The Role of the Microbiome in Food Allergies

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Breaking Down Silos: The Convergence of Infectious Diseases and Non-Communicable Diseases

National Academies Forum on Microbial Threats Workshop
June 11-12, 2019
New York, NY
THE FOOD ALLERGY EPIDEMIC

32 million Americans have food allergies

1 in 10 adults

1 in 13 children

51% More than half of adults with food allergies have experienced a severe reaction.

42% More than 40 percent of children with food allergies have experienced a severe reaction.

377% Claim lines with diagnoses of anaphylactic food reactions increased 377 percent between 2007 and 2016.

References:
- Prevalence and Severity of Food Allergies Among US Adults. JAMA Network Open 2018
Modern industrialized lifestyle factors trigger shifts in the commensal microbiota

The composition of the fecal microbiota is altered in cow’s milk allergic (CMA) infants.

Roberto Berni Canani
University of Naples

Berni Canani, et al /ISMEJ 2016, 10; 742
Are mice colonized with a healthy microbiota protected against an allergic response to food?
Mice colonized with healthy infants’ microbiota are protected against an allergic response to food.

Differentially abundant OTUs distinguish healthy and CMA colonized mice

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9 OTUs significantly correlate with genes upregulated in the ileum of healthy or CMA colonized mice

The closest match for the protective *Lachnospiraceae* OTUs is *A. caccae*, a butyrate producer in the human infant gut.

Monocolonization with *Anaerostipes caccae* protects against an allergic response to food.

Neonatal acquisition of *Clostridia* species protects against colonization by bacterial pathogens

Yun-Gi Kim, Kei Sakamoto, Sang-Uk Seo, Joseph M. Pickard, Merritt G. Gilliland III, Nicholas A. Pudlo, Matthew Hoostal, Xue Li, Thomas D. Wang, Taylor Feehley, Andrew T. Stefka, Thomas M. Schmidt, Eric C. Martens, Shinji Fukuda, Naohiro Inohara, Cathryn R. Nagler, Gabriel Núñez

modified from
M. Velasquez-Manoff,
Nature 2015, 518: S4
**ClostraBio** is engineering synthetic drugs to mimic the protective function of healthy bacteria

**Jeffrey Hubbell, PhD**
Co-founder & Board of Directors
Professor of Molecular Engineering and Enterprise
Univ. of Chicago

- Live biotherapeutics
  (A. caccae)
- Prebiotic dietary fibers

**Polymer** confers stability, solubility, and control of active ingredient release

**Bacterial metabolites** released throughout gut

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Acknowledgments

Sung Min Choi Hong
Elliott Culleen
Andrea Kemter
Shan Wang
Matt Bauer
Evelyn Campbell
Annie McFarland
Shijie Cao
Andrew Thompson
Ande Hesser
Rachel Chapman
Cat Plunkett
Pedro Belda-Ferre
Andrew Stefka
Emily Beltran
Rosita Aitoro

The Sunshine Charitable Foundation
Moss Family Foundation

Food Allergy Research & Education
End Allergies Together
Co-administration of CLB-001 and prebiotics (dietary fiber) may alter community structure in the ileum.