

Company Overview

April 2018

Peanut Allergy: A Global Problem



Dyer AA et al. *Allergy Asthma Proc.* 2015;36(1):58-64. Sicherer SH and Sampson HA. JACI 2014;133(2):292-307. Gupta R et al. *JAMA Pediatr.* 2013;167(11):1026-31. www.foodallergy.org • Diagnosis increased 445% in 12 years

- Occurs in 0.5-1.5% of general population of western countries
- Over 3 million peanut allergic in U.S., including 1.5 million children
- Direct costs of childhood food allergies is \$6 billion yearly in the U.S. alone
- No approved treatment

A Novel Solution: Oral Mucosal Immunotherapy (OMIT)



Peanut-derived proteins

Specialized toothpaste

Effortless daily administration

New "Easy-to-Use" Allergy Treatment Platform

Benefits of OMIT for Allergy Immunotherapy

Optimize Efficacy

- Simple daily administration supports long-term use
- Contacts entire interior of mouth including areas with high concentrations of oral immune cells

Optimize Safety

- Limits swallowing and avoids contact with stomach and esophagus
- Controlled time of contact with allergens



Optimize Usability

- OMIT replaces your normal toothpaste
- Helps users avoid feeling sick or "not normal"

Roadmap for Success

2018

Crowdfunding campaign Optimize formulation of Peanut OMIT to FDA standards Pre-IND and IND meetings with FDA for Peanut OMIT

2020 and Beyond

Complete clinical studies of Peanut OMIT (Phase II/III studies)

Obtain FDA and international approvals of Peanut OMIT

Results of first clinical study of Peanut OMIT (Phase I study)

Initiate development of additional food allergy OMIT products



OMIT Advances Peanut Allergy Immunotherapy

OMIT efficacy demonstrated with non-food allergies*

Studies have shown that therapeutic placement of peanut extracts under the tongue (sublingual immunotherapy or SLIT) can be safe and effective*

Sublingual immunotherapy for peanut allergy: Clinical and immunologic evidence of desensitization Edwin H. Kim, MD,* J. Andrew Bird, MD,* Michael Kulis, PhD,* Susan Laubach, MD,* Laurent Pons, PhD A Wesley Burks MD^a Durham reach to the treatment of pea Objective: We sanoht to investigat A randomized, double-blind, placebo-controlled pilot study effectiveness, and immunologic char with peanut allergy. of sublingual versus oral immunotherapy for the treatment Methods: In this double-blind, place of peanut allergy underwent 6 months of dose esca mintenance dosing followed by a d olled food challenge. Satya D. Narisety, MD,* Pamela A. Frischmeyer-Guerrerio, MD, PhD,** Corinne A. Keet, MD, MS,* Mark Gorelik, MD coults: Eighteen children aged 1 t on the of dosing and the food chal hn Schroeder, PhD,* Robert G. Har more so dosing and the lood chain were primarily orsphary negatian and the challenge, the treatment group safe peamit protein than the placebo grou P = 0.11. Mechanistic studies dens prick test wheat size (P = .020) and responsiveness after simulation with Background: Although promising res egarding oral immunotherapy (OIT) an mnunotherapy (SLIT) for the treatmen , direct comparisons of these appro-ective: This study was conducted to sety, and mechanistic correlates of pe-age, and mechanistic correlates of pe-hods: In this double-blind study child formized to receive active SLIT/place/ /placebo SLIT. Doses were escalated model (oIT), and subjects were reed nonths of maintenance. After unblind and 10⁻³ az/mL (P = 3009) of pea edified per protocal to offer an adr d by the National Institutes of He ubjects who passed challenges at 12 or Stacie M. Jones, MD,* Scott H. S reatment for 4 weeks and rechalle Lloyd Mayer, MD,* Robert Lindbl Allergy Research (CoFAR) Dome esults: Twenty-one-subjects ared 7 to 1 Five discontinued therapy during the bl emaining 16, all had a greater than 10-fe threshold after 12 months. The increased Background: There are presently a antly creater in the active OIT ere options for patients with peanut alle Objective: We sought to investigate t P = .01). Significant within-group change nologic effects of nearnt sublin Methods: After a baseline or al food o peanut powder (approximately 50% j consumed dose [SCD], 46 mg), 40 sul (median, 15 years), were peanut or placebo SLIT, A 5-g OFG weeks, followed by unblinding: place crossed over to higher dose peanut S subsequent crossover Week 44.5 g OI consuming 5 g or at least 10-fold most baseline OFC threshold were conside Results: After 44 weeks of SLIT, 14 receiving peanut SLIT were respond of 20 subjects receiving placebo (P-responders, median SCD increased f

Sublingual immunotherapy for peanut allergy: A randomized double-blind, placebo-controlled multicenter trial

David M. Fleischer, MD,* A. Wesley Burks, MD,* Brian P. Vickery, MD,* Amy M. Scurlock, MD,* Robert A. Wood, MD

clinical and immunologic effects in the first year.

Sublingual immunotherapy for peanut allergy: Long-term follow-up of a randomized multicenter trial

A. Wesley Burks, MD,* Robert A. Wood, MD,^b Stacie M. Jones, MD,* Scott H. Sicherer, MD,^d David M. Fleis Amy M. Scurlock, MD, Brian P. Vickery, MD, Andrew H. Liu, MD, Alice K. Henning, MS, Robert Lindblad, MD, Peter Dawson, PhD,⁹ Marshall Plaut, MD,^h and Hugh A, Sampson, MD,^d for the Consortium of Food Allergy Re Chapel Hill, NC, Baltimore, Rockville, and Bethesda, Md, Little Rock, Ark, New York, NY, and Denver, Co

Background: We previously reported the initial results of the first multicenter, randomized, double-blind, placebo-controlled another 10-g oral food challenge and an open feeding of pea clinical trial of peanut sublingual immunotherapy (SLIT), observing a favorable safety profile associated with modest butter to assess sustained unresponsiveness. Results: Approximately 98% of the 18,165 doses were tolerate

without adverse reactions beyond the or obharyny, with n evere symptoms or uses of epinephrine. A high rate (>50% Objective: We sought to provide long-term (3-year) clinical and immunologic outcomes for our peannt SLIT trial. Key end points (1) percentage of responders at 2 years (ie, could consume. itized to 10 g of pear were (1) percentage of responsers at 2 years via, count commu-ge of pranut power or a 41-664 internse from howeline, (2) percentage reaching descendization at 3 years (3) percentage attaining sustained surresponse/scena filter 3 years, (4) immunologic end points, and (5) assessment of softy perameters, Methodis: Response to treatment usa evaluated in 60 subjects aged 12 to 40 years by performing a 10-g penant powder oral field challenge after 2 and 3 years of daily penant SLTI. If therapy,

*See Scientific Appendix for more info

OMIT is Protected by Patents

- Platform exclusively licensed for food allergy OMIT
- Initial four OMIT patents issued in United States, Japan, Australia in 2016-2017
- Additional patents pending internationally
- Global protection expected through 2033 and beyond

The United States of America	Patent and Tra Has received an appli a new and useful inv description of the in The requirements of plied with, and it has	Iaw have been com- been determined that tion shall be granted	
Amenica	Grants to the patent the righ	(12) United States Patent Francois	(10) Patent No.: US 9,271,899 B2 (45) Date of Patent: Mar. 1, 2010
	ng, using, off invention dra America or im United States, tion is a proce- ers from using throughout the importing in America, proc for the term see or (c)(1), subje- nance fees as, See the Main inside of the co Micd.	(a) METHODS, AFTICLUS AND KITS PIR (MARK) (b) August Market Cosk, (c) (c) August Market, LLC, Ner Virk, XYI (C) (c) PTTN-Mic, Market, ZAHI (C) (c) PTTN-Mic, Ner, A. 2011 (c) Third Prior Markets Data (c) Third Priot Markets Data <td>1000000000000000000000000000000000000</td>	1000000000000000000000000000000000000
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		(58) Field of Classification Search None See application file for complete search history.	tablet for sublingual immunotherapy is randomized placeby-con- trolled trial. Allergy. 2006, 61:131–154; Blackwell Mankogaard DOI: 10.1111/j.1308.9995.2006.09959.x. (Continued)
		(3) LA Reference (1) LA REFERENCE (2) CONTROL (2) CONT	Continued) Prinary Examiner — David J Blanchard Aussianer Examiner — Garris Geffredon (74) Attorney, Agent, or Firm — Distance: & Sholl (57) ARSTRACT Compositions and methods of use for desensitizing a subject in on a altergen v ception of the soil moses are provided).

Intrommune Has Global Exclusive License For Food Allergy Immunotherapy

Competitive Advantages of OMIT

Daily Immunotherapy Administration	Projected Efficacy	Projected Safety	Support of Long- Term Adherence
Toothpaste (OMIT)	High	Very High	Very High
Skin Patch (EPIT)	Low	Very High	Low
Ingestion (OIT)	High	Low	Low
Placement Under Tongue (SLIT)	Medium	Medium	Low

Comparables

	Intrommune	Aimmune (AIMT)	DBV Technologies (DBVT)
Delivery	Toothpaste (OMIT)	Ingestion (OIT)	Skin Patch (EPIT)
Ownership	Private	Public	Public
Equity Valuation*	\$15 million	\$1.8 billion	\$1.4 billion

*As of April 11, 2018

Use of Proceeds

R&D: pre-clinical and clinical development and investigations

CMC: stability testing/manufacturing

Working Capital/G&A

FDA Regulatory: pre-IND interactions and IND filings

Fundraising Fees

Company Leadership



Michael Nelson, JD Chief Executive Officer 20 years of start-up, finance and legal experience





Wesley Burks, MD, FAAAAI Executive Dean UNC Medical School Distinguished Professor of Pediatrics Physician in Chief of North Carolina Children's Hospital

William Reisacher, MD

Weill Cornell Medical College

Senior Scientific Advisor & Co-Founder

Associate Professor of Otolaryngology

Associate Attending Otolaryngologist New York - Presbyterian Hospital



Anthony Robinson, MS, CRNP, MBA Chief Operating Officer 20 years of clinical and pharmaceutical development experience



Erick Berglund, PhD Chief Scientific Officer 25 years of scientific, start-up, and intellectual property experience



David Fleischer, MD Associate Professor of Pediatrics - Allergy Children's Hospital Colorado University of Colorado Denver School of Medicine



Matthew Greenhawt, MD, FAAP, MBA Assistant Professor of Pediatrics - Allergy Children's Hospital Colorado University of Colorado Denver School of Medicine



Danya Glabau, PhD Founder, Implosion Labs Faculty, Brooklyn Institute for Social Research Adjunct Faculty, NYU Tandon School of Engineering

Thank You

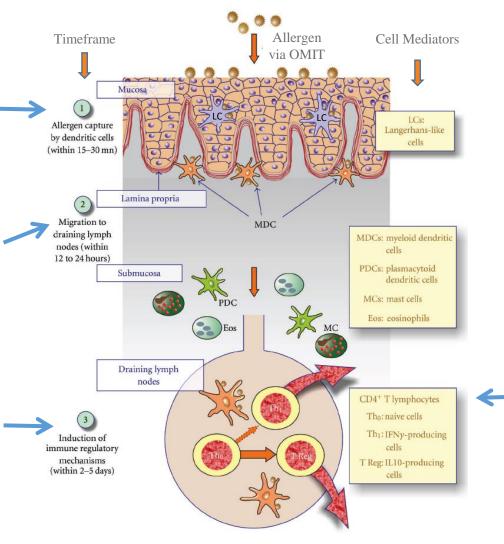
Michael Nelson, JD

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Scientific Appendix

Immunology And Biology Of OMIT

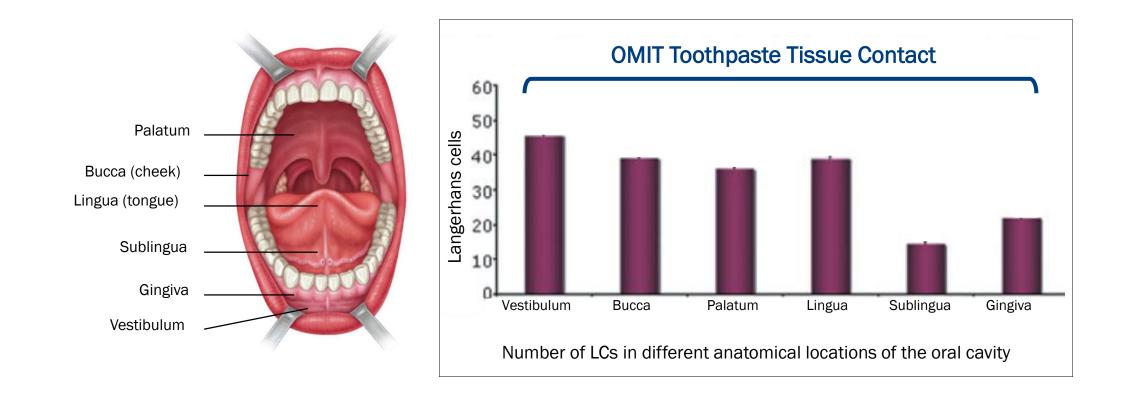
- 1. Following OMIT administration, allergen proteins bind to epithelial cells within minutes, then cross the oral mucosa 15-30 minutes later. Allergen is subsequently captured by Langerhans cells within the mucosa itself and myeloid dendritic cells along the lamina propria. These cells process the allergens into small peptides that are presented in association with MHC class I and class II molecules at the cell surface.
- 2. Those cells loaded with allergen-derived peptides reach cervical lymph nodes within 12 to 24 hours, where they interact with naive CD4+ T cells to support the differentiation of Th_1 and T_{Reg} cells within two to five days.
- 3. These CD4+ T cells subsequently migrate back to mucosal tissues, resulting in allergen tolerance with down-regulation of preexisting Th_2 responses.





 T_{Reg} and Th₀ cells inhibit Th₂ cells, which in turn inhibits Th₂ production of cytokines such as IL-3, IL-4, IL-5, and IL-9. These cytokines drive the differentiation, survival and activity of mast cells, basophils, eosinophils – the cells whose disproportionately high populations and errant activation cause the acute clinical symptoms of food allergies, including anaphylaxis.

OMIT Targets Entire Oral Mucosa



Optimizes Exposure To Oral Immune Cells

Allam JP, et al. Allergy. 2008; 63(6):720-727.

OMIT Successfully Tested in Non-Food Allergy

OMIT Respiratory Clinical Investigation				
Location	Weill Cornell Medical College			
Grant Funding	Empire State Development's Division of Science, Technology and Innovation (NYSTAR)			
Size	24 allergic rhinitis patients			
Duration	12 months			
Final Patient Enrolled	June 25, 2014			
Design	 Open label 12 patients using OMIT vs. 12 patients using SLIT allergy drops "Real-World" allergen treatment 			
Results	 Safe and efficacious Supports improved adherence compared to SLIT drops Reduction in symptom scores and medication use Biomarker trends (IgE, IgG4) indicate development of immunological tolerance 			

Oral mucosal immunotherapy for allergic rhinitis: A pilot study

William R. Reisacher, M.D.,¹ Maria V. Suurna, M.D.,¹ Kate Rochlin, Ph.D.,² Maria G. Bremberg, R.N.,¹ and Guy Tropper, M.D.³

ABSTRACT

Background: The sublingual mucosa has been used for many years to apply allergenic extracts for the purpose of specific immunotherapy (IT). Although sublingual IT (SLIT) is both safe and efficacious, the density of antigen-presenting cells is higher in other regions of the oral cavity and vestibule, which make them a potentially desirable target for IT.

Objective: To present the concept of oral mucosal IT (OMIT) and to provide pilot data for this extended application of SLIT. Methods: An open-label, 12-month, prospective study was undertaken as a preliminary step before a full-scale clinical investigation. Twenty-four individuals with allergic rhinitis received IT by applying allergenic extracts daily to either the oral vestibule plus oral cavity mucosa by using a glycerin-based toothpaste or to the sublingual mucosa by using 50% glycerin liquid drops. Adverse events, adherence rates, total combined scores, rhinoconjunctivitis quality-of-life questionnaire scores, changes in skin reactivity, and changes in serum antibody levels were measured for each participant.

Results: No severe adverse events occurred in either group. The adherence rate was 80% for the OMIT group and 62% for the SLIT group (p = 0.61). Decreased total combined scores were demonstrated for both the OMIT group (15.6%) and the SLIT group (22.3%), although this decrease did not reach statistical significance in either group. Both groups achieved a meaningful clinical improvement of at least 0.5 points on rhinoconjunctivitis quality-of-life questionnaire. A statistically significant rise in specific immunoglobulin G4 (lgC4) was seen in both groups over the first 6 months of treatment.

Conclusion: OMIT and SLIT demonstrated similar safety profiles and adherence rates. Measurements of clinical efficacy improved for both groups, but only changes in IgG4 achieved statistical significance. These pilot data provide enough evidence to proceed with a full-scale investigation to explore the role of OMIT in the long-term management of allergic rhinitis.

(Allergy Rhinol 7:e21-e28, 2016; doi: 10.2500/ar.2016.7.0150)

A pproximately 20–40% of the U.S. population has allergic rhinitis (AR).¹ AR can have a significant impact on the quality of life of the individual and may also lead to further sensitization and the development of asthma^{2,3} Although AR is commonly treated with pharmacotherapy and environmental control strategies, antigen-specific immunotherapy (IT) is currently the only disease-modifying treatment available. Allergenic extracts are delivered either through subcutaneous injection (subcutaneous IT [SCIT]) or by application to the sublingual mucosa (sublingual IT [SLIT]) on

W.R. Reisacher and K. Rochlin are both shareholders for Allovate. W.R. Reisacher is an adviser for Allovate. The remaining authors have no conflicts of interest pertaining to this article

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Adarses correspondence to William K. Kelsacher, M.D., Department of Ocoaryngology— Head and Neck Surgery, Weill Cornell Medical College/NewYork-Presbyterian Hospital, JOS York Avenue, 5th Floor, New York, NY 10021 E-mail address: wir2011@med.cornell.edu

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a consistent basis for ${\sim}3\text{--}5$ years to achieve a long-term benefit. 4

Since 1996, SLIT has been recognized as a potential alternative to SCIT by the World Health Organization, and the efficacy of the treatment for both AR and asthma has been confirmed in many randomized controlled trials and meta-analyses^{5–7} However, although the efficacy of both SCIT and SLIT versus placebo has been clearly demonstrated, conclusive head-to-head data are lacking.⁸ One systematic review by Dretzke *et al.*⁹ failed to demonstrate superiority of one delivery technique over another, whereas a separate systematic review concluded that there was moderate-grade evidence that favored SCIT for the reduction of AR symptoms.¹⁰ In Europe, SLIT represents the majority of new IT prescriptions, and its use has also been increasing in the United States.¹¹

Oral Langerhans cells (oLC) are antigen-presenting cells that possess the high affinity receptor for immunoglobulin E (lgE) and the natural protolerogenic characteristics that are necessary for successful IT.¹² Coupled with the production of interleukin 10 and transforming growth factor β , they are able to efficiently bind allergens and present them to T cells in local lymphoid tissue, which leads to an inhibitory effect on T-helper (Th) type 2-mediated (allergic) in

From the ¹Department of Otolaryngology—Head and Neck Surgery, Well Cornell Medical College, New York, NY, ¹Department of Cell Biology, Well Cornell Medical College, New York, NY, and ²Annu Carde Medical, Boucherrolle, Quebec, Canada Supported by research grants from the New York State Office of Science, Technology and Academic Research, Allovate and the American Academy of Otolaryngic Allergy Foundation, Crantors played no other roles.

Peanut SLIT Studies: Precedent for INT-301

PI/First Author	Study Status	Primary Outcome	Subjects	Duration	Safety	Efficacy
Wesley Burks/Edwin Kim	Published 2011 ¹	1 st clinical evidence of desensitization	18 children age 1-11	12 months, ongoing follow-up	No emergency epinephrine in 4,182 active doses	20x increase in peanut safely consumed
Wesley Burks/David Fleischer	Published 2013², 2015³	1 st double-blind placebo controlled trial	40 subjects age 12- 37	68 weeks	1 of 11,854 active doses required epinephrine	Statistically significant desensitization in majority
Robert Wood	Published 2015 ⁴	Compare efficacy & safety of peanut SLIT (3.7mg/day) vs. OIT (2000mg/day)	21 children age 7-13	18 months	SLIT significantly superior in safety	SLIT effective; OIT efficacy superior, but 4/11 dropped out
Wesley Burks	Ongoing, Interim data ^{5,6}	Effect of early intervention	50 children age 1-11	66 months	No safety issues reported	Desensitization to median 2900mg at 48 months; Sustained unresponsiveness [interim data]
Robert Wood	Ongoing, unpublished ⁷	Efficacy and safety of dissolving sublingual film	15 subjects age 18- 50	18 months	Unpublished	Unpublished
Wesley Burks	Ongoing, unpublished ⁷	FARE-sponsored early intervention	50 subjects age 1-4	36 months	Unpublished	Unpublished
¹ Kim E et al. JACI 2011(3);127:640-6. ⁵ Hamad A et al. Poster # 193 AAAAI 2017. ² Fleischer DM et al. JACI 2013;131(1):119-27. ⁶ Yang L et al. JACI 2017 139(2): Abstract 559. ³ Burks AW et al. JACI 2015;135(5):1240-1248.e3. ⁷ Ongoing, unpublished trials identified through ⁴ Narisety SD et al. JACI 2015;135(5):1275-1282.database searches at clinicaltrials.gov						