for the manufacture of our product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly impact our ability to develop, obtain regulatory approval for or market our product candidates, if approved. Any significant delay in the supply of a product candidate, or the raw material components thereof, for an ongoing clinical trial due to the need to replace a third party manufacturer could considerably delay completion of our clinical trials, product testing and potential regulatory approval of our product candidates.

We also intend to rely on third party manufacturers to supply us with sufficient quantities of our product candidates to be used, if approved, for commercialization. There is, however, no assurance that our third party manufacturers will have sufficient manufacturing capacity to meet demand for our product candidates, meet our working assumptions of manufacturing titer and yield per batch of our product candidates or consistently manufacture product meeting our quality requirements. Any shortfall in manufacturing capacity or reduction in anticipated manufacturing titer, yield per batch or batch success rates may adversely impact our ability to meet market demand for any approved product. Furthermore, if we are not able to produce supply at low enough costs, it would negatively impact our ability to generate revenue, harm our reputation, and could have an adverse effect on our business, financial condition, results of operations and prospects.

In addition, we currently rely on strategic collaborators and foreign suppliers and CDMOs, and will likely continue to rely on strategic collaborators and foreign suppliers and manufacturers in the future. Foreign third party suppliers and manufacturers, and third party suppliers and manufacturers operating in foreign countries, may be subject to trade restrictions and other foreign regulatory requirements which could increase the cost or reduce the supply of material available to us, delay the procurement or supply of such material or have an adverse effect on our ability to secure significant commitments from governments to purchase our potential therapies.

For example, the biopharmaceutical industry in China is strictly regulated by the Chinese government. Changes to Chinese regulations or government policies affecting biopharmaceutical companies are unpredictable and may have a material adverse effect on our strategic collaborators, third-party suppliers and manufacturers operating in China which could have an adverse effect on our business, financial condition, results of operations and prospects. Evolving changes in China's public health, economic, political, and social conditions and the uncertainty around China's relationship with other governments, such as the United States and the U.K., could also negatively impact our ability to manufacture or supply our product candidates for our planned clinical trials or have an adverse effect on our ability to secure government funding, which could adversely affect our financial condition and cause us to delay our clinical development programs. For example, on February 12, 2024, a group of bipartisan U.S. lawmakers sent a letter to Commerce Secretary Gina Raimondo, Treasury Secretary Janet Yellen, and Defense Secretary Lloyd Austin calling on them to investigate Chinese biotech company WuXi AppTec and its subsidiary, WuXi Biologics, one of our CDMOs, citing ties to the Chinese military, the Chinese Communist Party, and potential threats to U.S. intellectual property and national security, and requesting that U.S. agencies consider adding the companies to the U.S. Department of Defense's Chinese Military Companies List (1260H list), the Department of Commerce's Bureau of Industry and Security Entity List, and the Department of Treasury's Non-SDN Chinese Military-Industrial Complex Companies List.

Further, our reliance on third-party suppliers and manufacturers entails risks to which we would not be exposed to or that may be reduced if we conducted process development or manufactured product candidates ourselves, including:

- delay or inability to procure or expand sufficient manufacturing capacity;
- delays in process development;
- issues related to scale-up of manufacturing;
- excess manufacturing capacity or excess raw materials due to insufficient market demand for our product candidates and responsibility for the associated costs;
- costs and validation of new equipment and facilities required for scale-up;
- inability of our third-party manufacturers to execute process development, manufacturing, technology transfers, manufacturing procedures and other logistical support requirements appropriately or on a timely basis;
- inability to negotiate development and manufacturing agreements with third parties under commercially reasonable terms, if at all;
- breach, termination or nonrenewal of development and manufacturing agreements with third parties in a manner or at a time that is costly or damaging to us;
- reliance on single sources for product raw materials or components;
- lack of qualified backup suppliers for those raw materials or components that are currently purchased from a sole or single-source supplier;
- lack of ownership to the intellectual property rights to any improvements made by our third parties in the manufacturing process for our product candidates;
- price increases or decreased availability of product raw materials or components;
- disruptions to operations of our third-party suppliers and manufacturers by conditions unrelated to our business or operations, including supply chain issues, capacity constraints, transportation and labor disruptions, global competition for resources, the bankruptcy of the manufacturer and/or general economic conditions, heightened inflation, interest rate and currency rate fluctuations, and economic slowdown or recession;
- disruptions caused by geopolitical events, including civil or political unrest, terrorism, insurrection or war (such as the ongoing war between Ukraine and Russia, and between Israel and Hamas), man-made or natural disasters or public health pandemics or epidemics, including, for example, the COVID-19 pandemic; and
- carrier disruptions or increased costs that are beyond our control, including increases in material, labor or other manufacturing-related costs or higher supply chain logistics costs.

We may be unable to obtain product raw materials or components for an indeterminate period of time if any of our third-party suppliers and manufacturers were to cease or interrupt production or otherwise fail to supply these materials or components to us for any reason, including due to regulatory requirements or actions (including recalls), adverse financial developments at or affecting the supplier or manufacturer, failure by the supplier or manufacturer to comply with cGMP, facility outages (including due to contamination), business interruptions, or labor shortages or disputes. Suppliers and manufacturers may extend lead times, limit supplies, change manufacturing schedules, increase prices, or require significant upfront fees due to capacity and material supply constraints or other factors beyond our control. We cannot be sure that single source suppliers for our product raw materials or components will remain in business or that they will not be purchased by one of our competitors or another company that is not interested in continuing to produce our product raw materials or components for our intended purpose. In addition, the lead time needed to establish a relationship with a new raw material or component supplier or manufacturer can be lengthy and we may experience delays in meeting demand in the event we must switch to a new supplier or manufacturer. The time and effort to qualify a new supplier or manufacturer could result in manufacturing delays, additional costs, diversion of resources or reduced manufacturing capacity or yields, any of which would negatively impact our operating results.

Furthermore, there are a limited number of suppliers and manufacturers that supply synthetic siRNAs. We currently rely on a limited number of third party suppliers and CDMOs for our supply of synthetic siRNAs. There are risks inherent in pharmaceutical manufacturing that could affect the ability of our CDMOs to meet our delivery time requirements or provide adequate amounts of synthetic siRNAs to meet our needs. Included in these risks are potential extended lead times, delays or shortages of raw materials and components, synthesis and purification failures and/or contamination during the manufacturing process, as well as other issues with the CDMO's facility and ability to comply with the applicable manufacturing requirements, including cGMP requirements, which could result in unusable product. This would cause delays in our manufacturing timelines and ultimately delay our clinical trials and potentially put at risk commercial supply, as well as result in additional expense to us. To fulfill our siRNA supply requirements, we may need to secure alternative suppliers of synthetic siRNAs and/or key raw materials and components, and such alternative third party suppliers are limited and may not be readily available, or we may be unable to enter into agreements with them on reasonable terms and in a timely manner. Further, alternative suppliers would require filing and regulatory approvals.

In addition, third party manufacturers may have little or no experience with viral vector products and therefore may require a significant amount of support from us in order to implement and maintain the infrastructure and processes required to manufacture our HCMV vector-based product candidates. The challenges to HCMV-based vaccine manufacturing include the large size of the virus, which precludes terminal sterile filtration, and that some vectors have a restricted growth phenotype in cells that reduces yields during manufacturing. To address these challenges, we have made significant investments in process development and scale-up, largely funded by grants from the Bill & Melinda Gates Foundation. We have established a cGMP process in support of Phase 1 and Phase 2 clinical trials that has been successfully transferred and executed at a CDMO specializing in live vaccine manufacturing. However, the existing process will require additional process development and scale-up for later stages of clinical development and commercial supply. To fulfill our HCMV supply requirements, we may need to secure alternative suppliers and manufacturers viral vector products and/or key raw materials and components, and such alternative suppliers and manufacturers may not have the manufacturing experience or capacity required for HCMV-based vaccine manufacturing, or we may be unable to enter into agreements with them on reasonable terms and in a timely manner.

Any of these events could lead to clinical trial delays or failure to obtain regulatory approval or impact our ability to successfully commercialize, manufacture or supply our current or any future product candidates once approved. Some of these events could be the basis for FDA action, including injunction, request for recall, seizure or total or partial suspension of production. Any such recall, seizure or suspension could adversely impact our business in a variety of ways, including having to absorb related manufacturing and overhead costs as well as potential inventory write-offs.

Changes in U.S. and international trade policies, particularly with respect to China, may adversely impact our business and operating results.

The U.S. government has made statements and taken actions that have led to certain changes and may lead to additional changes to U.S. and international trade policies, including imposing several rounds of tariffs affecting certain products manufactured in China. In addition, the Chinese government took certain actions, including tariffs, which affect certain products manufactured in the U.S.

It is unknown whether and to what extent new tariffs (or other new laws or regulations) will be adopted, or the effect that any such actions would have on us or our industry. Any unfavorable government policies on international trade, such as export controls, capital controls or tariffs, may affect the demand for our product candidates, the competitive position of our product candidates, and import or export of raw materials and product used in our drug development and clinical manufacturing activities, particularly with respect to raw materials and product that we import from China, including pursuant to our development and manufacturing arrangements with WuXi Biologics. If any new tariffs, export controls, legislation and/or regulations are implemented, or if existing trade agreements are renegotiated or if the U.S. government takes retaliatory trade actions due to the recent U.S.-China trade tension, such changes could have an adverse effect on our business, financial condition and results of operations. For example, on February 12, 2024, a group of bipartisan U.S. lawmakers sent a letter to Commerce Secretary Gina Raimondo, Treasury Secretary Janet Yellen, and Defense Secretary Lloyd Austin calling on them to investigate Chinese biotech company WuXi AppTec and its subsidiary, WuXi Biologics, one of our CDMOs, citing ties to the Chinese military, the Chinese Communist Party, and potential threats to U.S. intellectual property and national security, and requesting that U.S. agencies consider adding the companies to the U.S. Department of Defense's Chinese Military Companies List (1260H list), the Department of Commerce's Bureau of Industry and Security Entity List, and the Department of Treasury's Non-SDN Chinese Military-Industrial Complex Companies List.

Our business involves the use of hazardous materials and we and our third-party manufacturers and suppliers must comply with environmental, health and safety laws and regulations, which can be expensive and restrict how we do, or interrupt our, business.

Our research and development activities and the activities of our third-party manufacturers and suppliers involve the generation, storage, use and disposal of hazardous materials, including the components of our product candidates and other hazardous compounds and wastes. We and our manufacturers and suppliers are subject to environmental, health and safety laws and regulations governing, among other matters, the use, manufacture, generation, storage, handling, transportation, discharge and disposal of these hazardous materials and wastes and worker health and safety. In some cases, these hazardous materials and various wastes resulting from their use are stored at our and our manufacturers' facilities pending their use, collection, and appropriate disposal. We cannot eliminate the risk of contamination or injury, which could result in an interruption of our commercialization efforts, research and development efforts and business operations, damages and significant cleanup costs and liabilities under applicable environmental, health and safety laws and regulations. We also cannot guarantee that the safety procedures utilized by our third-party manufacturers for handling and disposing of these materials and wastes generally comply with the standards prescribed by these laws and regulations. We may be held liable for any resulting damages costs or liabilities, which could exceed our resources, and state or federal or other applicable authorities may curtail our use of certain materials and/or interrupt our business operations. Furthermore, environmental, health and safety laws and regulations are complex, change frequently and have tended to become more stringent. We cannot predict the impact of such changes and cannot be certain of our future compliance. Failure to comply with these environmental, health and safety laws and regulations may result in substantial fines, penalties or other sanctions. We do not currently carry hazardous waste insurance coverage.

We rely on third parties to conduct, supervise and monitor our preclinical studies and clinical trials, and if those third parties perform in an unsatisfactory manner, it may harm our business.

We rely on CROs and clinical trial sites to ensure the proper and timely conduct of our preclinical studies and clinical trials, and we expect to have limited influence over their actual performance. We rely on CROs to monitor and manage data for our clinical programs, as well as the execution of future preclinical studies. We expect to control only certain aspects of our CROs' activities. Nevertheless, we will be responsible for ensuring that each of our preclinical studies and clinical trials is conducted in accordance with the applicable protocol, legal, regulatory and scientific standards, and our reliance on the CROs does not relieve us of our regulatory responsibilities.

We and our CROs are required to comply with the good laboratory practices, or GLPs, and GCPs, which are regulations and guidelines enforced by the FDA and comparable foreign regulatory authorities in the form of International Conference on Harmonization guidelines for any of our product candidates that are in preclinical and clinical development. The regulatory authorities enforce GCPs through periodic inspections of trial sponsors, principal investigators and clinical trial sites. Although we rely on CROs to conduct GLP-compliant and GCP-compliant pre-clinical and clinical trials, we remain responsible for ensuring that each of our GLP preclinical studies and clinical trials is conducted in accordance with its investigational plan and protocol and applicable laws and regulations. If we or our CROs fail to comply with GCPs, the clinical data generated in our clinical trials may be deemed unreliable, and the FDA or comparable foreign regulatory authorities may require us to perform additional clinical trials before approving our marketing applications. Accordingly, if our CROs fail to comply with these regulations or fail to recruit a sufficient number of subjects, we may be required to repeat clinical trials, which would delay the regulatory approval process.

Our reliance on third parties to conduct clinical trials will result in less direct control over the management of data developed through clinical trials than would be the case if we were relying entirely upon our own staff. Communicating with CROs and other third parties can be challenging, potentially leading to mistakes as well as difficulties in coordinating activities. If our CROs do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines or fail to comply with regulatory requirements, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols or regulatory requirements or for any other reasons, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for, or successfully commercialize, any product candidate that we develop. As a result, our financial results and the commercial prospects for any product candidate that we develop would be harmed, our costs could increase, and our ability to generate revenue could be delayed. While we will have agreements governing their activities, our CROs will not be our employees and we will not control whether or not they devote sufficient time and resources to our future clinical and preclinical programs. These CROs may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials or other product development activities which could harm our business. We face the risk of potential unauthorized disclosure or misappropriation of our intellectual property by CROs, which may reduce our trade secret protection and allow our potential competitors to access and exploit our proprietary technology.

If our relationship with any of these CROs terminates, we may not be able to enter into arrangements with alternative CROs or do so on commercially reasonable terms. Switching or adding additional CROs involves substantial cost and requires management time and focus. In addition, there is a natural transition period when a new CRO commences work. As a result, delays occur, which can negatively impact our ability to meet our desired clinical development timelines. While we intend to carefully manage our relationships with our CROs, there can be no assurance that we will not encounter challenges or delays in the future or that these delays or challenges will not have a negative impact on our business, financial condition, results of operations and prospects.

In addition, principal investigators for our clinical trials may serve as scientific advisors or consultants to us from time to time and receive compensation in connection with such services. Under certain circumstances, we may be required to report some of these relationships to the FDA. The FDA may conclude that a financial relationship between us and a principal investigator has created a conflict of interest or otherwise affected interpretation of the trial. The FDA may therefore question the integrity of the data generated at the applicable clinical trial site and the utility of the clinical trial itself may be jeopardized. This could result in a delay in approval or rejection of our marketing applications by the FDA and may ultimately lead to the denial of marketing approval of our product candidates.

Risks Related to Our Intellectual Property

If we breach our license agreements or any of the other agreements under which we acquired, or will acquire, the intellectual property rights to our product candidates, we could lose the ability to continue the development and commercialization of the related product candidates.

We license a number of technologies to form our antibody platform and T cell platform, and we license siRNA technology from Alnylam Pharmaceuticals, Inc. We have also developed certain product candidates using intellectual property licensed from third parties. A core element of our business strategy includes continuing to acquire or in-license additional technologies or product candidates for the treatment and prevention of serious infectious diseases and other serious conditions.

If we fail to meet our obligations under these agreements, our licensors may have the right to terminate our licenses. If any of our license agreements are terminated, and we lose our intellectual property rights under such agreements, this may result in a complete termination of our product development and any commercialization efforts for the product candidates which we are developing under such agreements. While we would expect to exercise all rights and remedies available to us, including seeking to cure any breach by us, and otherwise seek to preserve our rights under such agreements, we may not be able to do so in a timely manner, at an acceptable cost or at all. We may also be subject to risks related to disputes between us and our licensors regarding the intellectual property subject to a license agreement.

If we are unable to obtain and maintain patent protection for our product candidates and technology, or if the scope of the patent protection obtained is not sufficiently broad or robust, our competitors could develop and commercialize products and technology similar or identical to ours, and our ability to successfully commercialize our product candidates and technology may be adversely affected.

Our success depends, in large part, on our ability to obtain and maintain patent protection in the United States and other countries with respect to our product candidates and our technology. We and our licensors have sought, and intend to seek, to protect our proprietary position by filing patent applications in the United States and abroad related to our product candidates and our technology that are important to our business.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has, in recent years, been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are highly uncertain. Our pending and future patent applications may not result in patents being issued which protect our technology or product candidates or which effectively prevent others from commercializing competitive technologies and product candidates. Because patent applications in the United States and most other countries are confidential for a period of time after filing, and some remain so until issued, we cannot be certain that we or our licensors were the first to file a patent application relating to any particular aspect of a product candidate. Furthermore, if third parties have filed such patent applications with a priority date before March 16, 2013, an interference proceeding in the United States can be initiated by such third party, or by the U.S. Patent and Trademark Office, or USPTO, itself, to determine who was the first to invent any of the subject matter covered by the claims of our patent applications or issued patents.

The patent prosecution process is expensive, time-consuming and complex, and we may not be able to file, prosecute, maintain, enforce or license all necessary or desirable patent applications or patents at a reasonable cost or in a timely manner. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. In addition, changes in either the patent laws or interpretation of the patent laws in the United States could increase the uncertainties and costs surrounding the prosecution of patent applications and the term, enforcement or defense of issued patents. Similarly, changes in patent law and regulations in other countries or jurisdictions, changes in the governmental bodies that enforce them or changes in how the relevant governmental authority enforces patent laws or regulations may weaken our ability to obtain new patents or to enforce patents that we own or have licensed or that we may obtain in the future.

We or our licensors have not pursued or maintained, and may not pursue or maintain in the future, patent protection for our product candidates in every country or territory in which we may sell our products, if approved. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. Consequently, we may not be able to prevent third parties from infringing our patents in all countries outside of the United States, or from selling or importing products that infringe our patents in and into the United States or other jurisdictions.

Moreover, the coverage claimed in a patent application can be significantly reduced before the patent is issued and its scope can be reinterpreted after issuance. Even if the patent applications we license or own do issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors or other third parties from competing with us or otherwise provide us with any competitive advantage. Our competitors or other third parties may be able to circumvent our patents by developing similar or alternative products in a non-infringing manner.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in loss of exclusivity or in patent claims being narrowed, invalidated or held unenforceable, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology and product candidates. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our intellectual property may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours. In addition, if the breadth or strength of protection provided by the patents and patent applications we hold with respect to our product candidates is threatened, it could dissuade companies from collaborating with us to develop, and threaten our ability to commercialize, our product candidates, or could result in licensees seeking release from their license agreements.

Furthermore, our owned and in-licensed patents may be subject to a reservation of rights by one or more third parties. For example, the research resulting in certain of our owned and in-licensed patent rights and technology was funded in part by the U.S. government. As a result, the government may have certain rights, or march-in rights, to such patent rights and technology. When new technologies are developed with government funding, the government generally obtains certain rights in any resulting patents, including a nonexclusive license authorizing the government to use the invention for noncommercial purposes. These rights may permit the government to disclose our confidential information to third parties and to exercise march-in rights to use or allow third parties to use our licensed technology. The government can exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of the government-funded technology, because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations, or to give preference to U.S. industry. In addition, our rights in such inventions may be subject to certain requirements to manufacture products embodying such inventions in the United States. Any exercise by the government of such rights could harm our competitive position, business, financial condition, results of operations and prospects.

Obtaining and maintaining our patent rights depends on compliance with various procedural, document submission, fee payment and other requirements imposed by government patent agencies, and our patent protection could be reduced or eliminated for noncompliance with these requirements.

The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. In addition, periodic maintenance fees, renewal fees, annuity fees and various other government fees on patents and/or patent applications will have to be paid to the USPTO and various government patent agencies outside of the United States over the lifetime of our owned and licensed patents and/or applications and any patent rights we may own or license in the future. We rely on our service providers or our licensors to pay these fees. The USPTO and various non-U.S. government patent agencies require compliance with several procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply, and we are also dependent on our licensors to take the necessary action to comply with these requirements with respect to our licensed intellectual property. Noncompliance events that could result in abandonment or lapse of a patent or patent application include, but are not limited to, failure to respond to official actions within prescribed time limits, nonpayment of fees and failure to properly legalize and submit formal documents. If we or our licensors fail to maintain the patents and patent applications covering our product candidates or technologies, including as a result of geopolitical events such as civil or political unrest (including the ongoing war between Ukraine and Russia and recent events in Israel), we may not be able to use such patents and patent applications or stop a competitor from marketing products that are the same as or similar to our product candidates, which would have an adverse effect on our business. In many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. There are situations, however, in which noncompliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, potential competitors might be able to enter the market and this circumstance could harm our business.

In addition, if we fail to apply for applicable patent term extensions or adjustments, we will have a more limited time during which we can enforce our granted patent rights. In addition, if we are responsible for patent prosecution and maintenance of patent rights in-licensed to us or out-licensed by us, any of the foregoing could expose us to liability to the applicable patent owner or licensee, respectively.

Patent terms may be inadequate to protect our competitive position on our product candidates or any products approved in the future for an adequate amount of time and additional competitors could enter the market with generic or biosimilar versions of such products.

Patents have a limited lifespan. In the United States, the natural expiration of a patent is generally 20 years after its first effective filing date. Although various extensions may be available, the life of a patent and the protection it affords is limited. In addition, although upon issuance in the United States a patent's life can be increased based on certain delays caused by the USPTO, this increase can be reduced or eliminated based on certain delays caused by the patent applicant during patent prosecution. If we do not have sufficient patent life to protect our products, our competitors may be able to take advantage of our investment in development and clinical trials by referencing our clinical and preclinical data and launch their product earlier than might otherwise be the case, which could adversely affect our business and results of operations.

Given the amount of time required for the development, testing and regulatory review of our product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. We expect to seek extensions of patent terms in the United States and, if available, in other countries where we have or will obtain patent rights. In the United States, the Hatch-Waxman Act permits a patent term extension of up to five years beyond the normal expiration of the patent, provided that the patent is not enforceable for more than 14 years from the date of drug approval, which is limited to the approved indication (or any additional indications approved during the period of extension). Furthermore, only one patent per approved product can be extended and only those claims covering the approved product, a method for using it or a method for manufacturing it may be extended. However, the applicable authorities, including the FDA and the USPTO in the United States, and any equivalent regulatory authority in other countries, may not agree with our assessment of whether such extensions are available, and may refuse to grant extensions to our patents, or may grant more limited extensions than we request. If this occurs, our competitors may be able to take advantage of our investment in development and clinical trials by referencing our clinical and preclinical data and launch their product earlier than might otherwise be the case.

We may not be successful in securing or maintaining proprietary patent protection for products and technologies we develop or license. Moreover, if any of our owned or in-licensed patents are successfully challenged by litigation, the affected product could immediately face competition and its sales would likely decline rapidly. Any of the foregoing could harm our competitive position, business, financial condition, results of operations and prospects.

Third parties may initiate legal proceedings alleging that we are infringing, misappropriating or otherwise violating their intellectual property rights, the outcome of which would be uncertain and could have a negative impact on the success of our business.

Our commercial success depends, in part, upon our ability and the ability of others with whom we may collaborate to develop, manufacture, market and sell our current and any future product candidates and use our proprietary technologies without infringing, misappropriating or otherwise violating the proprietary rights and intellectual property of third parties. The biotechnology and pharmaceutical industries are characterized by extensive and complex litigation regarding patents and other intellectual property rights. Numerous U.S. and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are developing our product candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that sotrovimab and other product candidates may give rise to claims of infringement of the patent rights of others. We may in the future become party to, or be threatened with, adversarial proceedings or litigation regarding intellectual property rights with respect to our current and any future product candidates and technology, including interference proceedings, derivation proceedings, post grant review and inter partes review before the USPTO. If we are found to infringe a third party's valid and enforceable intellectual property rights, we could be required to obtain a license from such third party to continue developing, manufacturing and marketing our product candidate(s) and technology. Under any such license, we would most likely be required to pay various types of fees, milestones, royalties or other amounts. Moreover, we may not be able to obtain any required license on commercially reasonable terms or at all, and if such an instance arises, our ability to commercialize our product candidates may be impaired or delayed, which could in turn significantly harm our business. Parties making claims against us may also seek and obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize our product candidates.

The licensing or acquisition of third-party intellectual property rights is a competitive area, and more established companies may also pursue strategies to license or acquire third-party intellectual property rights that we may consider attractive or necessary. These established companies may have a competitive advantage over us due to their size, capital resources and greater clinical development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment or at all. If we are unable to successfully obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have, we may have to abandon development of the relevant program or product candidate, which could have an adverse effect on our business, financial condition, results of operations and prospects. Furthermore, even if we were able to obtain a license, it could be nonexclusive, thereby giving our competitors and other third parties access to the same technologies licensed to us, and it could require us to make substantial licensing and royalty payments. We could be forced, including by court order, to cease developing, manufacturing and commercializing the infringing technology or product candidate. We may also have to redesign our products, which may not be commercially or technically feasible or require substantial time and expense. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees, if we are found to have willfully infringed a patent or other intellectual property right. We may be required to indemnify collaborators or contractors against such claims. A finding of infringement could prevent us from manufacturing and commercializing our current or any future product candidates or force us to cease some or all of our business operations, which could harm our business. Even if we are successful in defending against such claims, litigation can be expensive and time-consuming and would divert management's attention from our core business. Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have an adverse effect on the price of our common stock.

Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business, financial condition, results of operations and prospects.

We may be subject to claims asserting that our employees, consultants or advisors have wrongfully used or disclosed alleged trade secrets of their current or former employers or claims asserting ownership of what we regard as our own intellectual property.

Certain of our employees, consultants or advisors are currently, or were previously, employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and advisors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these individuals or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such individual's current or former employer. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

In addition, we may in the future be subject to claims by our former employees or consultants asserting an ownership right in our patents or patent applications as a result of the work they performed on our behalf. For example, we may have inventorship disputes arise from conflicting obligations of consultants or others who are involved in developing our product candidates. Although it is our policy to require our employees and contractors who may be involved in the conception or development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who, in fact, conceives or develops intellectual property that we regard as our own, and we cannot be certain that our agreements with such parties will be upheld in the face of a potential challenge or that they will not be breached, for which we may not have an adequate remedy. The assignment of intellectual property rights may not be self-executing or the assignment agreements may be breached, and we may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property.

We may be involved in lawsuits to protect or enforce our patents, the patents of our licensors or our other intellectual property rights, which could be expensive, time-consuming and unsuccessful.

Competitors may infringe, misappropriate or otherwise violate our patents, the patents of our licensors or our other intellectual property rights. To counter infringement or unauthorized use, we may be required to file legal claims, which can be expensive and time-consuming and are likely to divert significant resources from our core business, including distracting our technical and management personnel from their normal responsibilities.

In addition, in an infringement proceeding, a court may decide that a patent of ours or our licensors is not valid or is unenforceable, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our owned or licensed patents at risk of being invalidated or interpreted narrowly and could put our owned or licensed patent applications at risk of not issuing. The initiation of a claim against a third party might also cause the third party to bring counterclaims against us, such as claims asserting that our patent rights are invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, non-enablement or lack of statutory subject matter. The outcome following legal assertions of invalidity and unenforceability is unpredictable. For the patents and patent applications that we have licensed, we may have limited or no right to participate in the defense of any licensed patents against challenge by a third party. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we would lose at least part, and perhaps all, of any future patent protection on our current or future product candidates. Such a loss of patent protection could harm our business.

We may not be able to prevent, alone or with our licensors, misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States. Our business could be harmed if in litigation the prevailing party does not offer us a license, or if the license offered as a result is not on commercially reasonable terms. Any litigation or other proceedings to enforce our intellectual property rights may fail and, even if successful, may result in substantial costs and distract our management and other employees.

There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have an adverse effect on the price of our common stock.

We may not have sufficient financial or other resources to adequately conduct such litigation or proceedings. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and more mature and developed intellectual property portfolios. Accordingly, despite our efforts, we may not be able to prevent third parties from infringing upon or misappropriating or from successfully challenging our intellectual property rights. Uncertainties resulting from the initiation and continuation of patent litigation or other proceedings could have an adverse effect on our ability to compete in the marketplace.

We may not be able to protect our intellectual property rights throughout the world, which could negatively impact our business.

Filing, prosecuting and defending patents covering our current and any future product candidates and technology platforms in all countries throughout the world would be prohibitively expensive. Competitors may use our technologies in jurisdictions where we or our licensors have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we may obtain patent protection but where patent enforcement is not as strong as that in the United States. These products may compete with our products in jurisdictions where we do not have any issued or licensed patents, and any future patent claims or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Issued patents may be challenged by third parties in the courts or patent offices in various countries throughout the world. Invalidation proceedings may result in patent claims being narrowed, invalidated or held unenforceable. Uncertainties regarding the outcome of such proceedings, as well as any resulting losses of patent protection, could harm our business.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our intellectual property and proprietary rights generally. Proceedings to enforce our intellectual property and proprietary rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly, could put our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property and proprietary rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. Some countries do not enforce patents related to medical treatments, or limit enforceability in the case of a public emergency. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we or any of our licensors is forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected.

If the U.S. government, the World Trade Organization, or WTO, or other governmental body imposes an intellectual property rights waiver, our ability to successfully commercialize our COVID-19 product candidates and protect our related technology could be adversely affected.

On June 17, 2022, the WTO adopted a Ministerial Decision to waive certain intellectual property rights for COVID-19 vaccines. The waiver allows certain developing countries to permit the manufacture and use of COVID-19 vaccines without the consent of the patent holder(s) to the extent necessary to address the COVID-19 pandemic. The waiver is in effect initially for five years from the date of the Ministerial Decision and will be reviewed annually. The WTO is considering whether to extend the waiver to diagnostics and therapeutics. The WTO may consider additional waivers, the ultimate timing and scope of which, if approved, are unknown. The scope and timing of such extensions and/or additional waivers will likely be subject to extensive negotiations given the complexity of the matter, which may result in prolonged uncertainty, which could adversely affect our business. If a waiver covering COVID-19 treatments or prophylactics, such as sotrovimab and VIR-7229, is approved, our ability to successfully commercialize our COVID-19 product candidates and protect our related technology could be adversely affected.

The current waiver is the result of public health concerns from the COVID-19 pandemic and an effort to make vaccines more widely available worldwide. This waiver may also lead to similar waivers of intellectual property rights in the future in connection with other public health pandemics or epidemics or other situations of public health concern, or to waivers for treatments or prophylactics in addition to vaccines. Given that our business is focused on treating and preventing infectious diseases and other serious conditions, there is a risk that our business and our ability to protect our technology could be adversely affected in situations beyond COVID-19.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to seeking intellectual property protection for our product candidates, we also rely on trade secrets, including unpatented know-how, technology and other proprietary information, to maintain our competitive position. Because we rely on third parties to help us discover, develop and manufacture our current and any future product candidates, or if we collaborate with third parties for the development, manufacturing or commercialization of our current or any future product candidates, we must, at times, share trade secrets with them. We may also conduct joint research and development programs that may require us to share trade secrets under the terms of our research and development collaborations or similar agreements.

We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, consulting agreements or other similar agreements with our advisors, employees, third-party contractors and consultants prior to beginning research or disclosing proprietary information. We also enter into invention or patent assignment agreements with our employees, advisors and consultants. Despite our efforts to protect our trade secrets, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others or are disclosed or used in violation of these agreements. Moreover, we cannot guarantee that we have entered into such agreements with each party that may have or have had access to our confidential information or proprietary technology and processes. Monitoring unauthorized uses and disclosures is difficult, and we do not know whether the steps we have taken to protect our proprietary technologies will be effective. If any of the collaborators, scientific advisors, employees, contractors and consultants who are parties to these agreements breaches or violates the terms of any of these agreements, we may not have adequate remedies for any such breach or violation, and we could lose our trade secrets as a result. Moreover, if confidential information that is licensed or disclosed to us by our partners, collaborators or others is inadvertently disclosed or subject to a breach or violation, we may be exposed to liability to the owner of that confidential information. Enforcing a claim that a third-party illegally or unlawfully obtained and is using our trade secrets, like patent litigation, is expensive and time-consuming, and the outcome is unpredictable. In addition, courts outside of the United States are sometimes less willing to protect trade secrets.

In addition, our competitors may independently develop knowledge, methods and know-how equivalent to our trade secrets. Competitors could purchase our products and replicate some or all of the competitive advantages we derive from our development efforts for technologies on which we do not have patent protection. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our trade secrets or other unauthorized use or disclosure could have an adverse effect on our business, financial condition, results of operations and prospects.

We also seek to preserve the integrity and confidentiality of our data and other confidential information by maintaining physical security of our premises and physical and electronic security of our information technology systems. Additionally, the risk of cyber-attacks or other privacy or data security incidents may be heightened as a result of our work-from-home policies for most of our employees, which provides our employees the choice of working full time in the office, a hybrid approach, or full-time remote. A remote working environment may be less secure and more susceptible to hacking attacks. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and detecting the disclosure or misappropriation of confidential information and enforcing a claim that a party illegally disclosed or misappropriated confidential information is difficult, expensive and time-consuming, and the outcome is unpredictable. Further, we may not be able to obtain adequate remedies for any breach. In addition, our confidential information may otherwise become known or be independently discovered by competitors, in which case we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us.

Any trademarks we may obtain may be infringed or successfully challenged, resulting in harm to our business.

We rely and expect to continue to rely on trademarks as one means to distinguish any of our products and product candidates that are approved for marketing from the products of our competitors. Additionally, the process of obtaining trademark protection is expensive and time-consuming, and we may not be able to prosecute all necessary or desirable trademark applications at a reasonable cost or in a timely manner or obtain trademark protection in all jurisdictions that we consider to be important to our business. Once we select trademarks and apply to register them, our trademark applications may not be approved. Third parties may oppose our trademark applications in certain jurisdictions, as in currently pending oppositions filed against EU-wide registration of our VIR Pharmaceuticals house mark and logo by Industria Quimica y Farmaceutica Vir. S.A., a Spanish company which claims exclusive rights in the term VIR in Spain and Portugal. We also have a pending opposition of the Vir logo in Turkey by Ulkar Kimya Sanayii Ve Ticaret Anonim Şirketi, a Turkish company which claims exclusive rights in the term VIR in Turkey. Third parties may also challenge our use of our trademarks. In the event that our trademarks are successfully challenged, we could be forced to rebrand our products, which could result in loss of brand recognition and could require us to devote resources to advertising and marketing new brands. Our competitors may infringe our trademarks, and we may not have adequate resources to enforce our trademarks.

In addition, any proprietary product name we propose to use with our current or any other product candidate in the United States must be approved by the FDA, regardless of whether we have registered it, or applied to register it, as a trademark. The FDA typically conducts a review of proposed product names, including an evaluation of the potential for confusion with other product names. If the FDA objects to any of our proposed proprietary product names, we may be required to expend significant additional resources in an effort to identify a suitable proprietary product name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA.

The exercise by the Bill & Melinda Gates Foundation of its licenses to certain of our intellectual property and its development and commercialization of products that we are also developing and commercializing could have an adverse impact on our market position.

We entered into an amended and restated letter agreement with the Bill & Melinda Gates Foundation, or the Gates Agreement, in January 2022, which amends and restates the letter agreement with the Bill & Melinda Gates Foundation that we entered into in December 2016. In connection with the Gates Agreement, the Bill & Melinda Gates Foundation purchased $20.0 million of shares of our convertible preferred stock which converted to shares of our common stock after our initial public offering and purchased $40.0 million of shares of our common stock. We are obligated to use the proceeds of the Bill & Melinda Gates Foundation's investment in furtherance of its charitable purposes to perform certain activities set forth in the Gates Agreement. For additional information regarding our obligations under the Gates Agreement, see the section titled "Business—Our Collaboration, License and Grant Agreements—Amended and Restated Letter Agreement with the Bill & Melinda Gates Foundation".

If we fail to comply with (i) our obligations to use the proceeds of the Bill & Melinda Gates Foundation's investment for the purposes described in the paragraph above and to not use such proceeds for specified prohibited uses, (ii) specified reporting requirements or (iii) specified applicable laws, or if we materially breach our specified global access commitments (any such failure or material breach, a specified default), we will be obligated to redeem or arrange for a third party to purchase all of our stock purchased by the Bill & Melinda Gates Foundation under the Gates Agreement, at the Bill & Melinda Gates Foundation's request, at a price equal to the greater of (1) the original purchase price or (2) the fair market value, which amount may increase in the event of a sale of our company or all of our material assets relating to the Gates Agreement. Additionally, if a specified default occurs or if we are unable or unwilling to continue the HIV program, tuberculosis program, vaccinal antibody program or, if applicable, the mutually agreed additional program (except for scientific or technical reasons), or if we institute bankruptcy or insolvency proceedings, then the Bill & Melinda Gates Foundation will have the right to exercise a non-exclusive, fully-paid license (with the right to sublicense) under our intellectual property to the extent necessary to use, make and sell products arising from such programs, in each case solely to the extent necessary to benefit people in the developing countries in furtherance of the Bill & Melinda Gates Foundation's charitable purpose.

The exercise by the Bill & Melinda Gates Foundation of any of its non-exclusive licenses to certain of our intellectual property (or its right to obtain such licenses), and its development and commercialization of product candidates and products that we are also developing and commercializing, could have an adverse impact on our market position.

Risks Related to Our Business Operations, Employee Matters and Managing Growth

We are highly dependent on our key personnel, and if we are not able to retain these members of our management team or recruit and retain additional management, clinical and scientific personnel, our business will be harmed.

We are highly dependent on our management, scientific and medical personnel. Our key personnel may currently terminate their employment with us at any time. The loss of the services of any of these persons could impede the achievement of our research, development and commercialization objectives. Additionally, we do not currently maintain "key person" life insurance on the lives of our executives or any of our employees.

We announced a Chief Executive Officer transition in January 2023 that became effective April 3, 2023 and announced a Chief Financial Officer transition in February 2023 that became effective March 27, 2023. Management transitions may create uncertainty and involve a diversion of resources and management attention, be disruptive to our daily operations or impact public or market perception, any of which could negatively impact our ability to operate effectively or execute our strategies.

Recruiting, integrating and retaining other senior executives, qualified scientific and clinical personnel and, if we progress the development of any of our product candidates, commercialization, manufacturing and sales and marketing personnel, will be critical to our success. Furthermore, replacing executive officers and key employees may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain regulatory approval of and commercialize our product candidates. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these key personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. Macroeconomic conditions, specifically labor shortages, increased competition for employees and wage inflation, could also have a material impact on our ability to attract and retain talent, our turnover rate and the cost of operating our business. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. If we are unable to continue to attract and retain high-quality personnel, our ability to pursue our growth strategy will be limited.

Our future performance will also depend, in part, on our ability to successfully integrate newly hired executive officers into our management team and our ability to develop an effective working relationship among senior management. Our failure to integrate these individuals and create effective working relationships among them and other members of management could result in inefficiencies in the development and commercialization of our product candidates, harming future regulatory approvals, sales of our product candidates and our results of operations.

We have in the past and may in the future acquire or invest in other companies or technologies, which could divert our management's attention, result in dilution to our stockholders and otherwise disrupt our operations and adversely affect our operating results.

We have in the past and may in the future seek to acquire or invest in additional businesses and/or technologies that we believe complement or expand our product candidates, enhance our technical capabilities or otherwise offer growth opportunities in the United States and internationally. The pursuit of potential acquisitions and investments may divert the attention of management and cause us to incur various expenses in identifying, investigating and pursuing suitable acquisitions, whether or not they are consummated. In addition, we are exposed to market risks related to our investments, including changes in fair value of equity securities we hold, which is discussed in greater detail under Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

For example, we acquired TomegaVax, Inc., or TomegaVax, in September 2016, Humabs BioMed SA, or Humabs, in August 2017, Agenovir Corporation, or Agenovir, in January 2018 and Statera Health, LLC, or Statera, in February 2018. Realizing the benefits of these acquisitions will depend upon the successful integration of the acquired technology into our existing and future product candidates. We also may not realize the anticipated benefits from any acquired business. We face many risks in connection with acquisitions and investments, whether or not consummated. A significant portion of the purchase price of companies we acquire may be allocated to acquired goodwill and other intangible assets, which must be assessed for impairment at least annually. If our acquisitions do not yield expected returns, we may in the future be required to take charges to our operating results based on this impairment assessment process, which could adversely affect our business, financial condition, results of operations and prospects.

Furthermore, acquisitions could also result in dilutive issuances of equity securities or the incurrence of debt, which could adversely affect our operating results. In addition, if an acquired business fails to meet our expectations, our business, financial condition, results of operations and prospects may suffer. We cannot assure you that we will be successful in integrating the businesses or technologies we may acquire. The failure to successfully integrate these businesses could have a material adverse effect on our business, financial condition, results of operations and prospects.

We have experienced significant growth in our organization in recent years and expect to continue to expand, and we may experience difficulties in managing this growth, which could disrupt our operations.

We have experienced significant growth in the number of our employees and the scope of our operations in recent years at both our sites and remote locations, particularly in the areas of research, development and regulatory affairs, and we expect to continue to experience growth as the clinical development of our product candidates progresses. In addition, if any of our product candidates receives marketing approval, we will need to build out our sales and marketing capabilities, either on our own or with others. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities, and continue to recruit and train additional qualified personnel. As a result of the global pandemic resulting from COVID-19, the majority of our workforce began working from home in March 2020. In April 2022, we reopened our offices to allow employees to return to work, and we now offer all our employees the choice of working full-time in the office, a hybrid approach, or full-time remote. Despite this, we must continue to effectively integrate, develop and motivate a growing number of new employees, and maintain the beneficial aspects of our corporate culture. The expansion of our operations may lead to significant costs and may divert our management and business development resources. We may not be able to effectively manage the expansion of our operations, recruit and train additional qualified personnel, or succeed at effectively integrating employees that joined during the global pandemic or otherwise joined us as remote workers. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

Business disruptions could seriously harm our future revenue and financial condition and increase our costs and expenses.

Our operations, and those of our CDMOs, CROs and other contractors and consultants, could be subject to earthquakes, power shortages, telecommunications failures, water shortages, floods, hurricanes, typhoons, fires, extreme weather conditions, public health pandemics or epidemics (including, for example, the COVID-19 pandemic), geopolitical events, including civil or political unrest in any of our business locations, terrorism, insurrection or war (such as the ongoing war between Israel and Hamas and Ukraine and Russia), and other natural or man-made disasters or business interruptions, for which we are predominantly self-insured. The occurrence of any of these business disruptions could seriously harm our operations and financial condition and increase our costs and expenses.

Our ability to develop our product candidates could be disrupted if our operations or those of our suppliers are affected by geopolitical events, man-made or natural disasters or other business interruptions. Our corporate headquarters are located in California near major earthquake faults and fire zones. The ultimate impact on us, our significant suppliers and our general infrastructure of being located near major earthquake faults and fire zones and being consolidated in certain geographical areas is unknown, but our operations and financial condition could suffer in the event of a major earthquake, fire or other natural disaster.

Our business could be materially adversely affected by the effects of public health outbreaks, pandemics or epidemics, including the COVID-19 pandemic and future pandemics.

Our business could be materially adversely affected by the effects of public health outbreaks, pandemics or epidemics, including the COVID-19 pandemic, the evolution of new and existing variants or subvariants of COVID-19 that are resistant to existing treatments or vaccinations and any future pandemics.

Public health outbreaks, pandemics or epidemics pose the risk that we or our employees, contractors, suppliers, CDMOs or other partners may be prevented from conducting business activities for an indefinite period of time due to spread of the disease, or due to shutdowns that may be requested or mandated by federal, state and local governmental authorities. Business disruptions could include restrictions on our ability to travel, quarantine orders, temporary closures of our facilities or the facilities of our contractors, suppliers, CDMOs and other partners and other restrictions by governments to reduce the spread of the disease. The effects of these business disruptions may negatively impact productivity, limit our ability to obtain sufficient materials, raise the cost of materials (or otherwise disrupt our supply chain) and delay our clinical programs and timelines, the magnitude of which will depend, in part, on the length and severity of such business disruptions.

For example, our clinical trials were affected by the COVID-19 pandemic. Site initiation and patient enrollment were delayed due to prioritization of hospital resources toward the COVID-19 pandemic, and, if there are future quarantines which impede patient movement or interrupt healthcare services, some patients may not be able or willing to comply with clinical trial protocols. Similarly, our ability to recruit and retain patients and principal investigators and site staff who, as healthcare providers, may have heightened exposure to COVID-19, was delayed or disrupted, which had adversely impacted our clinical trial operations. The public health emergency declarations related to COVID-19 ended on May 11, 2023. In addition, the FDA ended 22 COVID-19-related policies when the public health emergency ended on May 11, 2023, and the FDA allowed 22 related-policies to continue for 180 days. The FDA plans to retain 24 COVID-19-related policies with appropriate changes and four policies whose duration is not tied to the end of the public health emergency. However, at this point, it is unclear how, if at all, these developments will impact our efforts to develop and commercialize our product candidates.

We continue to monitor our operations and applicable government recommendations, and we have made lasting modifications to our normal operations because of the COVID-19 pandemic. We now offer all of our employees the choice of working full time in the office, a hybrid approach, or full-time remote. Coming into the office remains voluntary, unless a person's role requires them to be on site to do their job. As a result, we expect to continue to be subject to the challenges and risks of having a remote workforce, as well as new challenges and risks from operating with a hybrid workforce. For example, our employees are accessing our servers remotely through home or other networks to perform their job responsibilities. Such security systems may be less secure than those used in our offices, which may subject us to increased security risks, including cybersecurity-related events, and expose us to risks of data or financial loss and associated disruptions to our business operations. Additionally, employees who access company data and systems remotely may not have access to technology that is as robust as that in our offices, which could place additional pressure on our user infrastructure and third parties that are not easily mitigated. We may also be exposed to risks associated with the locations of remote employees, including compliance with local laws and regulations or exposure to compromised internet infrastructure. Allowing our employees to work remotely may create intellectual property risk if employees create intellectual property on our behalf while residing in a jurisdiction with unenforced or uncertain intellectual property laws. Further, if employees fail to inform us of changes in their work location, we may be exposed to additional risks without our knowledge.

Additionally, operating our business with both remote and in-person workers could have a negative impact on our corporate culture, decrease the ability of our workforce to collaborate and communicate effectively, decrease innovation and productivity, or negatively affect workforce morale. If we are unable to manage cybersecurity and other risks of a flexible-first workforce model, and maintain our corporate culture and workforce morale, our business could be harmed or otherwise adversely impacted.

If our information systems, or those maintained on our behalf, fail or suffer security breaches, such events could result in, without limitation, the following: a significant disruption of our product development programs; an inability to operate our business effectively; unauthorized access to or disclosure of the personal information we process; and other adverse effects on our business, financial condition, results of operations and prospects.

Our computer and information technology systems, cloud-based computing services and those of our current and any future collaborators, service providers and other parties upon whom we rely are potentially vulnerable to malware, computer viruses, denial-of-service attacks, ransomware attacks, user error or malfeasance, data corruption, cyber-based attacks, natural disasters, public health pandemics or epidemics, geopolitical events, including civil or political unrest, terrorism, war and telecommunication and electrical failures that may result in damage to or the interruption or impairment of key business processes, or the loss or corruption of our information, including intellectual property, proprietary business information and personal information. We may also experience server malfunction, software or hardware failures, supply-chain cyber-attacks, loss of data or other computer assets and other similar issues. We have experienced minor or inconsequential security breaches of our information technology systems, such as through attempted business email compromises. The techniques used to sabotage or to obtain unauthorized access to information systems, and networks in which cyber threat actors store data or through which they transmit data change frequently and we may be unable to implement adequate preventative measures. For example, attackers have used artificial intelligence and machine learning to launch more automated, targeted and coordinated attacks against targets. Any significant system failure, accident or security breach could have a material adverse effect on our business, financial condition and operations.

We may be required to expend significant resources, fundamentally change our business activities and practices, or modify our operations, including our clinical trial activities, or information technology in an effort to protect against security breaches and to detect (including performing required forensics), mitigate and remediate actual and potential vulnerabilities. Relevant laws, regulations, industry standards and contractual obligations may require us to implement specific security measures or use industry-standard or reasonable measures to protect against security breaches. The costs to us to mitigate network security problems, bugs, viruses, worms, malicious software programs, security breaches and security vulnerabilities could be significant, and while we have implemented security measures to protect our data security and information technology systems, our efforts to address these problems may not be successful, and these problems could result in unexpected interruptions, data loss or corruption, delays, cessation of service and other harm to our business and our competitive position. If the information technology systems of our third-party vendors become subject to disruptions or security breaches, we may have insufficient recourse against such third parties and we may have to expend significant resources to mitigate the impact of such an event, and to develop and implement protections to prevent future events of this nature from occurring. Although we maintain cybersecurity insurance coverage, such insurance may not be adequate to cover all liabilities that we may incur. Furthermore, if a security breach were to occur and cause interruptions in our operations, it could result in a disruption of our development programs and our business operations, whether due to a loss of our trade secrets or other proprietary information or other similar disruptions.

In addition, such a breach may require notification to governmental agencies, supervisory bodies, credit reporting agencies, the media, individuals, collaborators or others pursuant to various federal, state and foreign data protection, privacy and security laws, regulations and guidelines, industry standards, our policies and our contracts, if applicable. In addition, the U.S. Securities and Exchange Commission adopted rules in 2023 requiring us to publicly disclose certain cybersecurity incidents. Such notices could harm our reputation and our ability to compete. Such disclosures are costly, and the disclosure or the failure to comply with such requirements could lead to a material adverse effect on our reputation, business, or financial condition. Additionally, federal, state and foreign laws and regulations can expose us to enforcement actions and investigations by regulatory authorities, and potentially result in regulatory penalties and significant legal liability, if our information technology security efforts fail.

We are subject to stringent privacy laws, information security laws, regulations, policies and contractual obligations related to data privacy and security and changes in such laws, regulations, policies, contractual obligations and failure to comply with such requirements could subject us to significant fines and penalties, which may have a material adverse effect on our business, financial condition or results of operations.

We are subject to local, state, federal and international data privacy and protection laws and regulations that apply to the collection, transmission, storage and use of personally identifying information, which among other things, impose certain requirements relating to the privacy, security and transmission of personal information, including comprehensive regulatory systems in the United States, EU and the U.K. The legislative and regulatory landscape for privacy and data protection continues to evolve in jurisdictions worldwide, and there has been an increasing focus on privacy and data protection issues with the potential to affect our business. Additionally, our use of AI and machine learning may be subject to laws and evolving regulations regarding the use of AI or machine learning, controlling for data bias, and anti-discrimination. Implementation standards and enforcement practices are likely to remain uncertain for the foreseeable future, and we cannot yet determine the impact future laws, regulations, standards, or perception of their requirements may have on our business. Failure to comply with any of these laws and regulations could result in enforcement action against us, including fines, claims for damages by affected individuals, damage to our reputation and loss of goodwill, any of which could have a material adverse effect on our business, financial condition, results of operations or prospects.

If we are unable to properly protect the privacy and security of protected health information, we could be found to have breached our contracts. Further, if we fail to comply with applicable privacy laws, we could face civil and criminal penalties.

At least twelve states in the U.S., including California, have passed comprehensive privacy laws. These laws are either in effect or will go into effect sometime before the end of 2026. These laws create obligations related to the processing of personal information, as well as special obligations for the processing of "sensitive" data (which includes health data in some cases). There are also states that are strongly considering or have already passed comprehensive privacy laws during the 2023 legislative sessions that will go into effect in 2024 and beyond, including New York and New Jersey. Congress has also been debating passing a federal privacy law. These laws may impact our business activities, including our identification of research subjects, relationships with business partners and ultimately the marketing and distribution of our products.

Similar to the laws in the United States, there are significant privacy and data security laws that apply in Europe and other countries. The collection, use, disclosure, transfer or other processing of personal data, including personal health data, regarding individuals who are located in the European Economic Area, or EEA, and the processing of personal data that takes place in the EEA, is regulated by the GDPR, which went into effect in May 2018 and which imposes obligations on companies that operate in our industry with respect to the processing of personal data and the cross-border transfer of such data. The GDPR imposes onerous accountability obligations requiring data controllers and processors to maintain a record of their data processing and policies. If our or our collaboration partners' or service providers' privacy or data security measures fail to comply with the GDPR requirements, we may be subject to litigation, regulatory investigations, enforcement notices requiring us to change the way we use personal data and/or fines of up to 20 million Euros or up to 4% of the total worldwide annual turnover of the preceding financial year, whichever is higher, as well as compensation claims by affected individuals, negative publicity, reputational harm and a potential loss of business and goodwill.

While we continue to address the implications of the recent changes to data privacy regulations, data privacy remains an evolving landscape at both the domestic and international level, with new regulations coming into effect and continued legal challenges, and our efforts to comply with the evolving data protection rules may be unsuccessful. It is possible that these laws may be interpreted and applied in a manner that is inconsistent with our practices. We must devote significant resources to understanding and complying with this changing landscape. Failure to comply with laws regarding data protection would expose us to risk of enforcement actions taken by data protection authorities in the EEA and elsewhere and carries with it the potential for significant penalties if we are found to be non-compliant. Similarly, failure to comply with federal and state laws in the United States regarding privacy and security of personal information could expose us to penalties under such laws. Any such failure to comply with data protection and privacy laws could result in government-imposed fines or orders requiring that we change our practices, claims for damages or other liabilities, regulatory investigations and enforcement action, litigation and significant costs for remediation, any of which could adversely affect our business. Even if we are not determined to have violated these laws, government investigations into these issues typically require the expenditure of significant resources and generate negative publicity, which could harm our business, financial condition, results of operations or prospects.

Our employees, principal investigators, consultants and commercial partners may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements and insider trading.

We are exposed to the risk of fraud or other misconduct by our employees, principal investigators, consultants and commercial partners. Misconduct by these parties could include intentional failures, reckless and/or negligent conduct or unauthorized activities that violates (i) the laws and regulations of FDA and other regulatory authorities, including those laws requiring the reporting of true, complete and accurate information to such authorities, (ii) manufacturing standards, (iii) federal and state data privacy, security, fraud and abuse and other healthcare laws and regulations in the United States and abroad, (iv) laws that require the true, complete and accurate reporting of financial information or data and (v) insider trading laws that restrict the buying and selling of shares of our common stock while in possession of material non-public information. In particular, sales, marketing and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. Such misconduct also could involve the improper use of individually identifiable information, including, without limitation, information obtained in the course of clinical trials, creating fraudulent data in our preclinical studies or clinical trials or illegal misappropriation of drug product, which could result in regulatory sanctions and cause serious harm to our reputation. In addition, during the course of our operations, our directors, executives and employees may have access to material non-public information regarding our business, our results of operations or potential transactions we are considering. We may not be able to prevent a director, executive or employee from violating our insider trading policies and buying or selling, or "tipping" others who might buy or sell, shares of our common stock on the basis of, or while having access to, material non-public information. If a director, executive or employee was to be investigated, or an enforcement action was to be brought against a director, executive or employee for insider trading, it could have a negative impact on our reputation and our stock price.

It is not always possible to identify and deter misconduct by employees and other third parties, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from government investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. Additionally, we are subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. If any such actions are instituted against us and we are not successful in defending ourselves or asserting our rights, those actions could result in significant civil, criminal and administrative penalties, damages, fines, disgorgement, imprisonment, exclusion from participating in government-funded healthcare programs, such as Medicare and Medicaid, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of noncompliance with these laws, contractual damages, reputational harm and the curtailment or restructuring of our operations, any of which could have a negative impact on our business, financial condition, results of operations and prospects.

Our ability to use our net operating losses, or NOLs, to offset future taxable income may be subject to certain limitations.

As of December 31, 2023, we had net operating loss carryforwards of $487.0 million for federal tax purposes and $415.4 million for state tax purposes. If not utilized, federal carryforwards will begin expiring in 2036 and state carryforwards will begin expiring in 2031. Our ability to use our federal and state NOLs to offset potential future taxable income is dependent upon our generation of future taxable income before any expiration dates of the NOLs, and we cannot predict with certainty when, or whether, we will generate sufficient taxable income to use all of our NOLs.

Beginning in 2022, the Tax Cuts and Jobs Act of 2017 eliminated the option to deduct research and development expenditures currently and requires taxpayers to capitalize and amortize them over five or fifteen years pursuant to Section 174 of the Internal Revenue Code of 1986, as amended, or the Code. Although Congress is considering legislation that could repeal such requirement or defer the amortization requirement to later years, it is not certain that the provision will be repealed or otherwise modified. If the requirement is not modified, it will continue to reduce our anticipated net operating losses over the next several years.

Risks Related to Ownership of Our Common Stock

Our financial condition and results of operations may fluctuate from quarter to quarter and year to year, which makes them difficult to predict.

We expect our financial condition and results of operations to fluctuate from quarter to quarter and year to year due to a variety of factors, many of which are beyond our control. Accordingly, you should not rely upon the results of any quarterly or annual periods as indications of future operating performance. Factors that may cause fluctuations in our financial condition and results of operations include, without limitation, those listed elsewhere in this "Risk Factors" section and those listed below:

- the timing and cost of, and level of investment in, research and development activities relating to our product candidates, which will change from time to time;
- the cost of manufacturing our product candidates and any future product candidates, which may vary depending on FDA, EMA or other comparable foreign regulatory authority guidelines and requirements, the quantity of production and the terms of our agreements with manufacturers;
- expenditures that we will or may incur to acquire or develop additional product candidates and technologies or other assets;
- the timing and outcomes of preclinical studies and clinical trials for our product candidates;
- the need to conduct unanticipated clinical trials or clinical trials that are larger or more complex than anticipated;
- competition from existing and potential future products that compete with our product candidates, and changes in the competitive landscape of our industry, including consolidation among our competitors or partners;
- any delays in regulatory review or approval of our product candidates;
- the level of demand for any of our product candidates, if approved, which may fluctuate significantly and be difficult to predict;

- the risk/benefit profile, cost and reimbursement policies with respect to our product candidates, if approved, and existing and potential future products that compete with our product candidates;
- our ability to commercialize our product candidates, if approved, inside and outside of the U.S., either independently or working with third parties;
- our ability to adequately support future growth;
- potential unforeseen business disruptions that increase our costs or expenses;
- future accounting pronouncements or changes in our accounting policies; and
- the changing and volatile global economic and political environment both inside and outside the U.S., including heightened inflation, capital market volatility, interest rate and currency rate fluctuations, and economic slowdown or recession.

In addition, our collaboration revenue and certain assets and liabilities are subject to foreign currency exchange rate fluctuations due to the global nature of our operations. As a result, currency fluctuations among our reporting currency, the U.S. dollar, and other currencies in which we do business will affect our operating results, often in unpredictable ways. Currency exchange rates have been especially volatile in the recent past, and these currency fluctuations have affected, and may continue to affect, our assets and liabilities denominated in foreign currency. We are also exposed to market risks related to our investments, including changes in fair value of equity securities we hold which may fluctuate from quarter to quarter and year to year. For additional information, see Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

The market price of our common stock has been, and in the future, may be, volatile and fluctuate substantially, which could result in substantial losses for purchasers of our common stock.

Our stock price has been, and in the future, may be, subject to substantial volatility. From October 11, 2019, our first day of trading on The Nasdaq Global Select Market, or Nasdaq, through February 16, 2024, the closing price of our stock ranged from $7.76 per share to $83.07 per share. As a result of the volatility in our stock price, our stockholders could incur substantial losses.

The stock market in general and the market for biopharmaceutical and pharmaceutical companies in particular, has experienced extreme volatility that has often been unrelated to the operating performance of particular companies. The COVID-19 pandemic, for example, negatively affected some sectors of the stock market and investor sentiment and resulted in significant volatility. In addition, economic trends and other external factors including, but not limited to, heightened inflation, interest rate and currency rate fluctuations, economic slowdown or recession, capital markets volatility, foreign market trends, national crisis, and disasters, may impact the market price of our common stock and result in volatility. As a result of this volatility, you may not be able to sell your common stock at or above the price you paid for your shares. Market and industry factors may cause the market price and demand for our common stock to fluctuate substantially, regardless of our actual operating performance, which may limit or prevent investors from selling their shares at or above the price paid for the shares and may otherwise negatively affect the liquidity of our common stock.

Moreover, sales of a substantial number of shares of our common stock by our stockholders in the public market or the perception that these sales might occur, have in the past, and may in the future depress the market price of our common stock. Information related to our research, development, manufacturing, regulatory and commercialization efforts with respect to any of our product candidates or information regarding such efforts by competitors with respect to their potential therapies, may also meaningfully impact our stock price.

Some companies that have experienced volatility in the trading price of their shares have been the subject of securities class action litigation. Any lawsuit to which we are a party, with or without merit, may result in an unfavorable judgment. We also may decide to settle lawsuits on unfavorable terms. Any such negative outcome could result in payments of substantial damages or fines, damage to our reputation or adverse changes to our business practices. Defending against litigation is costly and time-consuming and could divert our management's attention and our resources. Furthermore, during the course of litigation, there could be negative public announcements of the results of hearings, motions or other interim proceedings or developments, which could have a negative effect on the market price of our common stock.

Concentration of ownership of our common stock among our existing executive officers, directors and principal stockholders may prevent new investors from influencing significant corporate decisions.

Our executive officers, directors and stockholders who own more than 5% of our outstanding common stock beneficially own a significant percentage of our outstanding common stock. If these persons acted together, they may be able to significantly influence all matters requiring stockholder approval, including the election and removal of directors and approval of any merger, consolidation or sale of all or substantially all of our assets. The concentration of voting power and transfer restrictions could delay or prevent an acquisition of our company on terms that other stockholders may desire or result in the management of our company in ways with which other stockholders disagree.

If research analysts do not publish research or reports, or publish unfavorable research or reports, about us, our business or our market, our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or financial analysts publish about us or our business. If any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our intellectual property or our stock performance, or if the clinical trials and operating results fail to meet the expectations of analysts, our stock could decline. If analysts cease coverage of us or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

Because we do not anticipate paying any cash dividends on our capital stock in the foreseeable future, capital appreciation, if any, will be your sole source of gain.

You should not rely on an investment in our common stock to provide dividend income. We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. In addition, the terms of any future debt agreements may preclude us from paying dividends. As a result, capital appreciation, if any, of our common stock will be your sole source of gain in the foreseeable future.

We have incurred and we will continue to incur significant increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives.

As a public company, we have incurred and we will continue to incur significant legal, accounting, investor relations and other expenses. In addition, the Sarbanes-Oxley Act and rules subsequently implemented by SEC and Nasdaq have imposed various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Further, in July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act was enacted, pursuant to which the SEC adopted rules and regulations related to corporate governance and executive compensation, such as “say on pay” and proxy access.

Stockholder activism, the current political environment and the current high level of U.S. government intervention and regulatory reform may also lead to substantial new regulations and disclosure obligations, which may in turn lead to additional compliance costs and impact the manner in which we operate our business in ways we do not currently anticipate. Our management and other personnel will need to devote a substantial amount of time to comply with these requirements. Moreover, these requirements will increase our legal and financial compliance costs and will make some activities more time-consuming and costly. For example, we expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements.

As a public company, we may also be subject to more stringent state law requirements, such as California Senate Bill 826, which generally requires public companies with principal executive offices in California to have a minimum number of females on the company’s board of directors, and California Assembly Bill 979, which generally requires public companies with principal executive offices in California to include specified numbers of directors from “underrepresented communities.” We are currently compliant with the requirements, but there are no assurances that we will be compliant in the future. Both Senate Bill 826 and Assembly Bill 979 have been challenged in legal proceedings and there is uncertainty whether the courts will uphold Senate Bill 826 or Assembly Bill 979. If we fail to comply with either Senate Bill 826 or Assembly Bill 979, we could be fined by the California Secretary of State, with a $100,000 fine for the first violation and a $300,000 for each subsequent violation, and our reputation may be adversely affected.

If we fail to develop or maintain proper and effective internal control over financial reporting, our ability to produce accurate and timely financial statements could be impaired, investors may lose confidence in us and the trading price of our common stock may decline.

Effective internal control over financial reporting are necessary for us to provide reliable financial reports and effectively prevent fraud and operate successfully as a public company. Any failure to maintain internal control over financial reporting could severely inhibit our ability to accurately report our financial condition, results of operations or cash flows. If our internal control over financial reporting is not effective, investors may lose confidence in the accuracy and completeness of our financial reports, the market price of our common stock could decline, and we could be subject to sanctions or investigations by Nasdaq, the SEC or other regulatory authorities. Failure to remedy any material weakness in our internal control over financial reporting could also restrict our future access to the capital markets.

A material weakness in internal control over financial reporting has in the past and could in the future lead to deficiencies in the preparation of financial statements. Deficiencies in the preparation of financial statements, could lead to litigation claims against us. The defense of any such claims may cause the diversion of management's attention and resources, and we may be required to pay damages if any such claims or proceedings are not resolved in our favor. Any litigation, even if resolved in our favor, could cause us to incur significant legal and other expenses. Such events could also affect our ability to raise capital to fund future business initiatives.

Pursuant to Section 404 of the Sarbanes-Oxley Act, we are required to furnish a report by our management on our internal control over financial reporting, including an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. The rules governing the standards that must be met for management to assess our internal control over financial reporting are complex and require significant documentation, testing and possible remediation. To comply with the Sarbanes-Oxley Act, the requirements of being a reporting company under the Securities Exchange Act of 1934, as amended, or the Exchange Act, and any complex accounting rules in the future, we may need to upgrade our information technology systems; implement additional financial and management controls, reporting systems and procedures; and hire additional accounting and finance staff.

Our reported financial results may be adversely affected by changes in accounting principles generally accepted in the United States.

Generally accepted accounting principles in the United States are subject to interpretation by the Financial Accounting Standards Board or the SEC, and various bodies formed to promulgate and interpret appropriate accounting principles. A change in these principles or interpretations could have a significant effect on our reported financial results, may retroactively affect previously reported results, could cause unexpected financial reporting fluctuations and may require us to make costly changes to our operational processes and accounting systems.

Provisions in our corporate charter documents and under Delaware law could make an acquisition of us, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current management.

Provisions in our corporate charter and our bylaws may discourage, delay or prevent a merger, acquisition or other change in control of us that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions also could limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, because our board of directors is responsible for appointing the members of our management team, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. For a summary of these provisions, see the section titled "Anti-Takeover Provisions of Delaware Law and Our Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws—Amended and Restated Certificate of Incorporation and Amended and Restated Bylaws" in Exhibit 4.3 Description of Capital Stock, as updated by our Amended and Restated Bylaws filed herewith as Exhibit 3.2.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware will be the exclusive forum for substantially all disputes between us and our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers or employees.

Our amended and restated certificate of incorporation provides that the Court of Chancery of the State of Delaware (or, if and only if the Court of Chancery of the State of Delaware lacks subject matter jurisdiction, any state court located within the State of Delaware or, if and only if all such state courts lack subject matter jurisdiction, the federal district court for the District of Delaware) will be the exclusive forum for the following types of actions or proceedings under Delaware statutory or common law:

- any derivative action or proceeding brought on our behalf;
- any action or proceeding asserting a claim of breach of a fiduciary duty owed by any of our current or former directors, officers or other employees to us or our stockholders;
- any action or proceeding asserting a claim against us or any of our current or former directors, officers or other employees, arising out of or pursuant to any provision of the Delaware General Corporation Law, our certificate of incorporation or our bylaws;
- any action or proceeding to interpret, apply, enforce or determine the validity of our certificate of incorporation or our bylaws; and
- any action asserting a claim against us or any of our directors, officers or other employees governed by the internal affairs doctrine.

This provision would not apply to suits brought to enforce a duty or liability created by the Exchange Act or any other claim for which the U.S. federal courts have exclusive jurisdiction. Furthermore, Section 22 of the Securities Act of 1933, as amended, or the Securities Act, creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our amended and restated certificate of incorporation further provides that the federal district courts of the United States will be the exclusive forum for resolving any complaint asserting a cause of action arising under the Securities Act, unless we consent in writing to the selection of an alternative forum. While the Delaware courts have determined that such choice of forum provisions are facially valid, a stockholder may nevertheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our amended and restated certificate of incorporation. This may require significant additional costs associated with resolving such action in other jurisdictions and there can be no assurance that the provisions will be enforced by a court in those other jurisdictions.

These exclusive-forum provisions may limit a stockholder's ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers or other employees, which may discourage these types of lawsuits. Furthermore, the enforceability of similar choice of forum provisions in other companies' certificates of incorporation has been challenged in legal proceedings, and it is possible that a court could find these types of provisions to be inapplicable or unenforceable. If a court were to find the exclusive-forum provision contained in our amended and restated certificate of incorporation to be inapplicable or unenforceable in an action, we may incur further significant additional costs associated with resolving such action in other jurisdictions, all of which could harm our business.

Item 1B. Unresolved Staff Comments.

None.

Item 1C. Cybersecurity

Our Board of Directors (the "Board") and management recognize the importance of maintaining the trust and confidence of our patients, investors, business partners and employees. The Board and our Audit Committee are actively involved in oversight of our cybersecurity program as part of our approach to risk management. Our cybersecurity policies, processes and practices are integrated into our operations and are based on recognized standards such as the National Institute of Standards and Technology Cybersecurity Framework. In general, we seek to address cybersecurity risks through a comprehensive, coordinated approach that is focused on preserving the confidentiality, security, and availability of the information that we create through our business operations by identifying, preventing, and mitigating cybersecurity threats and effectively responding to cybersecurity incidents when they occur.

Risk Management and Strategy

As one of the important elements that comprise and has been integrated into our overall enterprise risk management approach, our cybersecurity program includes the following:

Governance: As discussed in more detail below under the heading "Governance," our Board's oversight of cybersecurity risk management is supported by the Audit Committee of the Board, which regularly reviews operational risks. Our Chief Information Officer ("CIO"), together with our Head of Information Security ("HIS"), and other members of our management team meet regularly to review current cybersecurity risks. The CIO and management team representatives also meet with the Audit Committee at least on a quarterly basis to discuss and review our cybersecurity program and risk landscape.

Collaborative Approach: We have implemented a cross-functional approach involving all employees to help in identifying, preventing, and mitigating cybersecurity threats and incidents. We have implemented processes that provide for the prompt escalation of known cybersecurity incidents so that decisions regarding the public disclosure and reporting of such incidents can be made by our management team, together with the Audit Committee, in a timely manner.

Technical Safeguards: We deploy technical safeguards designed to protect our information systems from cybersecurity threats, including firewalls, intrusion prevention and detection systems, and access controls. We also employ multi-factor authentication and a managed endpoint detection and response solution for malware. These measures are evaluated and improved through vulnerability assessments and penetration testing completed by third party experts, as well as cybersecurity threat intelligence.

Incident Response and Recovery: We have established and maintain an incident response plan that addresses our response to a cybersecurity incident. This plan is evaluated regularly.

Third-Party Risk Management: We maintain a risk-based approach to identifying and overseeing cybersecurity risks presented by third parties, including vendors, service providers and third-party systems.

Education and Awareness: We provide regular training on cybersecurity threats to equip our personnel with effective tools to address them and to communicate our latest information security policies, processes and practices.

We periodically evaluate and test our policies, standards, processes, and practices to address cybersecurity threats and incidents. These efforts include a wide range of activities, including third party assessments, vulnerability testing, and other exercises focused on evaluating the effectiveness of our cybersecurity measures. The results of such assessments and reviews are reported to our management team, the Audit Committee and the Board, and we adjust our cybersecurity program as necessary based on the information provided by these assessments and reviews.

Governance

Our Board, in coordination with the Audit Committee, oversees our risk management approach, including the management of risks arising from cybersecurity threats. The Board and the Audit Committee each receive regular presentations and reports on cybersecurity risks, which address a wide range of topics including recent developments, evolving standards, vulnerability assessments, third-party and independent expert reviews, the threat environment, technological trends, and any material risks identified with our third parties. The Audit Committee also receives prompt and timely information regarding any significant cybersecurity incidents, as well as ongoing updates regarding any such incidents until they have been remediated. Our CIO, Audit Committee and Board review and discuss our approach to cybersecurity risk on an annual basis.

The HIS and CIO, in coordination with our management team, which includes our Chief Executive Officer ("CEO"), Chief Financial Officer ("CFO") and General Counsel, work collaboratively to implement a program designed to protect our information systems from cybersecurity threats and to promptly respond to any cybersecurity incidents in accordance with our incident response plan. Through an ongoing process, the HIS monitors the prevention, detection, mitigation, and remediation of cybersecurity threats and incidents in real time, and reports such threats and incidents to the CIO, management team, and when appropriate, the Audit Committee.

Selected Management and Director Qualifications

The HIS and CIO have both served in various roles in information technology and information security for many years, including serving in similar roles at other publicly traded companies. The HIS holds several industry accreditations, including being a certified Chief Information Security Officer, and has worked in the information technology field for over 25 years, specializing in Information Security for the last 15 years. The CIO has undergraduate and graduate degrees in technical fields, plus a master's degree in business administration, and has worked in healthcare information technology for over 20 years. Our CEO, CFO and General Counsel each hold undergraduate and graduate degrees in their respective fields, and each have over 20 years of experience managing risks at Vir and at similarly situated companies, including risks arising from cybersecurity threats. For example, our CFO has been responsible for leading and managing Information Technology departments at three separate publicly traded companies, including our Company, and has leadership experience in business continuity planning in various roles. Additionally, one of our directors formerly served as the United States Secretary of Homeland Security, in which capacity she had ultimate responsibility for the cybersecurity of the critical infrastructure of the United States of America, and as President of the University of California with responsibility for cybersecurity matters related to the university's various networks.

Risk and Issues Disclosure

We describe the risks we face, including cybersecurity risks, in Section 1A above, titled "Risk Factors". For the period covered by this Annual Report on Form 10-K, we are unaware of any specific cybersecurity threats that have materially affected the Company, its business strategy, results of operations or financial condition.

Item 2. Properties.

Our corporate headquarters are located in San Francisco, California, where we lease approximately 179,566 square feet of office, research and development, engineering, and laboratory space pursuant to two lease agreements that expire at various dates through 2033, one of which is renewable for additional five years.

We also have several other locations, including Bellinzona, Switzerland, where we lease approximately 12,292 square feet of office, research and development, engineering, and laboratory space pursuant to a lease agreement which expires on December 31, 2028, with an option to extend for five years and further approximately 3,143 square feet of office, research and development and laboratory space pursuant to a lease agreement which expires on April 30, 2032 with an option to terminate early on December 31, 2028. We have additional lease in St. Louis, Missouri, where we lease approximately 58,737 square feet of office, research and development, and laboratory space pursuant to a lease agreement that expires December 31, 2028; and Portland, Oregon, where we lease approximately 7,536 square feet of office, research and development, engineering, and laboratory space pursuant to a lease agreement that expires February 28, 2027, which is renewable for an additional five years. As we announced on December 13, 2023, our facilities in St. Louis, Missouri and Portland, Oregon will be closed in 2024.

We believe that our existing facilities are adequate for our near-term needs, but if required, we believe that suitable additional alternative spaces will be available in the future on commercially reasonable terms.

Item 3. Legal Proceedings.

From time to time, we may become involved in legal proceedings arising in the ordinary course of our business. We are not currently party to any material legal proceedings, and we are not aware of any pending or threatened legal proceeding against us that we believe could have an adverse effect on our business, operating results or financial condition.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Market Information for Common Stock

Our common stock has been listed on The Nasdaq Global Select Market under the symbol "VIR" since October 11, 2019.

Holders of Record

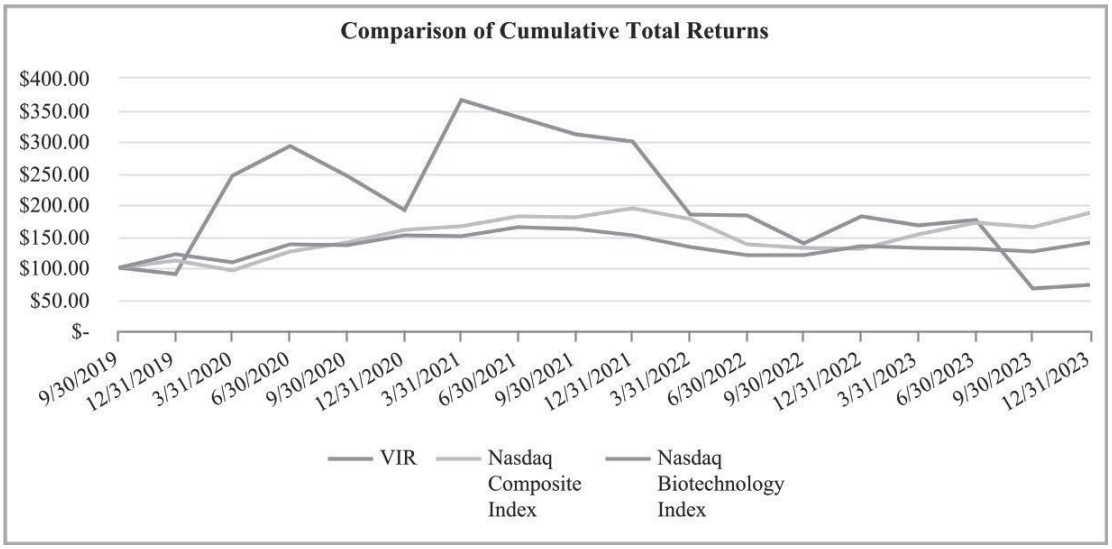
As of February 16, 2024, there were approximately 135,032,268 stockholders of record of our common stock. The actual number of stockholders is greater than this number of record holders, and includes stockholders who are beneficial owners, but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

Dividend Policy

We currently intend to retain future earnings, if any, for use in operation of our business and to fund future growth. We have never declared or paid any cash dividends on our capital stock and do not anticipate paying any cash dividends in the foreseeable future. Payment of cash dividends, if any, in the future will be at the discretion of our board of directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant.

Stock Performance Graph

The following graph shows the total stockholder's return on an investment of $100 in cash at market close on October 11, 2019 (the first day of trading of our common stock), through December 31, 2023 for (i) our common stock, (ii) the Nasdaq Composite Index and (iii) the Nasdaq Biotechnology Index. Pursuant to applicable Securities and Exchange Commission, rules, all values assume reinvestment of the full amount of all dividends; however, no dividends have been declared on our common stock to date. The stockholder return shown on the graph below is not necessarily indicative of future performance, and we do not make or endorse any predictions as to future stockholder return. This graph shall not be deemed "soliciting material" or be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any of our filings under the Securities Act of 1933, as amended, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.



Date	VIR	Nasdaq Composite Index	Nasdaq Biotechnology Index
10/11/2019	$ 100.00	$ 100.00	$ 100.00
10/31/2019	$ 100.57	$ 102.92	$ 106.95
12/31/2019	$ 89.69	$ 111.36	$ 120.19
3/31/2020	$ 244.44	$ 95.57	$ 107.67
6/30/2020	$ 292.23	$ 124.84	$ 136.40
9/30/2020	$ 244.86	$ 138.61	$ 135.11
12/31/2020	$ 191.01	$ 159.96	$ 151.06
3/31/2021	$ 365.69	$ 164.41	$ 149.97
6/30/2021	$ 337.23	$ 180.02	$ 163.40
9/30/2021	$ 310.41	$ 179.33	$ 161.40
12/31/2021	$ 298.64	$ 194.18	$ 150.10
3/31/2022	$ 183.45	$ 176.50	$ 132.24
6/30/2022	$ 181.67	$ 136.88	$ 118.99
9/30/2022	$ 137.52	$ 131.26	$ 119.59
12/31/2022	$ 180.53	$ 129.90	$ 133.73
3/31/2023	$ 165.98	$ 151.69	$ 130.94
6/30/2023	$ 174.96	$ 171.13	$ 129.40
9/29/2023	$ 66.83	$ 164.07	$ 125.49
12/29/2023	$ 71.75	$ 186.31	$ 138.72

Securities Authorized for Issuance Under Equity Compensation Plans

The information required by this Item regarding equity compensation plans is incorporated by reference to the information set forth in PART III Item 12 of this Annual Report on Form 10-K.

Use of Proceeds from Registered Securities

None.

Recent Sales of Unregistered Equity Securities

None.

Issuer Purchases of Equity Securities

None.

Item 6. [Reserved]

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

You should read the following discussion and analysis of our financial condition and results of operations in conjunction with our audited consolidated financial statements and the related notes and other financial information included elsewhere in this Annual Report on Form 10-K. Unless the context requires otherwise, references in this Annual Report on Form 10-K to the "Company", "Vir," "we," "our" and "us" refer to Vir Biotechnology, Inc. and its consolidated subsidiaries.

Our discussion and analysis below are focused on our financial results and liquidity and capital resources for the years ended December 31, 2023 and 2022, including year-over-year comparisons of our financial performance and condition for these years. Discussion and analysis of the year ended December 31, 2021 specifically, as well as the year-over-year comparison of our financial performance and condition for the years ended December 31, 2022 and 2021, are located in the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in the Annual Report on Form 10-K for the year ended December 31, 2022, as filed with the SEC on February 28, 2023. For a detailed discussion on our business environment, please read Item 1. Business, included in this Annual Report on Form 10-K. For additional information on the risks that could negatively impact our business, please read Item 1A. Risk Factors, included in this Annual Report on Form 10-K.

Overview

We are an immunology company focused on combining cutting-edge technologies to treat and prevent serious infectious diseases and other serious conditions, including viral-associated diseases. At Vir, we have a bold vision – powering the immune system to transform lives. We aim to achieve this in two fundamental ways – first through developing powerful antibody therapeutics and second by generating unique T cell responses in vivo through our T cell-based viral vector platform. Our growth and pursuit of scientific innovation is fueled by our world-class leading monoclonal antibody (mAb) platform that has a proven track record and is further strengthened by our artificial intelligence-led mAb optimization and engineering capabilities.

Our current clinical development pipeline consists of product candidates targeting hepatitis delta virus (HDV), hepatitis B virus (HBV), and human immunodeficiency virus (HIV). The most advanced preclinical candidates in our pipeline include those targeting influenza A and B, coronavirus disease 2019 (COVID-19), respiratory syncytial virus (RSV) and human metapneumovirus (MPV), and human papillomavirus (HPV). We have assembled two technology platforms that modulate the immune system by exploiting critical observations of natural immune processes— a mAb discovery platform and a T cell-based viral vector platform. Additionally, Vir is evaluating a small interfering RNA (siRNA) through a collaboration with Alnylam in our hepatitis clinical trials. We have established our own internal process development, analytical development, manufacturing, supply chain and quality capabilities and work with contract development and manufacturing organizations (CDMOs) to develop, manufacture, test and supply our early- and late-stage product candidates.

We have an industry-leading management team and board of directors with significant immunology and infectious diseases experience, including a proven track record of progressing product candidates from early-stage research through clinical development, and worldwide regulatory approval and commercialization experience. Given the global impact of infectious diseases and other serious conditions, we are committed to providing broad access to our therapeutics.

Significant Developments

Following is a summary of significant developments affecting our business that have occurred and that we have reported since the filing of our Annual Report on Form 10-K for the year ended December 31, 2022.

Pipeline Programs

Chronic Hepatitis Delta (CHD)

- In November 2023, we presented initial SOLSTICE data from a small subset of participants in a late-breaker presentation at the American Association for the Study of Liver Diseases (AASLD) The Liver Meeting.
    - After 12 weeks of combination treatment with tobevibart and elebsiran, 5 out of 6 participants achieved undetectable HDV RNA and 6 out of 6 were below the lower limit of quantification. This is the fastest decline in HDV RNA observed to date.

- The SOLSTICE trial is ongoing with enrollment currently ahead of schedule for completion in the first quarter of 2024 due to the high level of physician and patient interest. This portion of the SOLSTICE trial is investigating the combination of tobevibart and elebsiran given every 4 weeks in one cohort and tobevibart monotherapy given every 2 weeks in another cohort. Of the 30 participants anticipated to be enrolled in each cohort, approximately 44% have compensated cirrhosis.
    - We expect to report data on a subset of participants in the second quarter of 2024: 12-week treatment data for 15 participants per regimen as well as 24-week data for 10 participants per regimen. Complete 24-week treatment data for 30 participants per regimen is expected in the fourth quarter of 2024.
- In June 2023, we presented preclinical in vivo and in vitro data demonstrating the antiviral properties of elebsiran and tobevibart against hepatitis delta virus at the EASL Congress. These data further support the clinical development of these investigational medicines as a treatment for the chronic suppression of hepatitis delta virus.

Chronic Hepatitis B (CHB)

- In November 2023 we presented new MARCH Part B data at AASLD The Liver Meeting.
    - The data demonstrated an approximately three-fold higher response rate when adding tobevibart to a regimen of elebsiran with or without peginterferon after 24 weeks of treatment (15.0% for tobevibart + elebsiran + peginterferon alpha and 14.3% for tobevibart + elebsiran).
    - The MARCH Part B trial is ongoing with 48-week end of treatment data expected in the fourth quarter of 2024.
- The Phase 2 PREVAIL platform trial and its THRIVE/STRIVE sub-protocols are ongoing as of the date of this Annual Report on Form 10-K. The platform is evaluating combinations of tobevibart, elebsiran and/or peginterferon alpha in two CHB patient populations with the potential to evaluate other populations in the future. Initial data from this platform trial are expected in the first half of 2025.

HIV

- In September 2023, we announced the initiation of the Phase 1 trial of VIR-1388, an investigational novel T cell vaccine for the prevention of HIV. Our T cell platform utilizes human cytomegalovirus (HCMV) as a vector, which has the potential to induce high frequencies of antigen-specific, tissue-localizing effector memory T cells.
    - The trial is supported by the National Institute of Allergy and Infectious Diseases, part of the National Institutes of Health, and the Bill & Melinda Gates Foundation (BMGF), and is being conducted by the HIV Vaccine Trials Network.
    - In December 2023, *Nature Medicine* recognized the Phase 1 trial of VIR-1388 as one of the “11 clinical trials that will shape medicine in 2024.”
    - Initial data from the trial is expected in the second half of 2024.
- In May 2023 we reported safety and immunology data from the highest dose cohort 3 of the prototype Phase 1 trial of VIR-1111, an investigational HIV T cell vaccine based on HCMV. These data were consistent with the data from cohorts 1 and 2. Namely, no safety signals and no vector shedding or viremia were reported. In addition, no sustained HIV insert specific T cell responses were observed. The trial was funded in part by the BMGF.

COVID-19

- In October 2023, we announced we were awarded approximately $50.0 million in new funding from the Biomedical Advanced Research and Development Authority ("BARDA"), part of the Administration for Strategic Preparedness and Response within the U.S. Department of Health and Human Services ("HHS").
  - $40.0 million of the total funds is part of Project NextGen, the Biden administration's program to accelerate the development of next-generation COVID-19 vaccines and treatments, and will support the development through Phase 1 of VIR-7229, a next-generation COVID antibody that has been AI-engineered to have increased potency, breadth and resistance to viral escape compared to sotrovimab. It also supports developing alternative mAb delivery technologies, including RNA-delivered mAbs. We expect to initiate a Phase 1 clinical trial in 2024 and are exploring partner opportunities for post phase 1 development. The Phase 1 trial is expected to be completed in the second half of 2025.
  - $10.0 million of the total funds will support the discovery of new mAbs against a second pathogen of pandemic potential in the context of further advancing alternative mAb delivery technologies. This effort is receiving support from BARDA's Division of Chemical, Biological, Radiological and Nuclear Medical Countermeasures.
- On August 30 2023, *Nature* published in vivo research findings that showed the role effector function plays in sotrovimab's ability to activate the immune system and clear SARS-CoV-2.
- In February 2023, we and GSK amended their existing agreement to reflect that:
  - We will continue to discover, develop and advance next-generation solutions for COVID-19 and other potential coronavirus outbreaks, independently or with other partners.
  - The companies will continue working together to ensure ongoing access to sotrovimab for patients around the world, where authorized, and to develop new therapies for other respiratory diseases.

Influenza A virus

- We and GSK mutually terminated the Influenza Program under the Definitive Collaboration Agreement dated May 18, 2021, effective on February 21, 2024, to reflect that Vir retains sole rights to continue advancing its investigational therapies for influenza independently or with other partners. We are actively pursuing external partnership opportunities.
- In July 2023, we reported that the Phase 2 Prevention of Illness Due to Influenza A (PENINSULA) trial evaluating VIR-2482 for the prevention of symptomatic influenza A illness did not meet primary or secondary efficacy endpoints
- The full analysis of data from the Phase 2 PENINSULA trial is expected in the second quarter of 2024 in a scientific publication. Initial post-hoc analyses have yielded the following conclusions:
  - VIR-2482's ability to reduce cases of symptomatic flu improved to 57% for the 1,200 mg dose when the case definition (how symptomatic is defined) includes fever.
  - This relative risk reduction increases further to 65% when excluding the confirmed flu cases that occurred within a few days of dosing.

Preclinical Pipeline Candidates

- We are continuing to advance next-generation antibodies using our proprietary platform, which leverages dAIsY™, an AI engine, allowing us to bring high-quality drug candidates to the clinic more efficiently.
- We expect the filing of multiple new investigational new drugs ("INDs") in the next 12 to 24 months, including:
  - VIR-2981, an investigational neuraminidase-targeting mAb against both influenza A and B viruses.
  - VIR-8190, an investigational mAb against RSV and MPV.
  - VIR-1949, an investigational therapeutic T cell vaccine based on our HCMV vector platform that is designed to treat precancerous lesions caused by HPV.

Corporate Update

- In December of 2023, we announced strategic imperatives to focus its capital allocation on programs with the highest potential for patient impact and value creation, which include:
  - R&D facilities in St. Louis, Missouri and Portland, Oregon will be closed in 2024. Research activities will continue at our sites in San Francisco, California and Bellinzona, Switzerland.
  - Approximately 12% or 75 positions will be eliminated, which includes reductions from our discontinuation of its small molecule group which was initiated in the third quarter of 2023. The reductions will be substantially complete by the first quarter of 2024.
- In July 2023, we made the decision to increase focus on our proprietary antibody platform and discontinue our innate immunity small molecule platform.

Leadership Update

- In October 2023, we announced the appointment of Jennifer Towne, Ph.D., as Executive Vice President and Chief Scientific Officer, effective November 6, 2023. Dr. Towne joins us from The Janssen Pharmaceutical Companies of Johnson & Johnson, where she spent nine years holding immunology research leadership roles of increasing responsibility within Research and Development. Prior to Janssen, Dr. Towne held a variety of scientific roles during her 13 years at Amgen. During the course of her career, Dr. Towne led the development of 16 drug candidates from preclinical research to IND and early clinical development.
- In June 2023, Sasha Damouni Ellis joined us as Executive Vice President and Chief Corporate Affairs Officer. Previously, she was Senior Vice President, Corporate Affairs and Investor Relations of Marinus Pharmaceuticals.
- In May 2023, Jeff Calcagno, M.D., joined us as Executive Vice President and Chief Business Officer. He joined us from Johnson & Johnson (J&J), where he spent more than 12 years holding leadership roles of increasing responsibility within all three divisions of J&J Innovation (JJI), including as Global Transactions Lead for Infectious Diseases & Vaccines and as Head of JLABS Bay Area.
- In April 2023, Marianne De Backer, M.Sc., Ph.D., MBA, joined us as Chief Executive Officer (CEO) and member of the Board of Directors. Dr. De Backer has more than two decades of broad international experience, including a strong track record in global expansion, innovation technology licensing, and mergers and acquisitions. Prior to Vir, Dr. De Backer was Executive Vice President, Head of Pharmaceuticals Strategy, Business Development and Licensing/Open Innovation, and Member of the Executive Committee for Bayer Pharmaceuticals.
- In April 2023, George Scangos, Ph.D., retired from his position as CEO at Vir. He continues to provide strategic counsel to Vir as a member of the Board of Directors.
- In March 2023, Sung Lee, previously the Chief Financial Officer (CFO) and Management Board member of MorphoSys AG, became Vir's Executive Vice President and CFO.

Financial Overview

We were incorporated in April 2016 and commenced principal operations later that year. To date, we have focused primarily on organizing and staffing our company, business planning, raising capital, identifying, acquiring, developing and in-licensing our technology platforms and product candidates, and conducting preclinical studies and clinical trials.

We have financed our operations primarily through sales of our common stock from our initial public offering, subsequent follow-on offering and convertible preferred securities, and payments received under our grant and collaboration agreements. As of December 31, 2023, we had $1.63 billion in cash, cash equivalents, and investments. Based upon our current operating plan, we believe that the $1.63 billion will enable us to fund our operations for at least the next 12 months. However, our operating plan may change as a result of many factors currently unknown to us, and we may need to seek additional financing to fund our long-term operations sooner than planned. See the section titled "Liquidity, Capital Resources and Capital Requirements—Funding Requirements and Conditions" below for additional information.

Our net loss was $615.1 million for the year ended December 31, 2023, compared to net income of $515.8 million and $528.6 million for the years ended December 31, 2022 and December 31, 2021, respectively. As of December 31, 2023, we had accumulated deficit of $237.8 million. Although we recorded net income for the years ended December 31, 2022 and 2021, we have otherwise incurred net losses since inception and may continue to incur net losses in the foreseeable future.

Our primary use of our capital resources is to fund our operating expenses, which consist primarily of expenditures related to identifying, acquiring, developing, manufacturing and in-licensing our technology platforms and product candidates, conducting preclinical studies and clinical trials, and to a lesser extent, selling, general and administrative expenditures. Cash used to fund operating expenses is impacted by the timing of when we pay these expenses, as reflected in the change in our outstanding accounts payable and accrued expenses. In particular, we expect our expenses and losses to increase over time as we continue our research and development efforts, advance our product candidates through preclinical and clinical development, seek regulatory approval, and begin to prepare for commercialization. Our net losses may fluctuate significantly from quarter-to-quarter and year-to-year, depending on the timing of our clinical trials expenditures and our expenditures on other research and development activities.

We manufacture product candidates for three therapeutic modalities: mAbs, T cells and siRNA. We have established our own internal process development, manufacturing, supply chain and quality capabilities organizations that work with our selected CDMOs to develop, manufacture, test and supply our early- and late-stage product candidates developed with our proprietary and external technology platforms. Contract development and manufacturing of our antibody product candidates is supported by our San Francisco, California, laboratory for cell line development, process, analytical and formulation development, small-scale non-GMP manufacturing for preclinical studies and selected quality control testing. For our HCMV product candidates, our in-house capabilities for early-stage process development and HCMV research viral seed stock production will be transferred to a CDMO upon closure of our Portland, Oregon laboratory in 2024.

Our Collaboration, License and Grant Agreements

We have entered into collaboration, license and grant arrangements with various third parties. For details regarding these and other agreements, see the section titled “Business—Our Collaboration, License and Grant Agreements” and Note 6 — Grant Agreements and Note 7 — Collaboration and License Agreements to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

Components of Operating Results

Revenues

To date, sotrovimab has been granted emergency authorization, temporary authorization or marketing approval (under the brand name Xevudy®), and has been supplied in more than 30 countries. Although we have previously recognized revenue from our profit-share related to sotrovimab under our definitive collaboration agreement with GSK executed in June 2020, or the 2020 GSK Agreement, we may continue to incur net operating losses for at least the next several years as the extent of future revenue from the sale of sotrovimab remains uncertain. While we have an EUA from the U.S. Food and Drug Administration, or FDA, for sotrovimab, the FDA has excluded the use of sotrovimab in all U.S. regions due to the continued proportion of COVID-19 cases caused by certain Omicron subvariants. With this EUA revision, sotrovimab is not currently authorized for use in any U.S. region. Although certain countries outside the U.S. continue to maintain access to 500 mg IV while noting that the clinical efficacy is unknown or uncertain against existing and emerging variants, we cannot predict whether other countries will further limit the use of sotrovimab. Due to the evolving COVID-19 landscape and based on discussions with the FDA, we and GSK do not plan to file a Biologics License Application, or BLA, for sotrovimab at this time. In light of these developments, we cannot predict whether (if at all) or to what extent sotrovimab may be reauthorized for use by the FDA in any U.S. region in the future, and we do not expect meaningful collaboration revenue in the future from the sale of sotrovimab for the treatment of COVID-19 even if it were reauthorized by the FDA. In addition, we have not obtained regulatory approval for any other product candidates, and we do not expect to generate any significant revenue from the sale of our other product candidates until we complete clinical development, submit regulatory filings and receive approvals from the applicable regulatory bodies for such product candidates, if ever.

Our revenues consist of the following:

Collaboration revenue includes recognition of our profit-share from the sales of sotrovimab pursuant to the 2020 GSK Agreement. Our contractual share of 72.5% from the sales of sotrovimab is applied to the net sales reported in the period by GSK, net of cost of goods sold and allowable expenses from both GSK and us (e.g., manufacturing, distribution, medical affairs, selling, and marketing expenses). In order to record collaboration revenue, we utilize certain information from our collaboration partner, including actual net product sales and costs incurred for sales activities, and make key judgments based on business updates related to commercial and clinical activities, such as expected commercial demand, commercial supply plan, manufacturing commitments, risks related to expired or obsolete inventories, and risks related to potential product returns or contract terminations. In 2024, we expect a nominal amount of collaboration revenue, if any, from our 2020 GSK Agreement, and we may incur negative collaboration revenue related to costs for ongoing required support efforts that our partner GSK leads.

Constraint on variable consideration

In May 2021, the FDA granted an EUA in the U.S. for sotrovimab. In April 2022, the FDA excluded the use of sotrovimab in all U.S. regions due to the continued proportion of COVID-19 cases caused by certain Omicron subvariants. As the lead party for all manufacturing and commercialization activities, GSK incurs all of the manufacturing, sales and marketing expenses and is the principal on sales transactions with third parties. Our accounting policy related to the profit-share is to consider the agreed-upon share of the profit-sharing amounts each quarter and evaluate whether those amounts are subject to potential future adjustments based on the latest available facts and circumstances, subject to the terms of the 2020 GSK Agreement.

As we are the agent under the 2020 GSK Agreement, we recognize our contractual share of the profit-sharing amounts or royalties (in case of an opt-out) as revenue, based on sales net of various estimated deductions such as rebates, discounts, chargebacks, credits and returns, less cost of sales and allowable expenses (including manufacturing, distribution, medical affairs, selling, and marketing expenses) in the period the sale occurs. Manufacturing costs include inventory revaluation adjustments, lower of cost or market inventory adjustments, inventory write-downs and write-offs, and binding purchase commitments with a third-party manufacturer, among other manufacturing costs. Our contractual share of the profit-sharing amounts is subject to potential future adjustments to allowable expenses, which we account for as a form of variable consideration.

In 2023, GSK reported to us certain allowable manufacturing expenses related to excess sotrovimab supply and binding reserved manufacturing capacity not utilized, which we had previously reserved as a constraint on our cumulative profit-sharing amounts. GSK may continue to adjust allowable manufacturing expenses for our share of the excess supply write-offs and unused binding manufacturing capacity and report to us as cost-sharing amounts in future periods. We evaluate the latest available facts and circumstances to update our evaluation of whether any portion of profit-sharing amounts should continue to be constrained. We re-assess these estimates at each reporting period. Actual results could materially differ from estimates.

Contract revenue includes recognition of revenue generated from license rights issued to GSK, from research and development services under third-party contracts, and from a third-party clinical supply agreement.

Grant revenue is comprised of revenue derived from grant agreements with government-sponsored and private organizations.

License revenue from a related party is comprised of revenue related to Brii Bio's exercise of its option to obtain exclusive rights to develop and commercialize compounds arising from tobevibart in mainland China, Hong Kong, Macau and Taiwan recognized in the year ended December 31, 2022.

Operating Expenses

Cost of Revenue

Cost of revenue currently represents royalties earned by third-party licensors on net sales of sotrovimab. We recognize these royalties as cost of revenue when we recognize the corresponding revenue that gives rise to payments due to our licensors.

Research and Development

To date, our research and development expenses have related primarily to discovery efforts and preclinical and clinical development of our product candidates. Research and development expenses are recognized as incurred and payments made prior to the receipt of goods or services to be used in research and development are capitalized until the goods or services are received. We do not track all research and development expenses by product candidate.

Research and development expenses consist primarily of costs incurred for our product candidates in development and prior to regulatory approval, which include:

- expenses related to license and collaboration agreements, and change in the fair value of certain contingent consideration obligations arising from business acquisitions;
- personnel-related expenses, including salaries, benefits and stock-based compensation for personnel contributing to research and development activities;
- expenses incurred under agreements with third-party contract manufacturing organizations, contract research organizations, and consultants;
- clinical costs, including laboratory supplies and costs related to compliance with regulatory requirements; and
- other allocated expenses, including expenses for rent and facilities maintenance and depreciation and amortization.

We expect our research and development expenses to increase substantially in absolute dollars over time as we advance our product candidates into and through preclinical studies and clinical trials and pursue regulatory approval of our product candidates. The process of conducting the necessary clinical research to obtain regulatory approval is costly and time-consuming. The actual probability of success for our product candidates may be affected by a variety of factors including: the safety and efficacy of our product candidates, early clinical data, investment in our clinical programs, the ability of collaborators to successfully develop our licensed product candidates, competition, manufacturing capability and commercial viability.

As a result of the uncertainties discussed above, we are unable to determine the duration and completion costs of our research and development projects or when and to what extent we will generate significant revenue from the commercialization and sale of any of our product candidates. Clinical and preclinical development timelines, the probability of success and development costs can differ materially from expectations. We anticipate that we will make determinations as to which product candidates to pursue and how much funding to direct to each product candidate on an ongoing basis in response to the results of ongoing and future preclinical studies and clinical trials, regulatory developments, our ongoing assessments as to each product candidate's commercial potential and the impact of public health epidemics, such as the COVID-19 pandemic. In addition, our existing collaborators have significant discretion in determining the efforts and resources that they will apply to our collaborations and may not pursue further development and commercialization of products resulting from our collaboration arrangements or may elect to not to continue or renew research and development programs, which would delay the development and may increase the cost of developing our product candidates and may result in a need for additional capital or a suitable replacement collaborator. For those product candidates where there is not a current collaboration arrangement in place, we cannot forecast which product candidates may be subject to future collaborations, when such arrangements will be secured (if at all) and to what degree such arrangements will affect our development plans and capital requirements.

Our clinical development costs may vary significantly based on factors such as:

- whether a collaborator is paying for some or all of the costs;
- per patient trial costs;
- the number of trials required for approval;
- the number of sites included in the trials;
- enrollment and retention of patients in trials in countries disrupted by geopolitical events, including civil or political unrest;
- the length of time required to enroll eligible patients;
- the number of patients that participate in the trials;
- the number of doses that patients receive;
- the drop-out or discontinuation rates of patients;

- potential additional safety monitoring requested by regulatory agencies;
- the duration of patient participation in the trials and follow-up;
- the cost and timing of manufacturing our product candidates;
- the phase of development of our product candidates; and
- the efficacy and safety profile of our product candidates.

Selling, General and Administrative

Our selling, general and administrative expenses consist primarily of personnel-related expenses for personnel in executive, finance and other administrative functions, facilities and other allocated expenses, other expenses for outside professional services, including legal, audit and accounting services, insurance costs and change in fair value of certain contingent consideration obligations arising from business acquisitions. Personnel-related expenses consist of salaries, benefits and stock-based compensation.

We expect our selling, general and administrative expenses to increase in absolute dollars over time as we continue to support our research and development activities, and commercialization activities for any of our product candidates, if approved, and to grow our business.

Change in Fair Value of Equity Investments

Change in fair value of equity investments consists of the remeasurement of our investment in Brii Biosciences Limited's, or Brii Bio Parent, ordinary shares based on the quoted market price at each reporting date.

Interest Income

Interest income consists of interest earned on our cash, cash equivalents and investments.

Other (Expense) Income, Net

Other (expense) income, net consists of gains and losses from foreign currency transactions and the remeasurement of our contingent consideration obligation.

Benefit from (Provision for) Income Taxes

Benefit from (provision for) income taxes consists primarily of income taxes on our domestic and foreign operations.

Net Loss Attributable to Noncontrolling Interest

Net loss attributable to noncontrolling interest consists of net loss attributable to our noncontrolling interest in Encentrio Therapeutics, Inc., our subsidiary, during the three months ended March 31, 2023.

Results of Operations

Comparison of Years Ended December 31, 2023 and 2022

The following table summarizes our results of operations for the years presented (in thousands):

	Years Ended December 31,		
	2023	2022	Change
Revenues:			
Collaboration revenue	$ 37,266	$ 1,505,469	$ (1,468,203)
Contract revenue	2,228	52,714	(50,486)
License revenue from a related party	—	22,289	(22,289)
Grant revenue	46,686	35,325	11,361
Total revenues	86,180	1,615,797	(1,529,617)
Operating expenses:			
Cost of revenue	2,765	146,319	(143,554)
Research and development	589,671	474,648	115,023
Selling, general and administrative	178,049	161,762	16,287
Total operating expenses	770,485	782,729	(12,244)
(Loss) income from operations	(684,305)	833,068	(1,517,373)
Other income (loss):			
Change in fair value of equity investments	(21,888)	(111,140)	89,252
Interest income	86,990	28,092	58,898
Other (expense) income, net	(8,991)	4,260	(13,251)
Total other income (loss)	56,111	(78,788)	134,899
(Loss) income before benefit from (provision for) income taxes	(628,194)	754,280	(1,382,474)
Benefit from (provision for) income taxes	13,077	(238,443)	251,520
Net (loss) income	$ (615,117)	$ 515,837	$ (1,130,954)
Net loss attributable to noncontrolling interest	$ (56)	$ —	$ (56)
Net (loss) income attributable to Vir	$ (615,061)	$ 515,837	$ (1,130,898)

Revenues

The decrease in collaboration revenue for the year ended December 31, 2023 compared to the same period in 2022 was due to lower profit-sharing amounts under the 2020 GSK Agreement, which was attributable to lower sales of sotrovimab as a result of the decision by the FDA in April 2022 to exclude the use of sotrovimab in all U.S. regions due to the continued proportion of COVID-19 cases caused by certain Omicron subvariants, as further described above under "Components of Operating Results—Revenues". Collaboration revenue for the year ended December 31, 2023 consisted of $1.5 million in profit-sharing amount from the sale of sotrovimab and the release of $35.7 million profit-sharing amount previously constrained. Our release of the profit-sharing constraint and recognition of collaboration revenue was primarily driven by favorable changes in excess manufacturing commitments of sotrovimab.

The decrease in contract revenue for the year ended December 31, 2023 compared to the same period in 2022 was primarily due to the recognition of $39.8 million from deferred revenue in the third quarter of 2022 related to GSK's selection of RSV as its first pathogen under the Additional Programs of the 2021 GSK Agreement.

The decrease in license revenue from a related party for the year ended December 31, 2023 compared to the same period in 2022 was due to Brii Bio Parent's exercise of its option to obtain exclusive rights to develop and commercialize compounds and products arising from tobevibart in mainland China, Hong Kong, Macau and Taiwan.

The increase in grant revenue for the year ended December 31, 2023 compared to the same period in 2022 was primarily due to higher revenue recognized under our agreement with BARDA supporting the Company's Phase 2 PENINSULA trial of VIR-2482 and, to lesser extent, higher revenue recognized related to grants received from BMGF.

Cost of Revenue

The decrease in cost of revenue for the year ended December 31, 2023 compared to the same period in 2022 was due to lower third-party royalties owed based on the lower sales of sotrovimab under the 2020 GSK Agreement.

Research and Development Expenses

The following table shows the primary components of our research and development expenses for the years presented (in thousands):

	Years Ended December 31,		
	2023	2022	Change
Contract manufacturing	$ 114,262	$ 47,960	$ 66,302
Personnel	193,443	157,167	36,276
Clinical costs	121,422	118,849	2,573
Licenses, collaborations and contingent consideration	30,215	54,087	(23,872)
Other	130,329	96,585	33,744
Total research and development expenses	$ 589,671	$ 474,648	$ 115,023

The increase in research and development expenses for the year ended December 31, 2023 compared to the same period in 2022 was primarily due to the following factors:

- the increase in contract manufacturing expenses was primarily related to studies involving VIR-2482 and, to a lesser extent, elebsiran, tobevibart, and VIR-7229;
- the increase in personnel-related expenses was primarily attributable to supporting the advancement of our clinical programs and severance and other personnel related costs incurred in connection with strategic steps to reduce operating expenses adopted in 2023; and
- the increase in other research and development expenses was primarily attributable to non-cash impairment charges associated with certain non-prioritized in-process research and development assets, facilities related costs including depreciation, other costs due to an increase in our personnel, and non-cash impairment charges associated with the discontinuation of the Company's small molecule platform.

partially offset by

- the decrease in licenses, collaborations and contingent consideration expenses primarily attributable to lower costs under our collaboration arrangements with GSK and other R&D collaborators, and lower expenses associated with the change in fair value of the contingent consideration obligation from our acquisition of Humabs Biomed SA.

Selling, General and Administrative Expenses

The increase in selling, general and administrative expenses for the year ended December 31, 2023 compared to the same period in 2022 was primarily due to higher personnel related costs to support the growth of the Company.

Change in Fair Value of Equity Investments

Our equity investment consisted solely of shares of Brii Bio Parent, which is a marketable equity investment and remeasured to fair value at each reporting period. For the year ended December 31, 2023, we recognized an unrealized loss of $21.9 million due to the change in fair value, compared to an unrealized loss of $111.1 million for the same period in 2022.

Interest Income

The increase in interest income was primarily due to higher interest rates as well as higher balances of short-term and long-term investments for the year ended December 31, 2023 compared to the same period in 2022.

Other (Expense) Income, Net

The decrease in other (expense) income, net for the year ended December 31, 2023 compared to the same period in 2022 was primarily due to higher foreign exchange measurement losses related to the accrued liability recognized in connection with the profit-sharing amount constrained under the 2020 GSK Agreement and lower income associated with the decrease in the fair value of the contingent consideration obligation from our acquisition of TomegaVax.

Benefit from (Provision for) Income Taxes

The benefit from income taxes for the year ended December 31, 2023 was primarily due to a pre-tax loss and our ability to carry back the research and development credit to 2022. The provision for income taxes for the year ended December 31, 2022 was primarily due to taxable income for 2022 attributable to significant collaboration revenue from the sales of sotrovimab.

Liquidity, Capital Resources and Capital Requirements

Sources of Liquidity

To date, we have financed our operations primarily through sales of our common stock from our initial public offering and subsequent follow-on offering, sales of our convertible preferred securities, and payments received under our grant and collaboration agreements. As of December 31, 2023, we had $1.63 billion in cash, cash equivalents, and investments. As of December 31, 2023, we had accumulated deficits of $237.8 million. In November 2023, we entered into a sales agreement (the "Sales Agreement") with Cowen and Company, LLC, as sales agent ("TD Cowen"), pursuant to which the Company may from time to time offer and sell shares of its common stock for an aggregate offering price of up to $300.0 million, through or to TD Cowen, acting as sales agent or principal. The shares will be offered and sold under the shelf registration statement on Form S-3 and a related prospectus that we filed with the SEC on November 3, 2023. We will pay TD Cowen a commission of up to 3.0% of the aggregate gross proceeds from each sale of shares, reimburse legal fees and disbursements and provide TD Cowen with customary indemnification and contribution rights. As of December 31, 2023, no shares have been issued under the Sales Agreement.

Funding Requirements and Conditions

Our primary use of our capital resources is to fund our operating expenses, which consist primarily of expenditures related to identifying, acquiring, developing, manufacturing and in-licensing our technology platforms and product candidates, and conducting preclinical studies and clinical trials, and to a lesser extent, selling, general and administrative expenditures.

We have not obtained regulatory approval for any product candidates other than sotrovimab, and we do not expect to generate significant revenue from the sale of our other product candidates until we complete clinical development, submit regulatory filings and receive approvals from the applicable regulatory bodies for such product candidates, if ever. We may continue to incur net losses for the foreseeable future. Based upon our current operating plan, we believe that our existing cash, cash equivalents and investments as of December 31, 2023 as noted above will enable us to fund our operations for at least the next 12 months from the filing date of this Annual Report on Form 10-K.

However, our operating plan may change as a result of many factors currently unknown to us, and we may need to raise additional capital to complete the development and commercialization of our product candidates and fund certain of our existing manufacturing and other commitments. We expect to finance our cash needs through public or private equity or debt financings, third-party (including government) funding and marketing and distribution arrangements, as well as other collaborations, strategic alliances and licensing arrangements, or any combination of these approaches. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be or could be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of our common stockholders. See the sections titled "Risk Factors—Risks Related to Our Financial Position and Capital Needs—Raising additional capital may cause dilution to our stockholders, restrict our operations or require us to relinquish rights to our product candidates." and "Risk Factors—Risks Related to Our Financial Position and Capital Needs—We may require substantial additional funding to finance our operations. If we are unable to raise capital when needed, we could be forced to delay, reduce or terminate certain of our development programs or other operations" for a description of the risks that may be associated with any future capital raises.

We have based our projections of operating capital requirements on assumptions that may prove to be incorrect, and we may use all of our available capital resources sooner than we expect. Because of the numerous risks and uncertainties associated with research, development and commercialization of biotechnology products, we are unable to estimate the exact amount of our operating capital requirements. See the section titled "Risk Factors—Risks Related to Our Financial Position and Capital Needs" for a description of certain risks that will affect our future capital requirements.

We have various operating lease arrangements for office and laboratory spaces located in California, Oregon, Missouri and Switzerland with contractual lease periods expiring between 2024 and 2033. As of December 31, 2023, we expect to make total lease payments of $156.4 million through 2033.

To date, we have entered into collaboration, license and acquisition agreements where the payment obligations are contingent upon future events such as our achievement of specified development, regulatory and commercial milestones, and we are required to make royalty payments in connection with the sale of products developed under those agreements. For additional information regarding these agreements, including our payment obligations thereunder, see the sections titled "Business—Our Collaboration, License and Grant Agreements," as well as Note 4—Acquisitions and Note 7—Collaboration and License Agreements to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K. For information related to our future commitments under our facilities and manufacturing agreements, see Note 10—Commitments and Contingencies to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K.

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements.

Cash Flows

The following table summarizes our cash flows for the periods indicated (in thousands):

	Years Ended December 31,	
	2023	**2022**
Net cash (used in) provided by:		
Operating activities	$ (778,785)	$ 1,663,253
Investing activities	164,629	(1,193,461)
Financing activities	7,480	34,761
Net (decrease) increase in cash, cash equivalents and restricted cash and cash equivalents	$ (606,676)	$ 504,553

Operating Activities

Cash used in operating activities after adjustments for non-cash items decreased in 2023 primarily due to lower collaboration revenue from the sales of sotrovimab as part of the 2020 GSK Agreement and payments made to GSK related to previously reserved excess sotrovimab supply and binding reserved manufacturing capacity not utilized. The non-cash charges of $140.9 million primarily consisted of $111.3 million for stock-based compensation expense and an unrealized loss of $21.9 million on our equity investment.

Cash provided by operating activities after adjustments for non-cash items increased in 2022 primarily due to higher collaboration revenue from the sales of sotrovimab as part of the 2020 GSK Agreement, partially offset by $93.8 million for payment for contingent consideration in excess of acquisition date fair value. The non-cash charges of $575.9 million primarily consisted of $369.5 million for change in estimated constraint on profit-sharing amount, an unrealized loss of $111.1 million on our equity investment, and $102.1 million for stock-based compensation expense.

Investing Activities

Cash provided by investing activities during 2023 was primarily due to $2.2 billion in proceeds received from investments that matured or sold during the period, partially offset by purchases of investments of $2.0 billion and property and equipment of $21.6 million.

Cash used in investing activities during 2022 was primarily due to purchases of investments of $1.5 billion and property and equipment of $68.0 million, partially offset by $351.5 million in proceeds received from investments that matured during the period.

Financing Activities

Cash provided by financing activities during 2023 was primarily due to of proceeds from the issuance of common stock under our employee stock purchase plan of $4.3 million and exercises of stock options of $3.5 million.

Cash provided by financing activities in 2022 was primarily due to proceeds from the issuance of our common stock to BMGF of $28.5 million under the stock purchase agreement, from exercises of stock options of $4.5 million, and from issuance of common stock under our employee stock purchase plan of $3.2 million, partially offset by $1.2 million for payment of contingent consideration.

Critical Accounting Policies and Estimates

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States. The preparation of our consolidated financial statements requires us to make assumptions and estimates about future events and apply judgments that affect the reported amounts of assets, liabilities, revenue and expenses and the related disclosures. We base our estimates on historical experience and other assumptions that we believe to be reasonable under the circumstances. Actual results may differ from these estimates. The critical accounting policies, estimates and judgments that we believe to have the most significant impacts on our consolidated financial statements are described below. For more detail on our critical accounting policies, refer to Note 2—Summary of Significant Accounting Policies to our consolidated financial statements appearing elsewhere in this Annual Report on Form 10-K.

Accrued R&D expenses

We expense all research and development costs in the periods in which they are incurred. Clinical development costs compose a significant component of research and development costs. We typically contract with third parties, including contract research organizations ("CROs") and CDMOs to conduct and manage preclinical studies and clinical trials, research services, and clinical manufacturing services on our behalf. When billing terms under these contracts do not coincide with the timing of when the work is performed, we estimate our obligations for services provided but not yet billed as of the period end based on a number of factors that include, but are not limited to, our knowledge of the research and development programs and clinical manufacturing activities, the status of the programs and activities, invoicing to date, and the provisions in the contracts. We obtain information regarding unbilled services directly from outside service providers and perform procedures to support our estimates based on our internal understanding of the services provided to date. However, we may also be required to estimate these services based on information available to our internal clinical and manufacturing administrative staff if such information is not able to be obtained timely from our service providers. Accrued R&D expenses are included in accrued and other liabilities on the consolidated balance sheets. In the event that advance payments are made to a CRO, CDMO or other outside service providers, the payments are recorded within prepaid expenses and other current assets and other assets on the consolidated balance sheet and subsequently recognized as research and development expense when the associated services are performed. The status and timing of actual services performed may vary from our estimates, resulting in adjustments to expense in future periods. Changes in these estimates could materially affect our results of operations.

Contingent Consideration

Contingent consideration related to business combinations is considered to be Level 3 instruments that are initially measured at their estimated fair values on the transaction date and subsequently remeasured with changes recorded in the consolidated statement of operations each subsequent reporting period.

The estimated fair value of the contingent consideration related to the Humabs acquisition is determined by calculating the probability-weighted clinical and regulatory milestone payments based on the assessment of the likelihood and estimated timing that certain milestones will be achieved, as well as use of a Monte Carlo simulation model that includes significant estimates and assumptions pertaining to commercialization events and sales targets. The most significant unobservable inputs are the probabilities of achieving clinical and regulatory approval of the development projects and the subsequent commercial success and discount rates.

Recent Accounting Pronouncements Not Yet Adopted

See Note 2 — Summary of Significant Accounting Policies to our consolidated financial statements included elsewhere in this Annual Report on Form 10-K for information about recent accounting pronouncements, the timing of their adoption, and our assessment, to the extent we have made one yet, of their potential impact on our financial condition or results of operations.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

We are exposed to market risks in the ordinary course of our business. These risks primarily relate to interest rate and market price sensitivities.

Interest Rate Risk

We had cash, cash equivalents and restricted cash and cash equivalents of $261.3 million as of December 31, 2023, which primarily consisted of money market funds. We also had short-term and long-term investments of $1.38 billion as of December 31, 2023. The primary objective of our investment activities is to preserve capital to fund our operations. We also seek to maximize income from our investments without assuming significant risk. Because our investments are primarily short-term in duration and our holdings in U.S. government treasury bonds mature prior to our expected need for liquidity, we believe that our exposure to interest rate risk is not material, and one percent movement in market interest rates would not have a material impact on the total value of our portfolio. We had no debt outstanding as of December 31, 2023.

Foreign Currency

The functional currency of our foreign subsidiaries is the U.S. dollar. Monetary assets and liabilities of our foreign subsidiaries are translated into U.S. dollars at period-end exchange rates and non-monetary assets and liabilities are translated to U.S. dollars using historical exchange rates. Revenue and expenses are translated at average rates throughout the respective periods. As of the date of this Annual Report on Form 10-K, we are exposed to foreign currency risk primarily related to the operations of our Swiss and Australian subsidiaries and our collaboration with GSK and consequently the Swiss Franc, Australian dollar and British pound. Transaction gains and losses are included in other (expense) income, net on the consolidated statements of operations and were not material for the years ended December 31, 2023, 2022 and 2021.

Equity Investment Risk

We hold ordinary shares of Brii Bio Parent, which we acquired in connection with our collaboration, option and license agreement. These equity securities are measured at fair value with any changes in fair value recognized in our consolidated statements of operations. The fair value of these equity securities was approximately $9.9 million as of December 31, 2023. Changes in the fair value of these equity securities are impacted by the volatility of the stock market and changes in general economic conditions, among other factors. A hypothetical 10% increase or decrease in the stock prices of these equity securities would increase or decrease their fair value as of December 31, 2023 by approximately $1.0 million.

Item 8. Financial Statements and Supplementary Data.

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Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Vir Biotechnology, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Vir Biotechnology, Inc. (the Company) as of December 31, 2023 and 2022, the related consolidated statements of operations, comprehensive (loss) income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2023, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2023 and 2022, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2023, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2023, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated February 26, 2024 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of the critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the account or disclosure to which it relates.

Expense accruals for clinical trials

Description of the Matter

The Company accrued $33.1 million of research and development expenses as of December 31, 2023, a portion of which relates to expense accruals for clinical trials. As described in Note 2 to the consolidated financial statements, the Company determines accruals for clinical trials based on a number of factors, including the Company's knowledge of the research and development programs, the status of the programs and activities, invoicing to date, and the provisions in the contracts.

Auditing management's accounting for expense accruals for clinical trials is especially challenging because the evaluation is dependent on a high volume of data exchanged between third-party service providers, internal clinical personnel, and the Company's finance team.

How We Addressed the Matter in Our Audit

We obtained an understanding, evaluated the design, and tested the operating effectiveness of internal controls over the Company's process for accounting for expense accruals for clinical trials, including management's controls over the completeness and accuracy of data used in determining these costs, as well as management's process for estimating work completed under the service agreements.

To test expense accruals for clinical trials, our audit procedures included, amongst others, i) inspecting terms and conditions for selected clinical research organization (CRO) contracts ii) meeting with internal clinical personnel to understand the status of clinical activities for selected trials iii) testing management's determination of work performed by CROs by inspecting the terms and timelines of significant projects iv) obtaining external confirmations from selected CROs and v) inspecting selected invoices received after the balance sheet date to determine whether services performed prior to the balance sheet date have been properly accrued for as of December 31, 2023.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2017.

San Mateo, California

February 26, 2024

VIR BIOTECHNOLOGY, INC.

Consolidated Balance Sheets
(in thousands, except share and per share data)

	December 31,	
	2023	**2022**
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	$ 241,576	$ 848,631
Short-term investments	1,270,980	1,521,517
Restricted cash and cash equivalents, current	13,268	12,681
Equity investments	9,853	31,892
Prepaid expenses and other current assets	52,549	104,356
Total current assets	1,588,226	2,519,077
Intangible assets, net	22,565	32,755
Goodwill	16,937	16,937
Property and equipment, net	96,018	105,609
Operating right-of-use assets	71,182	82,557
Restricted cash and cash equivalents, noncurrent	6,448	6,656
Long-term investments	105,275	23,927
Other assets	12,409	14,570
TOTAL ASSETS	$ 1,919,060	$ 2,802,088
LIABILITIES AND STOCKHOLDERS' EQUITY		
CURRENT LIABILITIES:		
Accounts payable	$ 6,334	$ 6,422
Accrued and other liabilities	104,220	489,090
Deferred revenue, current	64,853	15,517
Total current liabilities	175,407	511,029
Deferred revenue, noncurrent	1,526	53,207
Operating lease liabilities, noncurrent	111,673	123,837
Contingent consideration, noncurrent	25,960	24,937
Other long-term liabilities	14,258	11,115
TOTAL LIABILITIES	328,824	724,125
Commitments and contingencies (Note 10)		
STOCKHOLDERS' EQUITY:		
Preferred stock, $0.0001 par value; 10,000,000 shares authorized as of December 31, 2023 and 2022, respectively; no shares issued and outstanding as of December 31, 2023 and 2022	—	—
Common stock, $0.0001 par value; 300,000,000 shares authorized as of December 31, 2023 and 2022, respectively; 134,781,286 and 133,236,687 shares issued and outstanding as of December 31, 2023 and 2022, respectively	13	13
Additional paid-in capital	1,828,862	1,709,835
Accumulated other comprehensive loss	(815)	(9,122)
(Accumulated deficit) retained earnings	(237,824)	377,237
TOTAL STOCKHOLDERS' EQUITY	1,590,236	2,077,963
TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY	$ 1,919,060	$ 2,802,088

The accompanying notes are an integral part of these consolidated financial statements.

VIR BIOTECHNOLOGY, INC.

Consolidated Statements of Operations
(in thousands, except share and per share data)

	Years Ended December 31,		
	2023	**2022**	**2021**
Revenues:			
Collaboration revenue	$ 37,266	$ 1,505,469	$ 917,194
Contract revenue	2,228	52,714	169,874
License revenue from a related party	—	22,289	—
Grant revenue	46,686	35,325	8,347
Total revenues	86,180	1,615,797	1,095,415
Operating expenses:			
Cost of revenue	2,765	146,319	65,865
Research and development	589,671	474,648	448,006
Selling, general and administrative	178,049	161,762	160,793
Total operating expenses	770,485	782,729	674,664
(Loss) income from operations	(684,305)	833,068	420,751
Other income (loss):			
Change in fair value of equity investments	(21,888)	(111,140)	138,049
Interest income	86,990	28,092	439
Other (expense) income, net	(8,991)	4,260	(9,437)
Total other income (loss)	56,111	(78,788)	129,051
(Loss) income before benefit from (provision for) income taxes	(628,194)	754,280	549,802
Benefit from (provision for) income taxes	13,077	(238,443)	(21,218)
Net (loss) income	$ (615,117)	$ 515,837	$ 528,584
Net loss attributable to noncontrolling interest	$ (56)	$ —	$ —
Net (loss) income attributable to Vir	$ (615,061)	$ 515,837	$ 528,584
Net (loss) income per share attributable to Vir, basic	$ (4.59)	$ 3.89	$ 4.07
Net (loss) income per share attributable to Vir, diluted	$ (4.59)	$ 3.83	$ 3.96
Weighted-average shares outstanding, basic	134,130,924	132,606,767	129,884,967
Weighted-average shares outstanding, diluted	134,130,924	134,810,908	133,437,126

The accompanying notes are an integral part of these consolidated financial statements.

VIR BIOTECHNOLOGY, INC.

Consolidated Statements of Comprehensive (Loss) Income
(in thousands)

	Years Ended December 31,		
	2023	**2022**	**2021**
Net (loss) income	$ (615,117)	$ 515,837	$ 528,584
Other comprehensive income (loss):			
Unrealized gain (loss) on investments	9,310	(7,524)	(957)
Actuarial (loss) gain	(1,003)	(499)	1,136
Total other comprehensive income (loss)	8,307	(8,023)	179
Comprehensive (loss) income	$ (606,810)	$ 507,814	$ 528,763
Comprehensive loss attributable to noncontrolling interest	$ (56)	$ —	$ —
Comprehensive (loss) income attributable to Vir	$ (606,754)	$ 507,814	$ 528,763

The accompanying notes are an integral part of these consolidated financial statements.

VIR BIOTECHNOLOGY, INC.

Consolidated Statements of Stockholders' Equity
(in thousands, except share data)

	Vir Stockholders' Equity						
	Common Stock						
	Share	Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Loss	(Accumulated Deficit) Retained Earnings	Noncontrolling interest	Total Stockholders' Equity
Balance at December 31, 2020	127,416,740	$ 13	$ 1,385,301	$ (1,278)	$ (667,184)	$ —	$ 716,852
Issuance of common stock in connection with a collaboration agreement	1,924,927	—	85,213	—	—	—	85,213
Issuance of common stock to settle a contingent consideration	42,737	—	1,860	—	—	—	1,860
Vesting of restricted common stock	89,261	—	—	—	—	—	—
Exercise of stock options	1,622,718	—	13,077	—	—	—	13,077
Issuance of common stock under employee stock purchase plan	65,021	—	2,300	—	—	—	2,300
Stock-based compensation	—	—	83,784	—	—	—	83,784
Other comprehensive income	—	—	—	179	—	—	179
Net income	—	—	—	—	528,584	—	528,584
Balance at December 31, 2021	131,161,404	13	1,571,535	(1,099)	(138,600)	—	1,431,849
Issuance of common stock in connection with a grant agreement	881,365	—	28,462	—	—	—	28,462
Vesting of restricted common stock	349,496	—	—	—	—	—	—
Exercise of stock options	696,963	—	4,534	—	—	—	4,534
Issuance of common stock under employee stock purchase plan	147,459	—	3,222	—	—	—	3,222
Stock-based compensation	—	—	102,082	—	—	—	102,082
Other comprehensive loss	—	—	—	(8,023)	—	—	(8,023)
Net income	—	—	—	—	515,837	—	515,837
Balance at December 31, 2022	133,236,687	13	1,709,835	(9,122)	377,237	—	2,077,963
Vesting of restricted common stock	734,662	—	—	—	—	—	—
Exercise of stock options	487,014	—	3,484	—	—	—	3,484
Issuance of common stock under employee stock purchase plan	322,923	—	4,283	—	—	—	4,283
Stock-based compensation	—	—	111,316	—	—	—	111,316
Other comprehensive income	—	—	—	8,307	—	—	8,307
Contributions from noncontrolling interest owners	—	—	—	—	—	100	100
Increase in ownership interest in a subsidiary	—	—	(56)	—	—	(44)	(100)
Net loss	—	—	—	—	(615,061)	(56)	(615,117)
Balance at December 31, 2023	134,781,286	$ 13	$ 1,828,862	$ (815)	$ (237,824)	$ —	$ 1,590,236

The accompanying notes are an integral part of these consolidated financial statements.

VIR BIOTECHNOLOGY, INC.

Consolidated Statements of Cash Flows
(in thousands)

	Years Ended December 31,		
	2023	**2022**	**2021**
CASH FLOWS FROM OPERATING ACTIVITIES:			
Net (loss) income	$ (615,117)	$ 515,837	$ 528,584
Adjustments to reconcile net (loss) income to net cash (used in) provided by operating activities:			
Changes in estimated constraint on profit-sharing amount	(28,118)	369,535	—
Depreciation and amortization	18,920	6,251	5,278
Amortization of intangible assets	531	532	533
Accretion of discounts on investments, net	(8,706)	(8,943)	(244)
Noncash lease expense	7,658	8,709	6,172
Change in fair value of equity investments	21,888	111,140	(138,049)
Change in estimated fair value of contingent consideration	1,024	2,115	91,848
Stock-based compensation	111,316	102,082	83,784
Change in deferred income taxes	(1,063)	(15,186)	15,186
In-process research and development impairment	9,658	—	—
Long-lived assets impairment and disposal loss	7,662	—	—
Payment of contingent consideration in excess of acquisition date fair value	—	(93,803)	(8,140)
Gain from a sublease termination	—	—	(4,844)
Other	153	(383)	697
Changes in operating assets and liabilities:			
Receivable from collaboration	(565)	770,038	(773,079)
Prepaid expenses and other current assets	64,970	(39,358)	(3,665)
Other assets	2,161	(11,795)	(1,483)
Accounts payable	732	797	(171)
Accrued liabilities and other long-term liabilities	(356,498)	(15,513)	58,498
Operating lease liabilities	(13,046)	(5,502)	(535)
Deferred revenue	(2,345)	(33,300)	92,041
Net cash (used in) provided by operating activities	(778,785)	1,663,253	(47,589)
CASH FLOWS FROM INVESTING ACTIVITIES:			
Purchases of property and equipment	(21,573)	(68,006)	(21,817)
Purchases of investments	(2,016,189)	(1,476,965)	(420,240)
Maturities and sales of investments	2,202,391	351,510	301,243
Net cash provided by (used in) investing activities	164,629	(1,193,461)	(140,814)

The accompanying notes are an integral part of these consolidated financial statements.

VIR BIOTECHNOLOGY, INC.

Consolidated Statements of Cash Flows
(in thousands)

	Years Ended December 31,		
	2023	**2022**	**2021**
CASH FLOWS FROM FINANCING ACTIVITIES:			
Proceeds from issuance of common stock under the employee stock purchase plan	4,283	3,222	2,300
Proceeds from exercise of stock options	3,484	4,534	13,077
Payment of principal on financing lease obligations	(287)	(260)	(259)
Contributions from noncontrolling interest owners	100	—	—
Increase in ownership interest in a subsidiary	(100)	—	—
Proceeds from issuance of common stock in connection with a collaboration agreement	—	—	85,213
Proceeds from issuance of common stock in connection with a grant agreement	—	28,462	—
Payment of contingent consideration	—	(1,197)	—
Net cash provided by financing activities	7,480	34,761	100,331
Net (decrease) increase in cash, cash equivalents and restricted cash and cash equivalents	(606,676)	504,553	(88,072)
Cash, cash equivalents and restricted cash and cash equivalents at beginning of period	867,968	363,415	451,487
Cash, cash equivalents and restricted cash and cash equivalents at end of period	$ 261,292	$ 867,968	$ 363,415
SUPPLEMENTAL DISCLOSURE OF CASH FLOW INFORMATION:			
Net refund received (cash paid) for income tax	$ 2,676	$ (252,030)	$ —
RECONCILIATION OF CASH, CASH EQUIVALENTS AND RESTRICTED CASH AND CASH EQUIVALENTS TO THE CONSOLIDATED BALANCE SHEETS:			
Cash and cash equivalents	$ 241,576	$ 848,631	$ 347,815
Restricted cash and cash equivalents, current	13,268	12,681	8,594
Restricted cash and cash equivalents, noncurrent	6,448	6,656	7,006
Total cash, cash equivalents and restricted cash	$ 261,292	$ 867,968	$ 363,415

The accompanying notes are an integral part of these consolidated financial statements.

1. *Organization*

Vir Biotechnology, Inc. ("Vir" or the "Company") is an immunology company focused powering the immune system to transform lives by treating and preventing infectious diseases and other serious conditions, including viral-associated diseases. Vir has assembled two technology platforms that are designed to modulate the immune system by exploiting critical observations of natural immune processes. Its current clinical development pipeline consists of product candidates targeting hepatitis delta virus ("HDV"), hepatitis B virus ("HBV"), and human immunodeficiency virus ("HIV"). Vir has several preclinical candidates in its pipeline, including those targeting influenza A and B, coronavirus disease 2019 ("COVID-19"), respiratory syncytial virus and human metapneumovirus, ("RSV" and "MPV", respectively), and human papillomavirus ("HPV").

In September 2022, the Company formed a new wholly-owned subsidiary in Switzerland, Vir Biotechnology International GmbH ("VBI"), a Swiss limited liability company. The primary purpose of VBI is to support Vir's research and development and international commercial activities outside of the United States.

In January 2023, a majority-owned subsidiary, Encentrio Therapeutics, Inc. ("Encentrio"), was incorporated in the State of Delaware. The Company initially owned 80% of Encentrio's outstanding voting shares. During the three months ended June 30, 2023, the Company increased its ownership of Encentrio's outstanding voting shares to 100%. The primary purpose of Encentrio is to conduct research and development of oncology therapeutics.

Sales Agreement

In November 2023, the Company entered into a sales agreement ("Sales Agreement") with Cowen and Company, LLC, as sales agent ("TD Cowen"), pursuant to which the Company may from time to time offer and sell shares of its common stock for an aggregate offering price of up to $300.0 million, through or to TD Cowen, acting as sales agent or principal. The shares will be offered and sold under the Company's shelf registration statement on Form S-3 and a related prospectus filed with the Securities and Exchange Commission ("SEC") on November 3, 2023. The Company will pay TD Cowen a commission of up to 3.0% of the aggregate gross proceeds from each sale of shares, reimburse legal fees and disbursements and provide TD Cowen with customary indemnification and contribution rights. As of December 31, 2023, no shares have been issued under the Sales Agreement.

Need for Additional Capital

Although the Company recorded net income for the years ended December 31, 2022 and 2021, it has otherwise incurred net losses since inception. The Company expects its earnings to be volatile and may continue to incur net losses over the next several years and may need to raise additional capital to fully implement its business plan. As of December 31, 2023, the Company had accumulated deficit of $237.8 million. The Company had $1.63 billion in cash, cash equivalents, and investments as of December 31, 2023. Based on the Company's current operating plan, management believes that the $1.63 billion as of December 31, 2023 will be sufficient to fund its operations through at least the next 12 months from the issuance date of these consolidated financial statements.

2. *Summary of Significant Accounting Policies*

Basis of Presentation

The Company's consolidated financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America ("GAAP") and include all adjustments necessary for the fair presentation of the Company's financial position for the periods presented. The consolidated financial statements include the accounts of Vir and its wholly-owned subsidiaries. All intercompany balances and transactions have been eliminated upon consolidation.

Foreign Currency

The functional currency of the Company's foreign subsidiaries is the U.S. dollar. Monetary assets and liabilities of foreign subsidiaries are translated into U.S. dollars at period-end exchange rates, and non-monetary assets and liabilities are translated to U.S. dollars using historical exchange rates. Revenue and expenses are translated at average exchange rates throughout the respective periods. Transaction gains and losses are included in other (expense) income, net on the consolidated statements of operations.

Use of Estimates

The preparation of the consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting periods. The Company evaluates its estimates and assumptions on an ongoing basis using historical experience and other factors and adjusts those estimates and assumptions when facts and circumstances dictate. Actual results could materially differ from those estimates.

Segments

The Company operates as one reportable segment. The Company's chief operating decision maker, its Chief Executive Officer, manages the Company's operations on a consolidated basis for purposes of allocating resources.

Concentration of Credit Risk, Credit Loss and Other Risks and Uncertainties

Although the Company received Emergency Use Authorization ("EUA"), temporary authorization or marketing approval for sotrovimab (under the brand name Xevudy®), sotrovimab is currently deauthorized in the U.S. and has limitations in use outside of the U.S. In addition, the Company is subject to a number of other challenges and risks similar to other biopharmaceutical companies in the early stage, including, but not limited to, the need to obtain adequate additional funding, possible failure of preclinical testing or clinical trials, the need to obtain marketing approval for its other product candidates, competitors developing new technological innovations, the need to successfully commercialize and gain market acceptance of sotrovimab and other product candidates and protection of proprietary technology. If the Company does not successfully obtain regulatory approval, commercialize or partner any of its product candidates, it will be unable to generate revenue from product sales or maintain profitability.

Financial instruments that potentially subject the Company to significant concentrations of credit risk consist primarily of cash, cash equivalents and investments. Cash and cash equivalents are deposited in checking and sweep accounts at financial institutions. Such deposits may, at times, exceed federally insured limits. The Company has not experienced any losses on its deposits of cash and cash equivalents. On March 10, 2023, Silicon Valley Bank ("SVB") was closed by the California Department of Financial Protection and Innovation, and the Federal Deposit Insurance Corporation ("FDIC") was appointed as receiver. Prior to such events, the Company held cash deposits at SVB in excess of government insured limits. On March 12, 2023, the U.S. Treasury Department, the Federal Reserve and the FDIC jointly announced enabling actions that fully protect all SVB depositors' insured and uninsured deposits, and that such depositors would have access to all of their funds starting March 13, 2023. On March 13, 2023, the Company was able to access its deposits at the FDIC's newly created Silicon Valley Bridge Bank, N.A., which was subsequently purchased on March 27, 2023 by First Citizens Bank & Trust Company, a subsidiary of First Citizens BancShares, Inc. As such, no losses have been incurred by the Company on deposits that were held at SVB. Management believes that the Company is not currently exposed to significant credit risk as the Company's investments are held in custody at third-party financial institutions.

The Company's investment policy limits investments to certain types of securities issued by the U.S. government, its agencies and institutions with investment-grade credit ratings and places restrictions on maturities and concentration by type and issuer. The Company is exposed to credit risk in the event of a default by the financial institutions holding its cash, cash equivalents and investments, and issuers of the investments to the extent recorded on the consolidated balance sheets. As of December 31, 2023 and 2022, the Company has no off-balance sheet concentrations of credit risk.

The Company is exposed to credit losses primarily through receivables from customers and collaborators and through its available-for-sale debt securities. The Company's expected loss allowance methodology for the receivables is developed using historical collection experience, current and future economic market conditions, a review of the current aging status and financial condition of the entities. Specific allowance amounts are established to record the appropriate allowance for customers that have a higher probability of default. Balances are written off when determined to be uncollectible. The Company's expected loss allowance methodology for the debt securities is developed by reviewing the extent of the unrealized loss, the size, term, geographical location, and industry of the issuer, the issuers' credit ratings and any changes in those ratings, as well as reviewing current and future economic market conditions and the issuers' current status and financial condition. There was no allowance for losses on available-for-sale debt securities attributable to credit risk as of December 31, 2023 and 2022.

Cash Equivalents

The Company considers all highly liquid investments with original maturities of three months or less at the date of purchase to be cash equivalents, which consist of amounts invested primarily in money market funds and are stated at fair value.

Investments

Investments include available-for-sale debt securities and equity investments, which are carried at fair value.

Available-for-Sale Debt Securities

The Company's valuations of marketable securities are generally derived from independent pricing services based on quoted prices in active markets for similar securities at period end. Generally, investments with original maturities beyond three months at the date of purchase and which mature at, or less than 12 months from the consolidated balance sheet date are considered short-term investments, with all others considered to be long-term investments. Unrealized gains and losses deemed temporary in nature are reported as a component of accumulated other comprehensive loss. The amortized cost of debt securities is adjusted for amortization of premiums and accretion of discounts to maturity, which is included in interest income on the consolidated statements of operations. The cost of securities sold is based on the specific identification method.

Equity Investments

The Company measures its investment in equity securities at fair value at each reporting date based on the market price at period end if it has a readily determinable fair value. Otherwise, the investments in equity securities are measured at cost less impairment, adjusted for observable price changes for identical or similar investments of the same issuer unless the Company has significant influence or control over the investee. Changes in fair value resulting from observable price changes are presented as change in fair value of equity investments, and changes in fair value resulting from foreign currency translation are included in other (expense) income, net on the consolidated statements of operations.

Restricted Cash and Cash Equivalents

Restricted cash and cash equivalents represent money market funds to secure standby letters of credit and security deposits with financial institutions, both under office and laboratory space lease agreements. Additionally, funds received from certain grants are restricted as to their use and are therefore classified as restricted cash and cash equivalents.

Property and Equipment, Net

Property and equipment are stated at cost, net of accumulated depreciation and amortization and, if applicable, impairment charges. Depreciation and amortization are computed using the straight-line method over the estimated useful lives of the respective assets, generally three to five years. Leasehold improvements are amortized over the lesser of their useful lives or the remaining life of the lease. When assets are retired or otherwise disposed of, the cost and related accumulated depreciation and amortization are removed from the balance sheet, and the resulting gain or loss is reflected in operations in the period realized. Maintenance and repairs are charged to operations as incurred.

The Company reviews property and equipment for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset (group) may not be recoverable. Recoverability is measured by comparing the carrying amount to the future net undiscounted cash flows that the asset (group) is expected to generate. If such asset (group) is considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the asset (group) exceeds its fair value projected discounted future net cash flows arising from the asset (group).

Acquired Intangible Assets

The Company's intangible assets were acquired via business combinations or asset acquisitions.

Indefinite-lived intangible assets represent the estimated fair value assigned to in-process research and development ("IPR&D") acquired in a business combination. The Company reviews indefinite-lived intangible assets for impairment at least annually or more frequently if events or changes in circumstances indicate that the carrying value of the assets might not be recoverable. If the carrying value of an indefinite-lived intangible asset exceeds its fair value, then it is written down to its fair value.

For IPR&D, if a product candidate derived from the indefinite-lived intangible asset is commercialized, the useful life will be determined, and the carrying value will be amortized prospectively over that estimated useful life. Alternatively, if a product candidate is abandoned, the carrying value of the intangible asset will be charged to research and development expenses. IPR&D assets acquired as part of an asset acquisition are recorded at cost and expensed immediately if they have no alternative future uses.

Finite-lived intangible assets acquired in a business combination are initially recognized at their fair value at the acquisition date. Finite-lived intangible assets acquired in an asset acquisition are initially recognized at cost. Amortization is computed using the straight-line method over the estimated useful lives of the respective finite-lived intangible assets, generally seven to 15 years. Finite-lived intangible assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset (group) may not be recoverable, like that of property and equipment.

Goodwill

Goodwill represents the excess of the purchase price over the estimated fair value of the net tangible and intangible assets acquired in a business combination. The Company tests goodwill for impairment at least annually or more frequently if events or changes in circumstances indicate that this asset may be impaired.

In testing for goodwill impairment, the Company has the option of first performing a qualitative assessment to determine whether it is more likely than not that the fair value of the reporting unit is less than its carrying amount. If the Company elects to bypass the qualitative assessment, or if a qualitative assessment indicates it is more likely than not that the carrying value exceeds its fair value, the Company performs a quantitative goodwill impairment test to compare the fair value of its reporting unit to its carrying value, including goodwill. If the carrying value, including goodwill, exceeds the reporting unit's fair value, the Company will recognize an impairment loss for the amount by which the carrying amount exceeds the reporting unit's fair value (but not in excess of the carrying value of goodwill).

Revenue Recognition

Collaboration, License and Contract Revenue

Under Accounting Standards Codification ("ASC") Topic 606, Revenue from Contracts with Customers ("ASC 606"), the Company recognizes revenue when the Company's customer obtains control of promised goods or services in an amount that reflects the consideration which the Company expects to receive in exchange for those goods and services. To determine revenue recognition for arrangements within the scope of ASC 606, the Company performs the following five steps: (i) identify the contract with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when or as the Company satisfies a performance obligation.

For collaborative arrangements that fall within the scope of ASC 808, Collaborative Arrangements ("ASC 808"), the Company first determines which elements of the collaboration are deemed to be a performance obligation with a customer within the scope of ASC 606. For elements of collaboration arrangements that are accounted for pursuant to ASC 808 and are not subject to the guidance in ASC 606, the Company applies the revenue recognition model under ASC 606, including the royalty exception guidance and variable consideration guidance under ASC 606 as described below, or other guidance, as deemed appropriate. When the Company is considered an agent in elements of collaboration arrangements within the scope of ASC 808, it records its share of collaboration revenue in the period in which such sales occur. The Company is considered an agent when the collaboration partner controls the product before transfer to the customers and has the ability to direct the use of and obtain substantially all of the remaining benefits from the product. In these instances, collaboration revenue is based upon the net sales reported by the Company's collaboration partners, net of cost of goods sold and allowable expenses (e.g., manufacturing, distribution, medical affairs, selling, and marketing expenses) in the period. In order to record collaboration revenue, the Company utilizes certain information from its collaboration partner, including actual net product sales and costs incurred for sales activities, and makes key judgments based on business updates related to commercial and clinical activities such as expected commercial demand, commercial supply plan, manufacturing commitments, risks related to expired or obsolete inventories, and risks related to potential product returns or contract terminations. The Company uses these estimates to determine whether payments due to it under its collaboration arrangements, such as profit-share payments, should be recognized as revenue in the period that they become due or whether any portion of the payments due should be constrained from revenue recognition because it is not probable that recognizing such amounts will not result in a significant reversal of cumulative revenues recognized in future reporting periods.

The Company has entered into a number of license and collaboration agreements that fall within the scope of ASC 606. The Company evaluates the promised goods or services in these agreements to determine which ones represent distinct performance obligations.

Prior to recognizing revenue, the Company estimates the transaction price, including variable consideration that is subject to a constraint. Amounts of variable consideration are included in the transaction price to the extent that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is subsequently resolved. These estimates are re-assessed each reporting period as required. These agreements may include the following types of consideration: non-refundable upfront payments, reimbursement for research and development services, research, development or regulatory milestone payments, profit-sharing arrangements, and royalty and commercial sales milestone payments.

If there are multiple distinct performance obligations, the Company allocates the transaction price to each distinct performance obligation based on their estimated standalone selling prices ("SSP"). The Company estimates the SSP for each distinct performance obligation by considering information such as market conditions, entity-specific factors, and information about its customer that is reasonably available. The Company considers estimation approaches that allow it to maximize the use of observable inputs. These estimation approaches may include the adjusted market assessment approach, the expected cost plus a margin approach or the residual approach. The Company also considers whether to use a different estimation approach or a combination of approaches to estimate the SSP for each distinct performance obligation. Developing certain assumptions (e.g., treatable patient population, expected market share, probability of success and product profitability, and discount rate based on weighted-average cost of capital) to estimate the SSP of a distinct performance obligation requires significant judgment.

For performance obligations satisfied over time, the Company estimates the efforts needed to complete the performance obligation and recognizes revenue by measuring the progress towards complete satisfaction of the performance obligation using an input measure.

For arrangements that include sales-based royalties, including commercial milestone payments based on pre-specified levels of sales, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). Achievement of these royalties and commercial milestones may solely depend upon the performance of the licensee.

Grant Revenue

Grants received, including cost reimbursement agreements, are assessed to determine if the agreement should be accounted for as an exchange transaction or a contribution. An agreement is accounted for as a contribution if the resource provider does not receive commensurate value in return for the assets transferred. Contributions are recognized as grant revenue when all donor-imposed conditions have been met.

Research and Development Expenses

To date, research and development expenses have related primarily to discovery efforts and preclinical and clinical development of product candidates. Research and development expenses are recognized as incurred, and payments made prior to the receipt of goods or services to be used in research and development are capitalized until the goods or services are received. Research and development expenses include expenses related to license and collaboration agreements; contingent consideration from business acquisitions; personnel-related expenses, including salaries, benefits, and stock-based compensation for personnel contributing to research and development activities; expenses incurred under agreements with third-party contract manufacturing organizations, contract research organizations, and consultants; clinical costs, including laboratory supplies and costs related to compliance with regulatory requirements; and other allocated expenses, including expenses for rent, facilities maintenance, and depreciation and amortization.

The Company has acquired and may continue to acquire the rights to develop and commercialize new product candidates from third parties. Upfront payments and research and development milestone payments made in connection with acquired licenses or product rights are expensed as incurred, provided that they do not relate to a regulatory approval milestone or assets acquired in a business combination.

The Company's expense accruals for clinical trials and manufacturing are based on estimates of contracted services provided by third-party vendors not yet billed. When billing terms under these contracts do not coincide with the timing of when the work is performed, the Company is required to make estimates of its outstanding obligations to those third parties as of the period end. The accrual estimates are based on a number of factors, including the Company's knowledge of the research and development programs and clinical manufacturing activities, the status of the programs and activities, invoicing to date, and the provisions in the contracts. The Company obtains information regarding unbilled services directly from these service providers and performs procedures to support its estimates based on its internal understanding of the services provided to date. However, the Company may also be required to estimate these services based on information available to its internal clinical and manufacturing administrative staff if such information is not able to be obtained timely from its service providers.

Stock-based Compensation

The Company recognizes stock-based compensation to employees over the requisite service period based on the grant-date fair value of the awards. The Company calculates the estimated fair value of stock options and employees' purchase rights under the Company' 2019 employee stock purchase plan ("ESPP") using the Black-Scholes valuation model, which requires the use of subjective assumptions including volatility and expected term, among others. The fair value of restricted stock awards ("RSAs") and restricted stock units ("RSUs") is based on the market value of the Company's common stock on the date of grant. Stock-based compensation is recognized using the straight-line method for awards that vest only upon the employee's or non-employee's continued service to the Company. Stock-based compensation expense of the employees' purchase rights under the ESPP is recognized over the offering period. Forfeitures are recognized as they occur.

Acquisitions

Business combinations are accounted for using the acquisition method of accounting. Under the acquisition method, assets acquired, including IPR&D projects, and liabilities assumed are recorded at their respective fair values as of the acquisition date. Any excess fair value of consideration transferred over the fair value of the net assets acquired is recorded as goodwill. Contingent consideration obligations incurred in connection with the business combination are recorded at their fair values on the acquisition date, are remeasured each subsequent reporting period until the related contingencies are resolved and are classified as contingent consideration on the consolidated balance sheets. The changes in fair values of contingent consideration related to the achievement of various milestones are recorded within research and development expenses or selling, general and administrative expenses based on the nature of the relevant underlying activities.

When the Company determines that an entity acquired does not meet the definition of a business, the transaction is accounted for as an acquisition of assets. Therefore, the consideration paid to acquire IPR&D is expensed, and no goodwill is recorded. Any contingent consideration is generally recognized only when it becomes payable or is paid.

Leases

In accordance with ASC 842, Leases, the Company determines if an arrangement is or contains a lease at inception by assessing whether the arrangement contains an identified asset and whether it has the right to control the identified asset. Right-of-use ("ROU") assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. Lease liabilities are recognized at the lease commencement date based on the present value of future lease payments over the lease term. ROU assets are based on the measurement of the lease liability and also include any lease payments made prior to or on lease commencement and exclude lease incentives and initial direct costs incurred, as applicable. On the lease commencement date, the Company estimates and includes in its lease payments any lease incentive amounts based on future events when (1) the events are within the Company's control and (2) the event triggering the right to receive the incentive is deemed reasonably certain to occur. If the lease incentive received is greater or less than the amount recognized at lease commencement, the Company recognizes the difference as an adjustment to ROU asset and/or lease liability, as applicable.

As the implicit rate in the Company's leases is generally unknown, the Company uses an incremental borrowing rate estimated based on the information available at the lease commencement date in determining the present value of future lease payments. When calculating its estimated incremental borrowing rates, the Company considers its credit risk, the lease term, the total lease payments and the impact of collateral, as necessary. The lease terms may include options to extend or terminate the lease when the Company is reasonably certain it will exercise such options. ROU assets and lease liabilities are remeasured upon certain modifications to leases using the present value of remaining lease payments and estimated incremental borrowing rate upon lease modification. Rent expense for the Company's operating leases is recognized on a straight-line basis within operating expenses over the reasonably assured lease term.

The Company elected to not separate lease and non-lease components for any leases within its existing classes of assets and, as a result, accounts for the lease and non-lease components as a single lease component. The Company also elected to not apply the recognition requirement to any leases within its existing classes of assets with a term of 12 months or less.

ROU assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset (group) may not be recoverable, like that of property and equipment.

Income Taxes

The Company uses the asset and liability method of accounting for income taxes. Current income tax expense or benefit represents the amount of income taxes expected to be payable or refundable for the current year. Deferred income tax assets and liabilities are determined based on the differences between the financial statement reporting and tax bases of assets and liabilities and net operating losses and credit carryforwards and are measured using the enacted tax rates and laws that will be in effect when such items are expected to reverse. Deferred income tax assets are reduced, as necessary, by a valuation allowance when management determines it is more likely than not that some or all of the tax benefits will not be realized.

The Company's tax positions are subject to income tax audits. The Company recognizes the tax benefit of an uncertain tax position only if it is more likely than not that the position is sustainable upon examination by the taxing authority, based on the technical merits. The tax benefit recognized is measured as the largest amount of benefit which is more likely than not to be realized upon settlement with the taxing authority. The Company evaluates uncertain tax positions on a regular basis. The evaluations are based on several factors, including changes in facts and circumstances, changes in tax law, correspondence with tax authorities during the course of the audit, and effective settlement of audit issues. The provision for income taxes includes the effects of any accruals that the Company believes are appropriate, as well as any related net interest and penalties.

Net (Loss) Income Per Share

Basic net (loss) income per common share is computed by dividing the net (loss) income attributable to Vir by the weighted-average number of common shares outstanding during the period, without consideration of common stock equivalents. Diluted net (loss) income per common share is computed by dividing the net (loss) income attributable to Vir by the sum of the weighted average number of common shares outstanding during the period plus any potential dilutive effects of common stock equivalents outstanding during the period calculated in accordance with the treasury stock method.

New Accounting Pronouncement Not Yet Adopted

In December 2023, the Financial Accounting Standards Board ("FASB") issued ASU No. 2023-09, Income Taxes (Topic 740): Improvements to Income Tax Disclosures ("ASU 2023-09"), which modifies the rules on income tax disclosures to require entities to disclose (1) specific categories in the rate reconciliation, (2) the income or loss from continuing operations before income tax expense or benefit (separated between domestic and foreign) and (3) income tax expense or benefit from continuing operations (separated by federal, state and foreign). ASU 2023-09 also requires entities to disclose their income tax payments to international, federal, state and local jurisdictions, among other changes. The guidance is effective for annual periods beginning after December 15, 2024. Early adoption is permitted. ASU 2023-09 should be applied on a prospective basis, but retrospective application is permitted. The Company is currently evaluating the impact the adoption of ASU 2023-09 may have on its consolidated financial statements and related disclosures.

3. ***Fair Value Measurements***

The Company determines the fair value of financial assets and liabilities using the fair value hierarchy, which establishes three levels of inputs that may be used to measure fair value, as follows:

- Level 1: Inputs which include quoted prices in active markets for identical assets and liabilities.
- Level 2: Inputs other than Level 1 that are observable, either directly or indirectly, such as quoted prices for similar assets or liabilities; quoted prices in markets that are not active; or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.
- Level 3: Unobservable inputs that are supported by little or no market activity and that are significant to the fair value of the assets or liabilities.

The carrying amounts of the Company's financial instruments, including accounts payable and accrued liabilities, approximate fair value due to their relatively short maturities.

Cash Equivalents and Available-for-Sale Securities

The following tables summarize the Company's Level 1 and Level 2 financial assets measured at fair value on a recurring basis by level within the fair value hierarchy (in thousands):

		December 31, 2023			
	Valuation Hierarchy	Amortized Cost	Gross Unrealized Holding Gains	Gross Unrealized Holding Losses	Aggregate Fair Value
Assets:					
Money market funds[1]	Level 1	$ 278,187	$ —	$ —	$ 278,187
U.S. government treasuries	Level 2	1,162,124	1,017	(80)	1,163,061
U.S. government agency bonds and discount notes	Level 2	181,189	27	(50)	181,166
Equity securities	Level 1	N/A	N/A	N/A	9,853
Total financial assets		$ 1,621,500	$ 1,044	$ (130)	$ 1,632,267

(1) Includes $19.7 million of restricted cash equivalents.

		December 31, 2022			
	Valuation Hierarchy	Amortized Cost	Gross Unrealized Holding Gains	Gross Unrealized Holding Losses	Aggregate Fair Value
Assets:					
Money market funds[1]	Level 1	$ 909,342	$ —	$ —	$ 909,342
U.S. government treasuries	Level 2	1,493,841	—	(8,396)	1,485,445
Equity securities	Level 1	N/A	N/A	N/A	$ 31,892
Total financial assets		$ 2,403,183	$ —	$ (8,396)	$ 2,426,679

(1) Includes $19.3 million of restricted cash equivalents.

Accrued interest receivable excluded from both the fair value and amortized cost basis of the available-for-sale debt securities are presented within prepaid expenses and other current assets in the consolidated balance sheets. Accrued interest receivable amounted to $4.0 million and $2.5 million as of December 31, 2023 and 2022, respectively. The Company did not write off any accrued interest receivable during the years ended December 31, 2023, 2022 and 2021.

The Company recognized total net unrealized gain of $0.9 million and total net unrealized loss of $8.4 million in accumulated other comprehensive loss as of December 31, 2023 and 2022, respectively. The gross unrealized losses as of December 31, 2023 and 2022 were due to changes in interest rates. The Company determined that the gross unrealized losses on our investments as of December 31, 2023 were temporary in nature. The Company currently does not intend, and it is highly unlikely that it will be required, to sell these securities before recovery of their amortized cost basis. As of December 31, 2023, no securities have contractual maturities of longer than two years.

As of December 31, 2023, the Company's equity investment consisted solely of ordinary shares of Brii Biosciences Limited ("Brii Bio Parent"). The equity securities of Brii Bio Parent are listed on the Stock Exchange of Hong Kong Limited and are considered to be marketable equity securities measured at fair value at each reporting date. As of December 31, 2023, the Company remeasured the equity investment at a fair value of $9.9 million. For the years ended December 31, 2023, 2022 and 2021, the Company recognized an unrealized (loss) income of $(21.9) million, $(111.1) million and $138.0 million, respectively, as other income (loss) in the consolidated statements of operations. For the years ended December 31, 2023, 2022 and 2021, the unrealized loss related to foreign currency translation were immaterial.

Contingent Consideration

Contingent consideration primarily includes potential milestone payments in connection with the acquisitions of Humabs BioMed SA ("Humabs"). See further discussion in Note 4—Acquisitions. The Company classifies the contingent consideration as Level 3 financial liabilities within the fair value hierarchy as of December 31, 2023 and 2022. The estimated fair value of the contingent consideration related to the Humabs acquisition was determined by calculating the probability-weighted clinical, regulatory and commercial milestone payments based on the assessment of the likelihood and estimated timing that certain milestones would be achieved.

As of December 31, 2023, the Company calculated the estimated fair value of the remaining clinical and regulatory milestones related to tobevibart (formerly as VIR-3434) using the following significant unobservable inputs:

Unobservable input	Range (Weighted-Average)[1]
Discount rates	11.7% - 12.5% (12.0%)
Probability of achievement	14.4% - 60.0% (42.9%)

(1) Unobservable inputs were weighted based on the relative fair value of the clinical and regulatory milestone payments.

For the commercial milestones, the Company used a Monte Carlo simulation because of the availability of discrete revenue forecasts. As of December 31, 2023, the Monte Carlo simulation assumed a commercial product launch and associated discrete revenue forecasts, as well as the following significant unobservable inputs for the remaining commercial milestones related to tobevibart:

Unobservable input	Value
Volatility	70.0%
Discount rate	10.0%
Probability of achievement	29.1%

The discount rate captures the credit risk associated with the payment of the contingent consideration when earned and due. As of December 31, 2023 and 2022, the estimated fair value of the contingent consideration related to the Humabs acquisition was $26.0 million and $23.4 million, respectively, with changes in the estimated fair value recorded in research and development expenses in the consolidated statements of operations based on the nature of the relevant underlying activities. The estimated fair value of the contingent consideration related to the Humabs acquisition involves significant estimates and assumptions which give rise to measurement uncertainty.

The following table sets forth the changes in the estimated fair value of the Company's contingent consideration (in thousands):

	Contingent Consideration
Balance at December 31, 2022	$ 24,937
Changes in fair value	1,024
Balance at December 31, 2023	$ 25,961

4. *Acquisitions*

In August 2017, the Company acquired all of the outstanding equity of Humabs, a private Swiss company, which discovers and develops monoclonal antibodies ("mAbs") derived from individuals whose immune systems have successfully responded to major diseases.

The Company acquired all of Humabs' rights, title and interest in and to substantially all of the assets of Humabs except for rights under certain license agreements with third parties. The Company is obligated to pass through to the former Humabs shareholders any amounts received by Humabs under such license agreements, net of any program expenses. The transaction was accounted for as an acquisition of a business. In addition to the cash payment and issuance of common stock to the former Humabs shareholders at the acquisition date, the Company also agreed to pay additional amounts in cash upon the achievement of specified milestone events: (i) up to $135.0 million upon the achievement of clinical, regulatory and commercial milestones for tobevibart; and (ii) up to $105.0 million upon the achievement of clinical, regulatory and commercial milestones for another product, which the Company elected as sotrovimab, a severe acute respiratory syndrome coronavirus 2 ("SARS-CoV-2") product. During the year ended December 31, 2020, the Company achieved two of the specified clinical milestones for tobevibart and sotrovimab totaling $20.0 million. During the year ended December 31, 2021, the Company achieved the specified regulatory milestone of $35.0 million and sales milestones totaling $60.0 million related to sotrovimab. The estimated fair value of the remaining contingent consideration was $26.0 million as of December 31, 2023.

The acquired developed technologies that have associated patents issued are classified as finite-lived intangible assets and are amortized on a straight-lined basis over their estimated remaining useful lives, generally between seven to 12 years. The Company also acquired indefinite-lived intangible assets consisting of IPR&D. These assets will not be amortized until regulatory approval is obtained in a major market. At that time, the Company will determine the useful life of the asset and begin amortization. If the associated research and development effort is abandoned or otherwise impaired, the related IPR&D assets will be written-off, and an impairment charge will be recorded.

5. *Goodwill and Intangible assets*

Goodwill

Goodwill of $16.9 million represents the excess of the purchase price over the estimated fair value of the net assets acquired from Humabs. There was no impairment for the years ended December 31, 2023, 2022 and 2021.

Intangible Assets

The following table summarizes the carrying amount of the finite-lived intangible assets (in thousands):

	December 31,		Weighted-Average Remaining Useful Life (Years)
	2023	2022	
Developed technology	$ 4,260	$ 4,260	5.6
Contract-based intangible asset	502	502	11.9
Finite-lived intangible assets, gross	4,762	4,762	
Less accumulated amortization	(3,270)	(2,738)	
Finite-lived intangible assets, net	$ 1,492	$ 2,024	

The contract-based intangible asset resulted from the product approval of a sublicensed intellectual property right in December 2020. The intellectual property right was previously accounted for as IPR&D. Amortization expense related to finite-lived intangible assets, included in research and development expenses on the consolidated statements of operations, totaled $0.5 million, $0.5 million and $0.5 million for the years ended December 31, 2023, 2022 and 2021, respectively. There was no impairment for the years ended December 31, 2023, 2022 and 2021.

Based on the finite-lived intangible assets recorded as of December 31, 2023, the estimated future amortization expense for the next five years is as follows (in thousands):

Years Ending December 31:	
2024	$ 260
2025	213
2026	213
2027	213
2028	213
Total	$ 1,112

Indefinite-Lived Intangible Assets

As of December 31, 2023 and 2022, the Company had indefinite-lived intangible assets of $21.1 million and $30.7 million, respectively, related to the purchased IPR&D from the Humabs acquisition. For the year ended December 31, 2023, $9.7 million impairment losses were recorded as part of research and development expenses for abandoned IPR&D assets related to non-prioritized research programs. No impairment losses had been recorded for the years ended December 31, 2022 and 2021.

6. *Grant Agreements*

Bill & Melinda Gates Foundation Grants

The Company has entered into various grant agreements with the Bill & Melinda Gates Foundation ("BMGF"), under which it was awarded grants totaling up to $49.9 million to support its HIV vaccine program, tuberculosis vaccine program, HIV vaccinal antibody program and malaria vaccinal antibody program. The term of the grant agreements will expire at various dates through June 2027, unless earlier terminated by the BMGF for the Company's breach, failure to progress the funded project, in the event of the Company's change of control, change in the Company's tax status, or significant changes in the Company's leadership that the BMGF reasonably believes may threaten the success of the project.

Concurrently with the execution of the grant agreement for the vaccinal antibody program, the Company entered into a stock purchase agreement with the BMGF, under which the BMGF purchased 881,365 shares of the Company's common stock on January 13, 2022, at a price per share of $45.38, for an aggregate purchase price of approximately $40.0 million. The fair market value of the common stock issued to the BMGF was $28.5 million, based on the closing stock price of $37.65 per share on the closing date and taking into account a discount for the lack of marketability due to the restrictions in place on the underlying shares, resulting in a $11.3 million premium received by the Company. The Company accounted for the common stock issued to the BMGF based on its fair market value on the closing date and determined that the premium paid by the BMGF should be included in the deferred revenue from the vaccinal antibody grant.

Payments received in advance that are related to future research activities along with the aforementioned premium received are deferred and recognized as revenue when the donor-imposed conditions are met, which is as the research and development activities are performed. The premium received by the Company is deferred and recognized over the same period as the grant proportionally. The Company recognized grant revenue of $13.3 million, $8.6 million, and $8.2 million for the years ended December 31, 2023, 2022, and 2021, respectively. As of December 31, 2023 and 2022, the Company had deferred revenue of $13.1 million and $15.5 million, respectively. As of December 31, 2023 and 2022, the Company had $9.2 million and $7.7 million, respectively, within accrued and other liabilities, which may need to be refunded to the BMGF.

Biomedical Advanced Research and Development Authority

In September 2022, the Company entered into an other transaction for advanced research agreement (the "BARDA Agreement") with the Biomedical Advanced Research and Development Authority ("BARDA"), part of the U.S. Department of Health and Human Services' Administration for Strategic Preparedness and Response. Under the BARDA Agreement, the Company may receive up to an estimated $1.0 billion to advance the development of a full portfolio of innovative solutions to address influenza and potentially other infectious disease threats. The Base Period (September 2022 to January 2026) for the BARDA Agreement includes government funding of approximately $55.0 million to reimburse a portion of expenses incurred by the Company to support the development of VIR-2482, an investigational prophylactic monoclonal antibody designed with the aim to protect against seasonal and pandemic influenza, including expenses related to the Phase 2 pre-exposure prophylaxis trial of VIR-2482. The BARDA Agreement also provides for additional BARDA funding after the exercise by BARDA of up to twelve options to further support the development of pre-exposure prophylactic antibodies including and beyond VIR-2482 for the prevention of influenza illness or possibly supporting medical countermeasures for other pathogens of pandemic potential.

In September 2023, the Company and BARDA entered into Amendment No. P00001 to the BARDA Agreement (the "Amended BARDA Agreement"), pursuant to which BARDA awarded the Company $50.1 million in new funding upon the exercise of an additional option. The Company will use $40.0 million to support the development of VIR-7229 through a Phase 1 clinical trial and $10.1 million to support the discovery of new monoclonal antibody against a second pathogen of pandemic potential. The Company may also receive up to $11.2 million of additional funding for the Base Period under the Amended BARDA Agreement to wind down activities related to the Phase 2 pre-exposure prophylaxis trial of VIR-2482. The Amended BARDA Agreement will expire in July 2027 and may be extended by mutual written agreement of the Company and BARDA, if funding is available and research opportunities within scope reasonably warrant, or, if any of the options are exercised (as described above), to cover the period of such exercised option set forth in the Amended BARDA Agreement. The Amended BARDA Agreement is terminable by the Company and BARDA at any time under specified circumstances, including for convenience.

The Company recognized grant revenue related to BARDA of $33.4 million and $26.4 million for the years ended December 31, 2023 and 2022, respectively, and other receivables in prepaid expenses and other current assets of $7.6 million and $26.4 million as of December 31, 2023 and 2022, respectively. As of December 31, 2023, $56.5 million of potential future reimbursement remains available out of $116.3 million total awarded amount under the Amended BARDA Agreement.

7. *Collaboration and License Agreements*

Collaboration Agreements with GSK

2020 GSK Agreement

In 2020, the Company, Glaxo Wellcome UK Limited and Beecham S.A. entered into a collaboration agreement (the "2020 GSK Agreement"). Subsequently, Beecham S.A. assigned and transferred all its rights, title, interest, and benefit in the 2020 GSK Agreement to GlaxoSmithKline Biologicals S.A. (Glaxo Wellcome UK Limited and GlaxoSmithKline Biologicals S.A., referred to, individually and together, as "GSK"). Under the terms of the 2020 GSK Agreement, the Company and GSK agreed to collaborate to research, develop and commercialize products for the prevention, treatment and prophylaxis of diseases caused by SARS-CoV-2, the virus that causes COVID-19, and potentially other coronaviruses. The collaboration initially focused on the development and commercialization of three programs: (1) antibodies targeting SARS-CoV-2 and potentially other coronaviruses (the "Antibody Program"); (2) vaccines targeting SARS-CoV-2 and potentially other coronaviruses (the "Vaccine Program"), and (3) products based on genome-wide CRISPR screening of host targets expressed in connection with exposure to SARS-CoV-2 and potentially other coronaviruses (the "Functional Genomics Program").

On February 8, 2023, the Company and GSK entered into Amendment No. 2 and Amendment No. 3 to the 2020 GSK Agreement. Pursuant to Amendment No. 2, the Company and GSK agreed to remove the Vaccine Program from the 2020 GSK Agreement, and to wind down and terminate the cost-sharing arrangements and all ongoing activities in relation to the Vaccine Program. As of the effective date of Amendment No. 2, the Vaccine Program had not yet advanced to its predefined development candidate stage. The Company retains the right to progress development of vaccine products directed to SARS-CoV-2 and other coronaviruses independently (including with or for third parties) outside the scope of the 2020 GSK Agreement, subject to the payment of tiered royalties to GSK on net sales of any vaccine products covered by certain GSK intellectual property rights in the low single digits. Pursuant to Amendment No. 3, the Company and GSK agreed to modify the Antibody Program to remove from the collaboration all coronavirus antibodies other than sotrovimab and VIR-7832, and certain variants thereof. Sotrovimab and VIR-7832, and certain variants thereof, remain subject to the terms of the 2020 GSK Agreement, and the Company retains the sole right to progress the development and commercialization of the terminated antibody products independently (including with or for third parties), subject to the payment of tiered royalties to GSK on net sales of such terminated antibody products at percentages ranging from the very low single digits to the mid-single digits, depending on the nature of the antibody product being commercialized.

Subject to an opt-out mechanism, the parties share all development costs, manufacturing costs, and costs and expenses for the commercialization of the collaboration products, with the Company bearing 72.5% of such costs for the antibody products, except that GSK has the sole right to develop (including to seek, obtain or maintain regulatory approvals), manufacture and commercialize sotrovimab in and for mainland China, Hong Kong, Macau and Taiwan at GSK's sole cost and expense, and equal sharing of such costs for the functional genomics products.

The 2020 GSK Agreement will remain in effect with respect to each collaboration program for as long as there is a collaboration product being developed or commercialized by the lead party, or the non-opt-out party, in such program. Either party has the right to terminate the 2020 GSK Agreement in the case of the insolvency of the other party, an uncured material breach of the other party with respect to a collaboration program or collaboration product, or as mutually agreed by the parties.

In May 2021, the U.S. Food and Drug Administration ("FDA") granted an EUA in the United States for sotrovimab, the first collaboration product under the Antibody Program. In April 2022, the FDA excluded the use of sotrovimab in all U.S. regions due to the continued proportion of COVID-19 cases caused by certain Omicron subvariants. As the lead party for all manufacturing and commercialization activities, GSK incurs all of the manufacturing, sales and marketing expenses and is the principal on sales transactions with third parties. As described in Note 2—Summary of Significant Accounting Policies, the Company's accounting policy related to the profit-share is to consider the agreed-upon share of the profit-sharing amounts each quarter and evaluate whether those amounts are subject to potential future adjustments based on the latest available facts and circumstances. As the Company is the agent, the Company recognizes its contractual share of the profit-sharing amounts or royalties (in case of an opt-out) as revenue, based on sales net of various estimated deductions such as rebates, discounts, chargebacks, credits and returns, less cost of sales and allowable expenses (including manufacturing, distribution, medical affairs, selling, and marketing expenses) in the period the sale occurs. Manufacturing costs include inventory revaluation adjustments, lower of cost or market inventory adjustments, inventory write-downs and write-offs, and binding purchase commitments with a third-party manufacturer among other manufacturing costs. In periods when allowable expenses exceed amounts recognized for net product sales of sotrovimab, negative revenue will be reported in our consolidated statements of operations. The Company's contractual share of the profit-sharing amounts is subject to potential future adjustments to allowable expenses, which represents a form of variable consideration. At each reporting period, the Company evaluates the latest available facts and circumstances to determine whether any portion of profit-sharing amounts should be constrained.

In 2023, GSK reported to the Company certain allowable manufacturing expenses related to excess sotrovimab supply and binding reserved manufacturing capacity not utilized, which the Company had previously reserved as a constraint on its cumulative profit-sharing amounts. For the year ended December 31, 2023, the Company paid GSK $341.4 million relating to these manufacturing expenses. GSK may continue to adjust allowable manufacturing expenses for the Company's share of the excess supply write-offs and unused binding manufacturing capacity and report to the Company as cost-sharing amounts in future periods. The Company evaluated the latest available facts and circumstances to update its assessment of profit-sharing amounts to be constrained. As of December 31, 2023, the accrued liability balance for the Company's share of the remaining estimated manufacturing expenses related to excess sotrovimab supply and binding reserved manufacturing capacity not utilized is immaterial. The Company re-assesses these estimates each reporting period.

During the years ended December 31, 2023, 2022, and 2021, the Company recorded profit-sharing amounts, profit-sharing amounts constrained, and profit-sharing amounts previously constrained, released as components of collaboration revenue in the consolidated statements of operations, as follows (in thousands):

	Years Ended December 31,		
	2023	2022	2021
Collaboration revenue, net			
Profit-sharing amount	$ 1,536	$ 1,875,147	$ 917,194
Profit-sharing amount constrained	—	(369,678)	—
Profit-sharing amount previously constrained, released	35,730	—	—
Total collaboration revenue, net	$ 37,266	$ 1,505,469	$ 917,194

Costs associated with co-development activities performed under the 2020 GSK Agreement are included in research and development expenses on the consolidated statements of operations, with any reimbursement of costs by GSK reflected as a reduction of such expenses. Under the 2020 GSK Agreement, the Company recognized additional net research and development expenses of $23.4 million, $31.4 million, and $77.3 million during the years ended December 31, 2023, 2022, and 2021, respectively.

2021 Expanded GSK Collaboration

In 2021, the Company and GSK entered into a collaboration agreement (the "2021 GSK Agreement") under which the parties agreed to expand the 2020 GSK Agreement to collaborate on three separate programs: (1) a program to research, develop and commercialize mAbs for the prevention, treatment or prophylaxis of the influenza virus (the "Influenza Program"), excluding VIR-2482 unless GSK exercises its exclusive option to co-develop and commercialize after the Company completes a Phase 2 clinical trial; (2) an expansion of the parties' current Functional Genomics Program to focus on functional genomics screens directed to targets associated with respiratory viruses (the "Expanded Functional Genomics Program"); and (3) additional programs to develop neutralizing mAbs directed to up to three non-influenza target pathogens selected by GSK (the "Selected Pathogens" and such programs, the "Additional Programs").

On February 21, 2024, the Company and GSK entered into a letter agreement (the "Letter Agreement") pursuant to which the Company and GSK agreed to remove the Influenza Program from the 2021 GSK Agreement and to wind down and terminate the cost-sharing arrangements and all ongoing activities in relation to the Influenza Program. As of the effective date of the Letter Agreement, GSK had not exercised the VIR-2482 Option. On July 20, 2023, the Company announced that the VIR-2482 Phase 2 Prevention of Illness Due to Influenza A, or PENINSULA, trial evaluating the prevention of symptomatic influenza A illness did not meet primary or secondary efficacy endpoints.

The parties mutually agree upon the allocation of responsibility for the development of products under the Expanded Functional Genomics Program, and for the development and early-stage manufacturing of products under the Additional Programs if and when GSK decides which Selected Pathogens to pursue. GSK is primarily responsible for commercial manufacturing and commercialization activities for products under the Expanded Functional Genomics Program and Additional Programs, if and when selected by GSK. For each collaboration program, the Company granted or will grant GSK certain license rights related to the development, manufacturing and commercialization of products arising from the program. GSK selected respiratory syncytial virus ("RSV") as its first pathogen under the Additional Programs and can select up to two additional non-influenza target pathogens prior to March 25, 2024.

The parties share 50% of all development costs in accordance with the budget for each of the collaboration programs (other than for VIR-2482). The parties also share 50% of all profits and losses arising from any collaboration product.

As of December 31, 2023, the total unrecognized transaction price of $51.7 million is classified as current deferred revenue on the Company's consolidated balance sheet related to the remaining performance obligations, being the material rights to select up to two additional non-influenza target pathogens under the Additional Programs.

Costs associated with co-development activities performed under the 2021 GSK Agreement are included in research and development expenses in the consolidated statements of operations, with any reimbursement of costs by GSK reflected as a reduction of such expenses.

During the years ended December 31, 2023, 2022, and 2021, the Company recognized additional net research and development expenses of $2.2 million, $2.3 million and $0.5 million, respectively. During the year ended December 31, 2022, the Company recognized the $39.8 million as contract revenue related to GSK's selection of RSV as its first pathogen under the Additional Programs.

Brii Biosciences

In 2018, the Company entered into a collaboration, option and license agreement (the "Brii Agreement") with Brii Bio Parent and Brii Bio, pursuant to which the Company granted to Brii Bio, with respect to up to four of the Company's programs, an exclusive option to obtain exclusive rights to develop and commercialize compounds and products arising from such programs in China, Taiwan, Hong Kong and Macau (collectively, the "China Territory") for the treatment, palliation, diagnosis, prevention or cure of acute and chronic diseases of infectious pathogen origin or hosted by pathogen infection (the "Field of Use"). To date, Brii Bio has opted in for elebsiran (formerly as VIR-2218) and tobevibart to develop and commercialize in the China Territory under the Brii Agreement. In partial consideration for the options granted by the Company to Brii Bio, Brii Bio Parent and Brii Bio granted the Company, with respect to up to four of Brii Bio Parent's or Brii Bio's programs, an exclusive option to be granted exclusive rights to develop and commercialize compounds and products arising from such Brii Bio programs in the United States for the Field of Use. To date, the Company has not exercised any of its options.

In July 2022, Brii Bio exercised its option to obtain exclusive rights to develop and commercialize compounds and products arising from tobevibart in the China Territory. In consideration of the Company's grant to Brii Bio of an exclusive license related to tobevibart in the China Territory, the Company received a $20.0 million option exercise fee in connection with the option exercise.

The Company evaluated the tobevibart transaction under ASC 606 and identified one performance obligation consisting of the license granted to Brii Bio. Under the Brii Agreement, Brii Bio is responsible for performing all research and development activities, and the Company does not have any other performance obligations within the context of ASC 606 under the arrangement after the option exercise. The transaction price was determined to be $22.3 million, which consists of the $20.0 million option exercise fee and $2.3 million of the deferred revenue allocated to the tobevibart option at the inception of the Brii Agreement. The Company determined that the license is considered a functional intellectual property that is a distinct performance obligation. Specifically, the Company believes the license is capable of being distinct, as Brii Bio has the capabilities to develop the license either on its own or by contracting with other third parties. Brii Bio can benefit from the license at the time of grant and, therefore, the related performance obligation is satisfied at a point in time.

For the years ended December 31, 2023 and 2021, no license revenue from a related party was recognized. For the year ended December 31, 2022, the Company recognized $22.3 million as license revenue from a related party.

Alnylam

In 2017, the Company entered into a collaboration and license agreement with Alnylam (the "Alnylam Agreement") for the development of siRNA products for the treatment of HBV, and following the exercise of certain program options, the development and commercialization of siRNA therapeutic products directed to up to four other infectious disease targets selected by the Company. Under the Alnylam Agreement, the Company obtained a worldwide, exclusive license to develop, manufacture and commercialize the HBV siRNA product candidates, including elebsiran, for all uses and purposes other than agricultural, horticultural, forestry, aquaculture and other residential applications (such excluded fields, the "Excluded Fields"). In addition, Alnylam granted the Company an exclusive option, for each of the infectious disease siRNA programs directed to the Company's selected targets, to obtain a worldwide, exclusive license to develop, manufacture and commercialize siRNA products directed to the target of each such program for all uses and purposes other than the Excluded Fields. Following the Company's exercise of an option for a program and payment of the program option exercise fee and any outstanding program costs due to Alnylam, the Company is solely responsible, at the Company's expense (subject to Alnylam's exercise of a profit-sharing option), for conducting all development, manufacture and commercialization activities for products arising from each such program. If Alnylam exercises its profit-sharing option, the parties will negotiate and enter into a profit-sharing agreement for such product.

The Company will be required to pay Alnylam up to $190.0 million in the aggregate for the achievement of specified development and regulatory milestones by the first siRNA product directed to HBV. Following commercialization, the Company will be required to pay to Alnylam up to $250.0 million in the aggregate for the achievement of specified levels of net sales by siRNA products directed to HBV. The Company may also be required to pay Alnylam tiered royalties at percentages ranging from the low double-digits to mid-teens on annual net sales of HBV products. The royalties are payable on a product-by-product and country-by-country basis until the later of the expiration of all valid claims of specified patents covering such product in such country and 10 years after the first commercial sale of such product in such country.

The term of the Alnylam Agreement will continue, on a product-by-product and country-by-country basis, until the expiration of all royalty payment obligations under the Alnylam Agreement. If the Company does not exercise its option for an infectious disease program directed to one of its selected targets, the Alnylam Agreement will expire upon the expiration of the applicable option period with respect to such program. The Company may terminate the Alnylam Agreement on a program-by-program basis or in its entirety for any reason on 90 days' written notice. Either party may terminate the agreement for cause for the other party's uncured material breach on 60 days' written notice (or 30 days' notice for payment breach), or if the other party challenges the validity or enforceability of any patent licensed to it under the Alnylam Agreement on 30 days' notice.

The Company incurred expenses under the Alnylam Agreement of $1.7 million, $1.4 million, and $11.2 million during the years ended December 31, 2023, 2022 and 2021, respectively.

Xencor

In 2020, the Company entered into a patent license agreement (the "2020 Xencor Agreement"), with Xencor under which the Company obtained a non-exclusive, sublicensable (only to its affiliates and subcontractors) license to incorporate Xencor's licensed technologies into, and to evaluate, antibodies that target any component of a coronavirus, including SARS-CoV-2, SARS-CoV and MERS-CoV, and a worldwide, non-exclusive, sublicensable license to develop and commercialize products containing such antibodies incorporating such technologies for all uses. These technologies are used in sotrovimab, incorporating Xencor's Xtend technology.

In consideration for the grant of the license, the Company is obligated to pay royalties based on net sales of licensed products at the mid-single-digits. The royalties are payable, on a product-by-product and country-by-country basis, until the later of the expiration of the last to expire valid claim in the licensed patents covering such product in such country or 12 years. During the years ended December 31, 2023, 2022, and 2021, the Company recognized $2.2 million, $114.5 million, and $52.7 million, respectively, as cost of revenue for royalties due to Xencor from the sale of sotrovimab.

The 2020 Xencor Agreement will remain in force, on a product-by-product and country-by-country basis, until the expiration of all royalty payment obligations under each of the respective agreements. The Company may terminate each agreement in its entirety, or on a target-by-target basis, for convenience upon 60 days' written notice. Either party may terminate each agreement for the other party's uncured material breach upon 60 days' written notice (or 30 days in the case of non-payment) or in the event of bankruptcy of the other party immediately upon written notice. Xencor may terminate each agreement immediately upon written notice if the Company challenges, or upon 30 days' written notice if any of the Company's sublicensees challenge, the validity or enforceability of any patent licensed to the Company under each respective agreement.

8. *Balance Sheet Components*

Property and Equipment, net

Property and equipment, net consists of the following (in thousands):

	December 31,	
	2023	2022
Laboratory equipment	$ 43,728	$ 36,533
Computer equipment	2,783	2,545
Furniture and fixtures	2,887	2,852
Leasehold improvements	80,290	84,422
Construction in progress	226	—
Property and equipment, gross	129,914	126,352
Less: accumulated depreciation and amortization	(33,896)	(20,743)
Total property and equipment, net	$ 96,018	$ 105,609

Depreciation and amortization expenses were $18.9 million, $6.3 million and $5.3 million for the years ended December 31, 2023, 2022 and 2021, respectively.

Accrued and Other Liabilities

Accrued and other liabilities consist of the following (in thousands):

	December 31,	
	2023	2022
Payroll and related expenses	$ 41,322	$ 28,286
Research and development expenses	33,129	48,880
Operating lease liabilities, current	12,867	4,137
Excess funds payable under grant agreements	9,202	7,652
Other professional and consulting expenses	3,418	3,987
Accrued royalties	816	10,447
Accrued income taxes	149	15,228
Net profit-sharing	—	357,762
Other accrued expenses	3,317	12,711
Total accrued and other liabilities	$ 104,220	$ 489,090

9. ***Restructuring, Impairment and Other Costs***

In December 2023, the Company initiated strategic steps to reduce operating expenses and focus its capital allocation on programs with the highest potential for patient impact and value creation ("Restructuring Plan"). As part of the steps, the R&D facilities in St. Louis, Missouri and Portland, Oregon will be closed in 2024. In addition, approximately 75 net positions, or 12% of the workforce, will be eliminated, which includes reductions from the Company's discontinuation of its innate immunity small molecule group that was initiated in the third quarter of 2023. The Company expects all actions related to the Restructuring Plan to be substantially completed in the third quarter of 2024.

During the year ended December 31, 2023, the Company incurred severance and other employee-related expenses of $5.9 million, of which $4.0 million is included in research and development expense and $1.9 million is included in selling, general and administrative expense. As of December 31, 2023, the Company recorded $4.5 million as accrued and other liabilities related to restructuring costs. The Company expects to incur additional charges of approximately $25 million to $35 million, primarily related to facility closures in the future.

In addition to these strategic steps, the Company also recorded one-time non-cash impairment charges and disposal losses on ROU assets, leasehold improvements, and equipment of $7.7 million for the year ended December 31, 2023, primarily related to consolidation of facilities and disposal of equipment used in the small molecule platform that was discontinued. Of the $7.7 million, $5.6 million is included in research and development expense, and $2.1 million is included in selling, general and administrative expense.

10. ***Commitments and Contingencies***

Lease Agreements

The Company has various operating lease arrangements for office and laboratory spaces located in California, Oregon, Missouri, and Switzerland with contractual lease periods expiring at various dates through 2033. These leases require monthly lease payments that may be subject to annual increases throughout the lease term. Certain lease agreements also provide the Company with the option to renew for five years. These renewal options are not considered in the remaining lease term unless it is reasonably certain that the Company will exercise such options. In December 2023, the Company announced that the R&D facilities in Missouri and Oregon will be closed in 2024.

Throughout the term of the lease agreements, the Company is responsible for paying certain operating costs, in addition to rent, such as common area maintenance, taxes, utilities and insurance. These additional charges are considered variable lease costs and are recognized in the period in which the costs are incurred.

The discount rate used to determine the present value of the lease payments is our estimated collateralized incremental borrowing rate, based on the yield curve for the respective lease terms, as we generally cannot determine the interest rate implicit in the leases.

The following table contains a summary of the lease costs recognized under ASC 842 and additional information related to operating leases (in thousands, except weighted average amounts):

	Years Ended December 31,		
	2023	2022	2021
Operating lease cost	$ 13,934	$ 15,910	$ 11,921
Variable lease cost	10,996	10,176	4,517
Total lease cost	$ 24,930	$ 26,086	$ 16,438
Other Information			
Weighted average remaining lease term (in years)	8.9	10.0	10.4
Weighted average incremental borrowing rate (%)	5.1	5.2	5.2
Cash paid for amounts included in the measurement of operating lease liabilities	$ 19,584	$ 12,716	$ 6,250
ROU assets obtained in exchange for new operating lease liabilities	$ 957	$ 4,046	$ 77,187

The maturity of the Company's operating lease liabilities as of December 31, 2023 was as follows (in thousands):

	Amounts
2024	$ 18,798
2025	16,490
2026	16,935
2027	17,114
2028	17,388
Thereafter	69,688
Total lease payments	156,413
Less: imputed interest	(31,873)
Present value of operating lease liabilities	$ 124,540

The following amounts were recorded in the consolidated balance sheets as of December 31, 2023 and 2022 (in thousands):

	December 31,	
	2023	2022
Operating Leases		
Prepaid expenses and other current assets[(1)]	$ —	$ 17,616
Operating ROU assets	71,182	82,557
Accrued and other liabilities	$ 12,867	$ 4,137
Operating lease liabilities, noncurrent	111,673	123,837
Total operating lease liabilities	$ 124,540	$ 127,974

(1) For certain operating leases, lease incentives expected to be received exceeds the minimum lease payments expected to be paid over the next 12 months, therefore the net amount is recorded in prepaid expenses and other current assets.

Indemnification

In the ordinary course of business, the Company enters into agreements that may include indemnification provisions. Under such agreements, the Company may indemnify, hold harmless and defend an indemnified party for losses suffered or incurred by the indemnified party. In some cases, the indemnification will continue after the termination of the agreement. The maximum potential amount of future payments the Company could be required to make under these provisions is not determinable. In addition, the Company has entered into indemnification agreements with its directors and certain officers that may require the Company, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service as directors or officers. To date, no demands have been made upon the Company to provide indemnification under these agreements, and thus, there are no indemnification claims that the Company is aware of that could have a material effect on the Company's consolidated balance sheets, consolidated statements of operations, or consolidated statements of cash flows.

11. *Related Party Transactions*

As a result of the Brii Agreement, the Company holds a minority equity interest in Brii Bio through its parent company, Brii Bio Parent. As of December 31, 2023, one member of the Company's board of directors serves on Brii Bio Parent's board of directors.

12. *Stock-Based Awards*

2019 Equity Incentive Plan

In September 2019, the Company's board of directors adopted, with the approval of its stockholders, the 2019 Equity Incentive Plan (the "2019 Plan") for the issuance of incentive stock options ("ISO"), non-qualified stock options ("NSO"), stock appreciation rights ("SARs"), restricted stock, other stock awards and performance cash awards, to employees, non-employee directors, and consultants. The 2019 Plan became effective concurrent with the Company's initial public offering ("IPO"). Awards granted under the 2019 Plan expire no later than 10 years from the date of grant. For ISO and NSO, the option price shall not be less than 100% of the estimated fair value on the date of grant. Options granted typically vest over a four-year period but may be granted with different vesting terms. As of December 31, 2023, there are 15,467,779 shares available for the Company to grant under the 2019 Plan.

2016 Equity Incentive Plan

In September 2016, the Company adopted the 2016 Equity Incentive Plan (the "2016 Plan") for the issuance of ISO, NSO, SARs, restricted stock and other stock awards, to employees, non-employee directors, and consultants under terms and provisions established by the Company's board of directors and approved by the stockholders.

Awards granted under the 2016 Plan expire no later than 10 years from the date of grant. For ISO and NSO, the option price shall not be less than 100% of the estimated fair value on the date of grant. Options granted typically vest over a four-year period but may be granted with different vesting terms.

In conjunction with adopting the 2019 Plan, the Company discontinued the 2016 Plan with respect to the new equity awards.

2019 Employee Stock Purchase Plan

In September 2019, the Company's board of directors adopted, with the approval of its stockholders, the Employee Stock Purchase Plan ("ESPP"). The ESPP became effective on the completion of the Company's IPO.

The ESPP initially authorized the issuance of 1,280,000 shares of the Company's common stock under purchase rights granted to its employees or employees of any of the Company's designated affiliates. The number of shares of the Company's common stock reserved for issuance is subject to an automatic increase at each calendar year. Under the ESPP, the Company may specify offerings with durations of not more than 27 months and may specify shorter purchase periods within each offering. The ESPP allows eligible employees to purchase shares of the Company's common stock at a discount through payroll deductions of up to 15% of their earnings, subject to any plan limitations. Unless otherwise determined by the Company's board of directors, employees can purchase shares at 85% of the lower of the fair market value of the Company's common stock on the first date of an offering or the purchase date. During the year ended December 31, 2023, 322,923 shares were issued under the ESPP.

Stock Option Activity

Activity under the Company's stock option plans is set forth below:

	Number of Options	Weighted Average Exercise Price	Weighted Average Remaining Contractual Term	Aggregate Intrinsic Value
			(Years)	(in thousands)
Outstanding at December 31, 2022	10,604,367	$ 31.70	7.6	
Granted	3,296,741	$ 23.70		
Exercised	(487,014)	$ 7.15		
Forfeited	(2,061,875)	$ 31.47		
Outstanding at December 31, 2023	11,352,219	$ 30.47	7.1	$ 8,141
Vested and expected to vest at December 31, 2023	11,352,219	$ 30.47	7.1	$ 8,141
Vested and exercisable at December 31, 2023	6,582,670	$ 31.26	6.2	$ 8,098

The aggregate intrinsic value of options exercised during the years ended December 31, 2023, 2022 and 2021 was $5.9 million $12.1 million, and $65.1 million, respectively.

During the years ended December 31, 2023, 2022, and 2021, the estimated weighted-average grant date fair value of the options granted was $19.13, $22.69, and $47.62 per share, respectively.

As of December 31, 2023, the Company expects to recognize the remaining unamortized stock-based compensation expense of $98.4 million related to stock options, over an estimated weighted average period of 2.5 years.

Stock Options Granted to Employees

The fair value of stock options granted to employees was estimated on the date of grant using the Black-Scholes option-pricing model with the following assumptions:

	Years Ended December 31,		
	2023	**2022**	**2021**
Expected term of options (in years)	5.5 – 6.1	5.3 – 6.1	5.3 – 6.1
Expected stock price volatility	99.0% – 101.5%	101.4% – 111.2%	103.1% – 112.1%
Risk-free interest rate	3.4% – 4.9%	1.6% – 4.3%	0.6% – 1.3%
Expected dividend yield	—	—	—

The valuation assumptions for stock options were determined as follows:

Expected Term—The expected term represents the period that the stock options granted are expected to be outstanding and is determined using the simplified method (based on the mid-point between the vesting date and the end of the contractual term) as the Company has limited historical information to develop reasonable expectations about future exercise patterns and post-vesting employment termination behavior for its stock option grants.

Expected Volatility—Since inception the expected volatility was determined by examining the historical volatilities for industry peers and using an average of historical volatilities of the Company's industry peers. Beginning the first quarter of 2022, the expected volatility is determined by using a blended approach of the Company and its industry peers' historical volatilities.

Risk-Free Interest Rate—The Company determines the risk-free interest rate over the expected term of the stock options based on the constant maturity rate of U.S. Treasury securities with similar maturities as of the date of the grant.

Expected Dividend Rate—The expected dividend is zero as the Company has not paid nor does it anticipate paying any dividends on its profit interest units in the foreseeable future.

Employees Stock Purchase Plan

In June 2021, the Company initiated its first offering period under the ESPP. Each offering period is six months, which commences on the grant date on or after June 1 and December 1 of each year and ends on the purchase date on or before November 30 and May 31 of each year.

The fair value of employees' purchase rights under the ESPP was estimated on the date of grant using the Black-Scholes option-pricing model with the following assumptions:

	Years Ended December 31,		
	2023	**2022**	**2021**
Expected term of ESPP (in years)	0.5	0.5	0.5
Expected stock price volatility	41.2% - 95.1%	59.0% - 86.0%	76.1% - 144.1%
Risk-free interest rate	4.5% - 5.2%	0.10% - 4.5%	0.04% - 0.1%
Expected dividend yield	—	—	—

The expected term of employees' purchase rights is equal to the purchase period. The expected volatility was determined based on the Company's historical volatility. The risk-free interest rate is based on the constant maturity rate of U.S. Treasury securities with similar maturities as of the date of the grant over the expected term of the employees' purchase rights. The expected dividend is zero as the Company has not paid nor does it anticipate paying any dividends on its profit interest units in the foreseeable future. Based on the Black-Scholes option-pricing model, the estimated weighted-average grant date fair value of the employees' purchase rights granted for the years ended December 31, 2023, 2022 and 2021 was $4.93, $9.09 and $19.85 per share, respectively.

Restricted Stock Activity

The Company's RSUs activity was summarized as follows:

	Shares	Weighted Average Grant Date Fair Value Per Share
Unvested as of December 31, 2022	2,667,828	$ 37.46
Granted	3,534,242	$ 24.91
Vested	(734,662)	$ 38.91
Forfeited	(662,441)	$ 33.45
Unvested as of December 31, 2023	4,804,967	$ 28.56

The unvested shares of RSUs have not been included in the shares issued and outstanding.

As of December 31, 2023, there was $102.1 million of total unrecognized compensation cost related to unvested restricted stock units, all of which is expected to be recognized over a remaining weighted-average period of 2.8 years.

Stock-Based Compensation Expense

Stock-based compensation is recognized on a straight-line basis over the requisite service period, which is generally the vesting period. The following table sets forth the total stock-based compensation expense for all awards granted to employees and the ESPP in the consolidated statements of operations (in thousands):

	Years Ended December 31,		
	2023	2022	2021
Research and development	$ 62,745	$ 53,153	$ 42,554
Selling, general and administrative	48,571	48,929	41,230
Total stock-based compensation	$ 111,316	$ 102,082	$ 83,784

13. ***Net (Loss) Income Per Share***

Basic net (loss) income per common share is computed by dividing the net (loss) income by the weighted-average number of common shares outstanding during the period, without consideration of common stock equivalents. Diluted net (loss) income per common share is computed by dividing the net (loss) income by the sum of the weighted-average number of common shares outstanding during the period plus any potential dilutive effects of common stock equivalents outstanding during the period calculated in accordance with the treasury stock method. For periods that the Company was in a net loss position, basic net loss per share is the same as diluted net loss per share as the inclusion of all potential common securities outstanding would have been anti-dilutive.

The following is a calculation of the basic and diluted net (loss) income per share (in thousands, except share and per share data):

	Years ended December 31,		
	2023	2022	2021
Net (loss) income attributable to Vir	$ (615,061)	$ 515,837	$ 528,584
Weighted-average shares outstanding, basic	134,130,924	132,606,767	129,884,967
Weighted-average effect of dilutive securities:			
Options to purchase common stock	—	2,130,212	3,513,438
Restricted shares subject to future vesting	—	73,851	35,488
Shares to purchase under Employee Stock Purchase Plan	—	78	—
Contingently issuable shares	—	—	3,233
Weighted-average shares outstanding, diluted	134,130,924	134,810,908	133,437,126
Net (loss) income attributable to Vir per share, basic	$ (4.59)	$ 3.89	$ 4.07
Net (loss) income attributable to Vir per share, diluted	$ (4.59)	$ 3.83	$ 3.96

Potentially dilutive securities that were not included in the diluted per share calculations because they would be anti-dilutive were as follows:

	As of December 31,		
	2023	2022	2021
Options issued and outstanding	11,124,181	8,853,734	5,764,308
Restricted shares subject to future vesting	5,260,229	2,646,748	1,088,304
Total	16,384,410	11,500,482	6,852,612

14. *Defined Contribution Plan*

The Company sponsors a 401(k) retirement savings plan for the benefit of its employees. Eligible employees may contribute a percentage of their compensation to this plan, subject to statutory limitations. The Company made contributions to the plan for eligible participants, and recorded contribution expenses of $4.6 million, $4.0 million, and $2.7 million for the years ended December 31, 2023, 2022, and 2021, respectively.

15. *Income Taxes*

(Loss) income before benefit from (provision for) income taxes consists of the following (in thousands):

	Years Ended December 31,		
	2023	2022	2021
Domestic	$ (608,134)	$ 692,445	$ 535,989
Foreign	(20,060)	61,835	13,813
Total (loss) income before benefit from (provision for) income taxes	$ (628,194)	$ 754,280	$ 549,802

The components of benefit from (provision for) income taxes consist of the following (in thousands):

	Years Ended December 31,		
	2023	2022	2021
Current:			
Federal	$ 12,774	$ (238,550)	$ (3,526)
State	(685)	(2,432)	(105)
Foreign	(75)	(12,647)	(2,401)
	12,014	(253,629)	(6,032)
Deferred:			
Federal	406	15,186	(15,186)
State	598	—	—
Foreign	59	—	—
	1,063	15,186	(15,186)
Benefit from (provision for) income taxes	$ 13,077	$ (238,443)	$ (21,218)

A reconciliation between the U.S. federal statutory income tax rate and the reported effective income tax rate is as follows:

	Years Ended December 31,		
	2023	2022	2021
U.S. federal statutory income tax rate	21.0 %	21.0 %	21.0 %
Foreign tax at less than federal statutory rate	—	(0.3)	(0.2)
State taxes, net of federal benefit	5.3	0.1	0.7
Research and development tax credit	2.4	(2.0)	(1.6)
Permanent items	(1.6)	(7.4)	1.8
Changes in valuation allowance	(24.2)	21.1	(17.9)
Other	(0.8)	(0.9)	0.1
Effective income tax rate	2.1 %	31.6 %	3.9 %

The tax effects of temporary differences that give rise to significant portions of the Company's deferred tax assets and liabilities as of December 31, 2023, and 2022, are related to the following (in thousands):

	December 31,	
	2023	2022
Deferred tax assets:		
Net operating loss carryforwards	$ 138,257	$ 14,793
Research and development tax credit carryforward	17,917	12,123
Equity compensations	34,875	24,250
Reserves and accruals	21,745	85,977
Capitalized research and development	136,962	75,680
Lease liabilities	29,047	18,553
Intangible assets	19,060	18,348
Valuation allowance	(356,833)	(204,601)
Deferred tax assets	41,030	45,123
Deferred tax liabilities:		
ROU assets	(16,536)	(20,834)
Property and equipment	(19,610)	(13,151)
Unrealized gain on investments	(1,190)	(5,880)
IPR&D	(5,884)	(8,511)
Deferred tax liabilities	(43,220)	(48,376)
Net deferred tax liabilities	$ (2,190)	$ (3,253)

Although the Company has taxable income for the years ended December 31, 2022, and 2021, it has otherwise incurred accumulated tax losses since inception. Based on the available objective evidence, the Company cannot conclude it is more likely than not that the deferred tax assets will be fully realizable. Accordingly, the Company has provided a valuation allowance against its deferred tax assets. For the year ended December 31, 2023, the Company recorded a valuation allowance increase of $152.2 million. As of December 31, 2023, the Company has net operating loss carryforwards of $487.0 million for federal purposes and $415.4 million for state tax purposes. If not utilized, these carryforwards will begin to expire in 2036 for federal and in 2031 for state tax purposes. As of December 31, 2023, the Company also has net operating loss carryforwards of $19.4 million for Australian tax purposes, which have an indefinite carryforward period, and $10.7 million net operating loss carryforwards for Swiss tax purposes, which have a seven-year carryforward period.

Under the Tax Reform Act of 1986, the amounts of and benefits from net operating loss carryforwards may be impaired or limited in certain circumstances. Events which cause limitations in the amount of net operating losses that the Company may utilize in any one year include, but are not limited to, a cumulative ownership change of more than 50% over a three-year period. The Company completed its Section 382 analysis as of December 31, 2023, and based on this analysis, it does not expect that the annual limitations will significantly impact its ability to utilize its net operating loss or tax credit carryforwards prior to expiration.

As of December 31, 2023, the Company has research tax credit carryforwards of $0.4 million and $21.4 million for federal and state tax purposes, respectively. If not utilized, the federal carryforward will expire in various amounts beginning in 2036. The California credits can be carried forward indefinitely.

The Tax Cuts and Jobs Act of 2017 subjects a U.S. shareholder to current tax on global intangible low-taxed income ("GILTI") earned by certain foreign subsidiaries. The FASB Staff Q&A, Topic 740 No. 5, Accounting for Global Intangible Low-Taxed Income, states that an entity can make an accounting policy election to either recognize deferred taxes for temporary differences expected to reverse as GILTI in future years or provide for the tax expense related to GILTI in the year the tax is incurred. The Company has elected to recognize the tax on GILTI as a period expense in the period the tax is incurred.

Uncertain Tax Positions

As of December 31, 2023, and 2022, the Company had an unrecognized tax benefit balance of $13.6 million and $10.6 million, respectively, related to transfer pricing and research and development tax credits. A portion of the unrecognized tax benefits as of December 31, 2023, if recognized, would increase the Company's effective tax rate by 1.2%. Other unrecognized tax benefits as of December 31, 2023, if recognized, would be in the form of net operating loss and tax credit carryforwards, which attract a full valuation allowance offset, and would not impact the Company's effective tax rate. There are no provisions for which it is reasonably possible that the total amounts of unrecognized tax benefits will significantly increase or decrease within 12 months of the reporting date. Because the statute of limitations does not expire until after the net operating loss and credit carryforwards are actually used, the statutes are still open on calendar years ending December 31, 2017 and forward for federal and state purposes.

The Company recognized $0.5 million expense for interest and penalties related to uncertain tax positions during 2023, all of which was recorded as accrued and other liabilities as of December 31, 2023. The Company files U.S. federal, state, Switzerland and Australia tax returns. The Company's tax years remain open for all years. As of December 31, 2023, the Company was not under examination by the Internal Revenue Service or any state or foreign tax jurisdiction.

A reconciliation of the beginning and ending amounts of the liability for uncertain tax positions is as follows (in thousands):

	Years Ended December 31,		
	2023	2022	2021
Gross unrecognized tax benefits at January 1	$ 10,638	$ 7,422	$ 4,877
Addition for tax positions taken in the prior years	29	—	—
Reduction for tax positions taken in the prior years	—	(12)	(62)
Addition for tax positions taken in current year	2,916	3,228	2,607
Gross unrecognized tax benefits at December 31	$ 13,583	$ 10,638	$ 7,422

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures.

Our management, with the participation and supervision of our Chief Executive Officer and our Chief Financial Officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Securities Exchange Act of 1934, as amended, or the Exchange Act) as of the end of the period covered by this Annual Report on Form 10-K. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on that evaluation, our Chief Executive Officer and our Chief Financial Officer have concluded that, as of the end of the period covered by this Annual Report on Form 10-K, our disclosure controls and procedures were effective to provide reasonable assurance that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in SEC rules and forms, and that such information was accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rules 13a-15(f) under the Exchange Act). Our internal control over financial reporting is designed under the supervision of our Chief Executive Officer and Chief Financial Officer to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with generally accepted accounting principles. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Management assessed the effectiveness of our internal control over financial reporting based on the framework set forth by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO") in Internal Control — Integrated Framework (2013 Framework). Based on our assessment, our management concluded that our internal control over financial reporting was effective as of December 31, 2023.

The effectiveness of our internal control over financial reporting has been audited by Ernst & Young LLP, an independent registered public accounting firm, as stated in their attestation report herein, which expresses an unqualified opinion on the effectiveness of our internal control over financial reporting as of December 31, 2023.

Changes in Internal Control Over Financial Reporting

There have been no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during our quarter ended December 31, 2023 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Stockholders and the Board of Directors of Vir Biotechnology, Inc.

Opinion on Internal Control Over Financial Reporting

We have audited Vir Biotechnology, Inc.'s internal control over financial reporting as of December 31, 2023, based on criteria established in Internal Control—Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) (the COSO criteria). In our opinion, Vir Biotechnology, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2023, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2023 and 2022, the related consolidated statements of operations, comprehensive (loss) income, stockholders' equity and cash flows for each of the three years in the period ended December 31, 2023, and the related notes and our report dated February 26, 2024 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

San Mateo, California

February 26, 2024

Item 9B. Other Information.

On October 20, 2023, Dr. George Scangos, one of our directors, adopted a Rule 10b5-1 trading plan for the sale of our common stock that is intended to satisfy the affirmative defense conditions of Securities Exchange Act Rule 10b5-1(c) (the "Scangos Trading Plan"). The Scangos Trading Plan provides for two market order sales of 100% of the net shares deposited to Dr. Scangos after a mandatory sell-to-cover of shares occurs to generate funds to satisfy the Company's tax withholding obligation in connection with two restricted stock unit awards with scheduled vesting dates of February 16, 2024 and February 22, 2024, respectively. Pursuant to these two restricted stock awards, 27,750 shares of our common stock will have vested on each of those dates (for an aggregate of 55,500 shares of our common stock), which aggregate amount includes all the shares subject to the Scangos Trading Plan. The Scangos Trading plan will expire upon the earlier of (i) the date all sales contemplated by the Scangos Trading Plan have been executed, or (ii) December 31, 2024.

None of our other directors or officers (as defined in Rule 16a-1(f) of the Exchange Act) entered into or terminated a Rule 10b5-1 trading arrangement or adopted or terminated a non-Rule 10b5-1 trading arrangement (as defined in Item 408(c) of Regulation S-K) during the fourth quarter of 2023.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections.

Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item is incorporated by reference to the information set forth in the sections titled "Proposal 1—Election of Directors," "Information Regarding the Board of Directors and Corporate Governance—Code of Business Conduct and Ethics," "Delinquent Section 16(a) Reports," "Information Regarding the Board of Directors and Corporate Governance—Nominating and Corporate Governance Committee" and "Information Regarding the Board of Directors and Corporate Governance—Audit Committee" in our definitive proxy statement for our 2024 Annual Meeting of Stockholders, or the Proxy Statement.

Item 11. Executive Compensation.

The information required by this item is incorporated by reference to the information set forth in the sections titled "Executive Compensation" in our Proxy Statement.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this item is incorporated by reference to the information set forth in the sections titled "Security Ownership of Certain Beneficial Owners and Management" and "Executive Compensation—Equity Compensation Plan Information" in our Proxy Statement.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item is incorporated by reference to the information set forth in the sections titled "Information Regarding the Board of Directors and Corporate Governance—Independence of the Board of Directors," Information Regarding the Board of Directors and Corporate Governance —Audit Committee," Information Regarding the Board of Directors and Corporate Governance—Compensation Committee," Information Regarding the Board of Directors and Corporate Governance—Nominating and Corporate Governance Committee" and "Transactions with Related Persons" in our Proxy Statement.

Item 14. Principal Accounting Fees and Services.

The information required by this item is incorporated by reference to the information set forth in the section titled "Proposal 3—Ratification of Appointment of Independent Registered Public Accounting Firm" in our Proxy Statement.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

The financial statements, financial statement schedules and exhibits filed as part of this Annual Report on Form 10-K are as follows:

(a)(1) Financial Statements

Reference is made to the financial statements included in Item 8 of Part II hereof.

(a)(2) Financial Statement Schedules

All financial statements schedules are omitted because the required information is included in the consolidated financial statements or the notes thereto included in Item 8 of Part II hereof.

(a)(3) Exhibits

Exhibit Number	Description
3.1	Amended and Restated Certificate of Incorporation of the Company (incorporated herein by reference to Exhibit 3.1 to the Company's Current Report on Form 8-K (File No. 001-39083), filed with the SEC on October 16, 2019).
3.2	Amended and Restated Bylaws of the Company (incorporated herein by reference to Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-39083), filed with the SEC on March 8, 2023).
4.1	Form of Common Stock Certificate of the Company (incorporated herein by reference to Exhibit 4.1 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 30, 2019).
4.2	Amended and Restated Investors' Rights Agreement, by and among the Company and certain of its stockholders, dated November 29, 2017 (incorporated herein by reference to Exhibit 4.2 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
4.3	Description of Capital Stock (incorporated herein by reference to Exhibit 4.4 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March 26, 2020).
10.1+	Vir Biotechnology, Inc. 2019 Equity Incentive Plan, (incorporated herein by reference to Exhibit 4.8 to the Company's Form S-8 (File No. 333-234212), filed with the SEC on October 15, 2019).
10.2+	2019 Employee Stock Purchase Plan (incorporated herein by reference to Exhibit 4.11 to the Company's Form S-8 (File No. 33-234212), filed with the SEC on October 15, 2019).
10.3+	Form of Indemnity Agreement by and between the Company and its directors and executive officers (incorporated herein by reference to Exhibit 10.1 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.4+	Forms of Option Grant Notice and Option Agreement under Vir Biotechnology, Inc. 2019 Equity Incentive Plan, (incorporated herein by reference to Exhibit 10.3 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.5+	Form of Restricted Stock Unit Grant Notice and Unit Award Agreement under Vir Biotechnology, Inc. 2019 Equity Incentive Plan (incorporated herein by reference to Exhibit 10.5 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 25, 2021).

10.6+	Vir Biotechnology, Inc. 2016 Equity Incentive Plan, as amended (incorporated herein by reference to Exhibit 10.5 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.7+	Forms of Incentive Stock Option Notice and Agreement, Non-Qualified Stock Option Notice and Agreement, Restricted Stock Agreement, Restricted Stock Agreement and Restricted Stock Purchase Agreement under the Vir Biotechnology, Inc. 2016 Equity Incentive Plan, as amended (incorporated herein by reference to Exhibit 10.6 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.8+	Non-Employee Director Compensation Policy (incorporated herein by reference to Exhibit 10.8 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 28, 2023).
10.9+	Offer Letter between the Company and Marianne De Backer, dated January 19, 2023 (incorporated herein by reference to Exhibit 10.1 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 8, 2023).
10.10+	Offer Letter between the Company and Sung Lee, dated February 13, 2023 (incorporated herein by reference to Exhibit 10.2 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 8, 2023).
10.11+	Amended and Restated Employment Letter Agreement between the Company and Phil Pang, dated August 27, 2019 (incorporated herein by reference to Exhibit 10.12 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.12+	Amended and Restated Employment Letter Agreement between the Company and Ann (Aine) M. Hanly, dated May 4, 2021 (incorporated herein by reference to Exhibit 10.6 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 6, 2021).
10.13+	Employment Agreement between Humabs BioMed SA (f/k/a Humabs Holding GmbH) and Johanna Friedl-Naderer, dated December 16, 2021 (incorporated herein by reference to Exhibit 10.1 to the Company's Form 10-Q (File No. 001-39803), filed with the SEC on May 5, 2022).
10.14+	Agreement on Transfer of Employment and Amendment of Employment Agreement between Humabs BioMed SA, Vir Biotechnology International GmbH and Johanna Friedl-Naderer, dated December 19, 2022 (incorporated herein by reference to Exhibit 10.17 to the Company's Form 10-K (File No. 001-39803), filed with the SEC on February 28, 2023).
10.15+	Separation Agreement between Vir Biotechnology International GmbH and Johanna Friedl-Naderer, dated September 23, 2023 (incorporated herein by reference to Exhibit 10.2 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on November 3, 2023).
10.16+	Vir Biotechnology, Inc. Change in Control and Severance Benefit Plan (incorporated herein by reference to Exhibit 10.15 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.17+	Amended and Restated Employment Letter Agreement between the Company and George Scangos, dated August 27, 2019 (incorporated herein by reference to Exhibit 10.9 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.18+	Amended and Restated Employment Letter Agreement between the Company and Howard Horn, dated August 27, 2019 (incorporated herein by reference to Exhibit 10.10 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.19†	Collaboration, Option, and License Agreement between the Company and Brii Biosciences Limited (previously named BiiG Therapeutics Limited), dated May 23, 2018 (incorporated herein by reference to Exhibit 10.16 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).

10.20†	Collaboration and License Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated October 16, 2017 (incorporated herein by reference to Exhibit 10.17 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.21†	Amendment No.1 to the Collaboration and License Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated December 17, 2019 (incorporated herein by reference to Exhibit 10.19 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March 26, 2020).
10.22†	Amendment No.2 to the Collaboration and License Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated March 3, 2020 (incorporated herein by reference to Exhibit 10.20 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March 26, 2020).
10.23†	Amendment No.3 to the Collaboration and License Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated April 1, 2020 (incorporated herein by reference to Exhibit 10.21 to the Company's Registration Statement on Form S-1 (File No. 333-239689), filed with the SEC on July 6, 2020).
10.24†	Letter Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated December 23, 2020 (incorporated herein by reference to Exhibit 10.24 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 25, 2021).
10.25†	Common Stock Issuance Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated October 16, 2017 (incorporated herein by reference to Exhibit 10.18 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.26†	Amendment No. 1 to the Common Stock Issuance Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated December 17, 2019 (incorporated herein by reference to Exhibit 10.22 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March, 26, 2020).
10.27†	Letter Agreement between the Company and Alnylam Pharmaceuticals, Inc., dated November 13, 2018 (incorporated herein by reference to Exhibit 10.19 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.28†	License Agreement between the Company and MedImmune, LLC, dated September 7, 2018 (incorporated herein by reference to Exhibit 10.20 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.29†	Amendment No. 1 to License Agreement between the Company and MedImmune, LLC, dated September 1, 2020 (incorporated herein by reference to Exhibit 10.29 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 25, 2021).
10.30†	Second Revised and Restated Master License Agreement between the Company and Oregon Health & Science University, dated August 27, 2019 (incorporated herein by reference to Exhibit 10.21 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.31†	Letter Agreement between the Company and the stockholders of TomegaVax, Inc. set forth therein, dated September 12, 2016 (incorporated herein by reference to Exhibit 10.22 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.32†	Agreement and Plan of Merger between the Company, Vir Merger Sub, Inc., Agenovir Corporation, and Dr. Stephen R. Quake, dated January 2, 2018 (incorporated herein by reference to Exhibit 10.23 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).

10.33†	Securities Purchase Agreement between the Company, Humabs BioMed SA, the shareholders of Humabs set forth therein, the option-holders of Humabs set forth therein and Fortis Advisors LLC and certain Securityholders, dated August 22, 2017 (incorporated herein by reference to Exhibit 10.24 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.34†	Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated January 26, 2018 (incorporated herein by reference to Exhibit 10.26 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.35†	Amendment No. 1 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated April 18, 2019 (incorporated herein by reference to Exhibit 10.31 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March 26, 2020).
10.36†	Amendment No. 2 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated February 24, 2020 (incorporated herein by reference to Exhibit 10.32 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March 26, 2020).
10.37†	Amendment No. 3 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated May 22, 2020 (incorporated herein by reference to Exhibit 10.38 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 25, 2021).
10.38†	Amendment No. 4 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated December 8, 2020 (incorporated herein by reference to Exhibit 10.39 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 25, 2021).
10.39†	Amendment No. 5 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated June 2, 2021 (incorporated herein by reference to Exhibit 10.3 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on August 5, 2021).
10.40†	Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated March 16, 2018 (incorporated herein by reference to Exhibit 10.27 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.41†	Amendment No. 1 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated April 22, 2019 (incorporated herein by reference to Exhibit 10.34 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March 26, 2020).
10.42†	Amendment No. 2 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated October 28, 2019 (incorporated herein by reference to Exhibit 10.35 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on March 26, 2020).
10.43†	Amendment No. 3 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated May 29, 2020 (incorporated herein by reference to Exhibit 10.12 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on August 11, 2020).
10.44†	Amendment No. 4 to the Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated June 16, 2021 (incorporated herein by reference to Exhibit 10.4 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on August 5, 2021).
10.45†	Amendment No. 5 to Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated December 8, 2021 (incorporated herein by reference to Exhibit 10.43 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 28, 2022).
10.46†	Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated November 5, 2021 (incorporated herein by reference to Exhibit 10.44 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 28, 2022).
10.47†	Amended and Restated Letter Agreement between the Company and the Bill & Melinda Gates Foundation, dated January 12, 2022 (incorporated by reference to Exhibit 10.45 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 28, 2022).

10.48	Stock Purchase Agreement between the Company and the Bill & Melinda Gates Foundation, dated January 12, 2022 (incorporated herein by reference to Exhibit 10.46 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 28, 2022).
10.49†	Grant Agreement between the Company and the Bill & Melinda Gates Foundation, dated January 12, 2022 (incorporated herein by reference to Exhibit 10.47 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 28, 2022).
10.50†	Amended and Restated Exclusive License Agreement between the Company (as successor in interest to Humabs BioMed SA (f/k/a Humabs Holding GmbH)) and the Institute for Research in Biomedicine, dated December 16, 2011 (incorporated herein by reference to Exhibit 10.28 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.51†	Amendment to Amended and Restated Exclusive License Agreement between the Company (as successor in interest to Humabs BioMed SA (f/k/a Humabs Holding GmbH)) and the Institute for Research in Biomedicine, dated February 10, 2012 (incorporated herein by reference to Exhibit 10.29 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.52†	Exclusive License Agreement between the Company (as successor in interest to Humabs BioMed SA) and the Institute for Research in Biomedicine, dated December 16, 2011 (incorporated herein by reference to Exhibit 10.30 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.53	Amendment to License Agreement between the Company (as successor in interest to Humabs BioMed SA) and the Institute for Research in Biomedicine, dated February 10, 2012 (incorporated herein by reference to Exhibit 10.31 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.54†	Amendment Agreement between the Company (as successor in interest to Humabs BioMed SA) and the Institute for Research in Biomedicine, dated January 29, 2018 (incorporated herein by reference to Exhibit 10.32 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.55†	Exclusive License Agreement between the Company and The Rockefeller University, dated July 31, 2018 (incorporated herein by reference to Exhibit 10.33 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.56†	Amendment to Exclusive License Agreement between the Company and The Rockefeller University, dated May 17, 2019 (incorporated herein by reference to Exhibit 10.34 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.57†	Second Amendment to Exclusive License Agreement between the Company and The Rockefeller University, dated September 28, 2020 (incorporated herein by reference to Exhibit 10.51 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 25, 2021).
10.58†	Third Amendment to Exclusive License Agreement between the Company and The Rockefeller University, dated March 1, 2021 (incorporated herein by reference to Exhibit 10.5 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 6, 2021).
10.59†	Sub-License and Collaboration Agreement between the Company (as successor in interest to Humabs BioMed SA) and MedImmune, LLC, dated March 20, 2012 (incorporated herein by reference to Exhibit 10.35 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.60†	Amendment 1 to Sub-License and Collaboration Agreement between the Company (as successor in interest to Humabs BioMed SA) and MedImmune, LLC, dated April 19, 2013 (incorporated herein by reference to Exhibit 10.36 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).

10.61†	Amendment 2 to Sub-License and Collaboration Agreement between the Company (as successor in interest to Humabs BioMed SA) and MedImmune, LLC, dated April 27, 2015 (incorporated herein by reference to Exhibit 10.37 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.62†	Amendment 3 to Sub-License and Collaboration Agreement between the Company (as successor in interest to Humabs BioMed SA) and MedImmune, LLC, dated December 31, 2015 (incorporated herein by reference to Exhibit 10.38 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.63†	Amendment 4 to Sub-License and Collaboration Agreement between the Company (as successor in interest to Humabs BioMed SA) and MedImmune, LLC, dated August 29, 2016 (incorporated herein by reference to Exhibit 10.39 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.64†	Amendment 5 to Sub-License and Collaboration Agreement between the Company (as successor in interest to Humabs BioMed SA) and MedImmune, LLC, dated July 15, 2017 (incorporated herein by reference to Exhibit 10.40 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.65†	Amendment 6 to Sub-License and Collaboration Agreement between the Company (as successor in interest to Humabs BioMed SA) and MedImmune, LLC, dated September 7, 2018 (incorporated herein by reference to Exhibit 10.41 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.66	Lease Agreement between the Company and ARE-SAN FRANCISCO NO. 43, LLC, dated March 30, 2017 (incorporated herein by reference to Exhibit 10.42 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.67	First Amendment to Lease Agreement between the Company and ARE-SAN FRANCISCO NO. 43, LLC, dated April 10, 2019 (incorporated herein by reference to Exhibit 10.43 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.68†	Lease Agreement between the Company and KRE Exchange Owner LLC, dated December 16, 2021 (incorporated herein by reference to Exhibit 10.66 to the Company's Form 10-K (File No. 001-39083), filed with the SEC on February 28, 2022).
10.69†	Patent License Agreement between the Company and Xencor, Inc., dated August 15, 2019 (incorporated herein by reference to Exhibit 10.44 to the Company's Registration Statement on Form S-1 (File No. 333-233604), filed with the SEC on September 3, 2019).
10.70†	Amendment 1 to Patent License Agreement between the Company and Xencor, Inc., dated February 23, 2021 (incorporated herein by reference to Exhibit 10.3 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 6, 2021).
10.71†	Patent License Agreement between the Company and Xencor, Inc., dated March 25, 2020 (incorporated herein by reference to Exhibit 99.1 to the Company's Form 8-K (File No. 001-39083), filed with the SEC on June 19, 2020).
10.72†	Amendment 1 to Patent License Agreement between the Company and Xencor, Inc., dated February 23, 2021 (incorporated herein by reference to Exhibit 10.4 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 6, 2021).
10.73†	Definitive Collaboration Agreement between the Company, Glaxo Wellcome UK Limited and Beecham S.A., dated June 9, 2020 (incorporated herein by reference to Exhibit 10.54 to the Company's Registration Statement on Form S-1 (File No. 333-239689), filed with the SEC on July 6, 2020).

10.74	Stock Purchase Agreement between the Company and Glaxo Group Limited, dated April 5, 2020 (incorporated herein by reference to Exhibit 10.55 to the Company's Registration Statement on Form S-1 (File No. 333-239689), filed with the SEC on July 6, 2020).
10.75†	Preliminary Collaboration Agreement between the Company and Glaxo Wellcome UK Limited, dated February 14, 2021 (incorporated herein by reference to Exhibit 10.1 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 6, 2021).
10.76†	Definitive Collaboration Agreement between the Company and Glaxo Wellcome UK Limited, dated May 18, 2021 (incorporated herein by reference to Exhibit 10.2 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on August 5, 2021).
10.77†	Amendment No. 1 to the Definitive Collaboration Agreement between the Company and Glaxo Wellcome UK Limited dated May 27, 2022 (incorporated herein by reference to Exhibit 10.2 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on August 9, 2022).
10.78†	Amendment No. 2 to the Definitive Collaboration Agreement between the Company and Glaxo Wellcome UK Limited, dated February 8, 2023 (incorporated herein by reference to Exhibit 10.3 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 8, 2023).
10.79†	Amendment No. 3 to the Definitive Collaboration Agreement between the Company and Glaxo Wellcome UK Limited, dated February 8, 2023 (incorporated herein by reference to Exhibit 10.4 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 8, 2023).
10.80†	Stock Purchase Agreement between the Company and Glaxo Group Limited, dated February 14, 2021 (incorporated herein by reference to Exhibit 10.2 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on May 6, 2021).
10.81†	Binding Letter Agreement between the Company and Samsung Biologics Co., Ltd., dated April 9, 2020 (incorporated herein by reference to Exhibit 10.57 to the Company's Registration Statement on Form S-1 (File No. 333-239689), filed with the SEC on July 6, 2020).
10.82	Assignment and Novation Agreement among the Company, GlaxoSmithKline Trading Services Limited and Samsung Biologics Co., Ltd., dated July 31, 2020 (incorporated herein by reference to Exhibit 99.2 to the Company's Form 8-K (File No. 001-39083), filed with the SEC on August 7, 2020).
10.83†	Letter of Intent between the Company and WuXi Biologics (Hong Kong) Limited, dated June 15, 2020 (incorporated herein by reference to Exhibit 10.59 to the Company's Registration Statement on Form S-1 (File No. 333-239689), filed with the SEC on July 6, 2020).
10.84†	Termination Agreement between the Company and WuXi Biologics (Hong Kong) Limited dated May 16, 2022 (incorporated herein by reference to Exhibit 10.1 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on August 9, 2022).
10.85†	Other Transaction for Advanced Research (OTAR) between the Company and the United States of America Department of Health and Human Services, Administration for Strategic Preparedness and Response, Biomedical Advanced Research and Development Authority, concerning Pre-exposure Prophylactic Monoclonal Antibodies for the Prevention of Influenza Illness and Medical Countermeasures for Other Emerging Pathogens of Pandemic Potential (Agreement No. 75A50122C00081), dated September 28, 2022 (incorporated herein by reference to Exhibit 10.2 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on November 3, 2023).
10.86†	Amendment No. 1 to the Other Transaction for Advanced Research (OTAR) between the Company and the United States of America Department of Health and Human Services, Administration for Strategic Preparedness and Response, Biomedical Advanced Research and Development Authority, concerning Pre-exposure Prophylactic Monoclonal Antibodies for the Prevention of Influenza Illness and Medical Countermeasures for Other Emerging Pathogens of Pandemic Potential (Agreement No. 75A50122C00081, Amendment No. P00001), dated September 29, 2023 (incorporated herein by reference to Exhibit 10.3 to the Company's Form 10-Q (File No. 001-39083), filed with the SEC on November 3, 2023).

10.87	Sales Agreement, dated as of November 3, 2023, by and between the Registrant and Cowen and Company, LLC (incorporated by reference to Exhibit 1.2 to the Company's registration statement on Form S-3 (Filed No. 333-275314), filed with the SEC on November 3, 2023).
21.1	List of subsidiaries of the Company.
23.1	Consent of Independent Registered Public Accounting Firm.
24.1	Power of Attorney (included on the signature page to this report).
31.1	Certification of Principal Executive Officer pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
31.2	Certification of Principal Financial Officer pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
97	Dodd-Frank Compensation Recovery Policy.
101.INS	Inline XBRL Instance Document the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL document.
101.SCH	Inline XBRL Taxonomy Extension Schema Document.
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document.
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document.
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document.
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101).

+ Indicates a management contract or compensatory plan or arrangement.

† Certain portions of this exhibit (indicated by "[***]") have been omitted pursuant to Item 601(b)(10)(iv) of Regulation S-K.

* The certification attached as Exhibit 32.1 that accompany this Annual Report on Form 10-K is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Annual Report on Form 10-K, irrespective of any general incorporation language contained in such filing.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized**.**

VIR BIOTECHNOLOGY, INC.

Date: February 26, 2024

By: /s/ **Marianne De Backer**

Marianne De Backer, M.Sc., Ph.D., MBA
Chief Executive Officer and Director
(Principal Executive Officer)

Date: February 26, 2024

By: /s/ **Sung Lee**

Sung Lee
Executive Vice President and Chief Financial Officer
(Principal Financial and Accounting Officer)

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Marianne De Backer, M.Sc., Ph.D., MBA, Sung Lee and Vanina de Verneuil, and each of them, as his or her true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution for him or her and in his or her name, place, and stead, in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with exhibits thereto and other documents in connection therewith, with the SEC, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done therewith, as fully to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents, and any of them or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this Report has been signed below by the following persons on behalf of the Registrant in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Marianne De Backer Marianne De Backer, M.Sc., Ph.D., MBA	Chief Executive Officer and Director *(Principal Executive Officer)*	February 26, 2024
/s/ Sung Lee Sung Lee	Executive Vice President and Chief Financial Officer *(Principal Financial and Accounting Officer)*	February 26, 2024
/s/ Vicki Sato Vicki Sato, Ph.D.	Chairman of the Board of Directors	February 26, 2024
/s/ Jeffrey S. Hatfield Jeffrey S. Hatfield	Director	February 26, 2024
/s/ Robert More Robert More	Director	February 26, 2024
/s/ Janet Napolitano Janet Napolitano	Director	February 26, 2024
/s/ Robert Nelsen Robert Nelsen	Director	February 26, 2024
/s/ Robert Perez Robert Perez	Director	February 26, 2024
/s/ Saira Ramasastry Saira Ramasastry	Director	February 26, 2024
/s/ George Scangos George Scangos, Ph.D.	Director	February 26, 2024
/s/ Phillip Sharp Phillip Sharp, Ph.D.	Director	February 26, 2024
/s/ Elliott Sigal Elliott Sigal, M.D., Ph.D.	Director	February 26, 2024