"Deciphering the Dynamic Coupling of the Human Immune System and the Gut Microbiome"

Overview

Data-Enabled Life Sciences Research (DELSA)

DELSA Workshop IV

Bethesda, MD

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http://lsmarr.calit2.net

Why Did I Have an Autoimmune Disease like IBD?

Despite decades of research,
the etiology of Crohn's disease
remains unknown.
Its pathogenesis may involve
a complex interplay between
host genetics,
immune dysfunction,
and microbial or environmental factors.

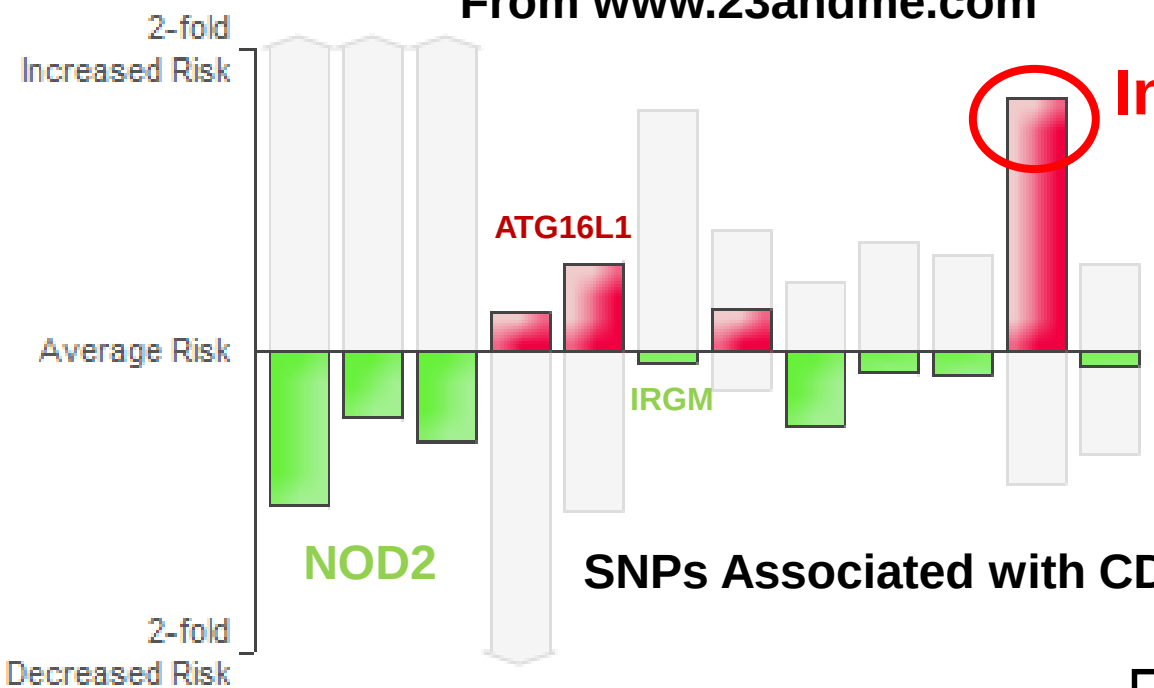
--The Role of Microbes in Crohn's Disease

So I Set Out to Quantify All Three!

Paul B. Eckburg & David A. Relman
Clin Infect Dis. 44:256-262 (2007)

I Wondered if Crohn's is an Autoimmune Disease, Did I Have a Personal Genomic Polymorphism?

From www.23andme.com



SNPs Associated with CD

Polymorphism in Interleukin-23 Receptor Gene — 80% Higher Risk of Pro-inflammatory Immune Response

Now Have My Full Human Genome Sequenced

News and Views

Nature Medicine **13**, 26 - 28 (2007)
doi:10.1038/nm0107-26

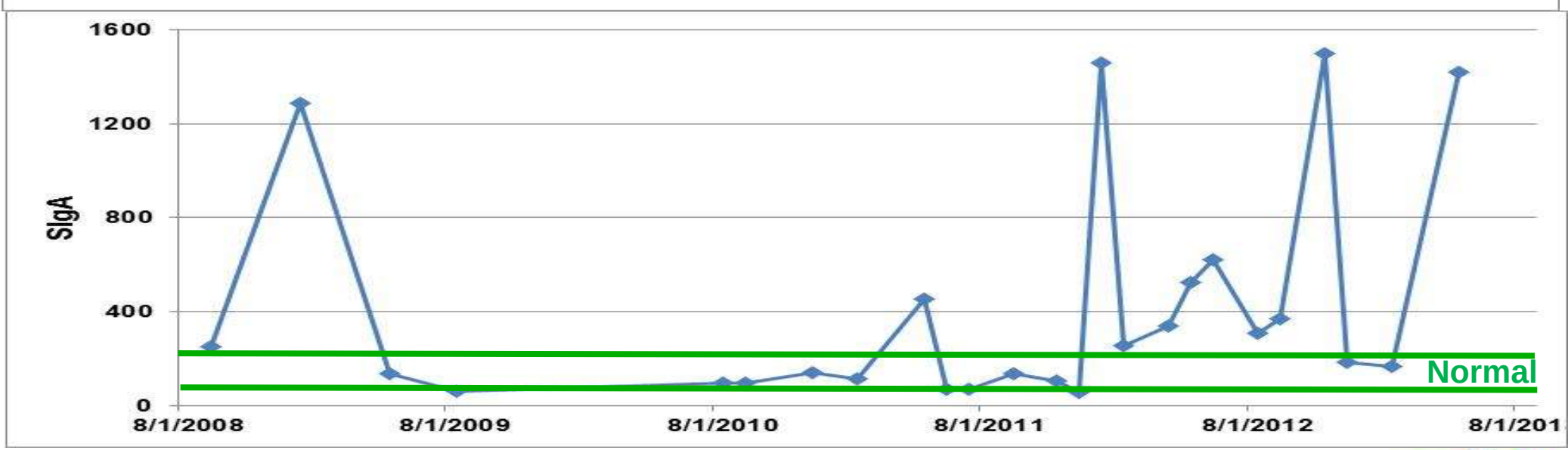
IL-23: a master regulator in Crohn disease

Markus F Neurath[1]

Source: Larry Smarr, Calit2

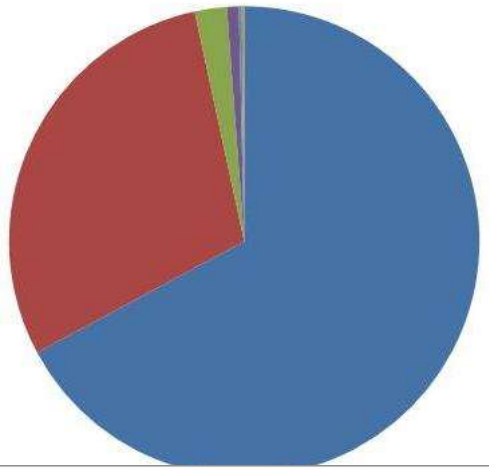
Fine Time Resolution Sampling Reveals Distinct Dynamics of Innate and Adaptive Immune System

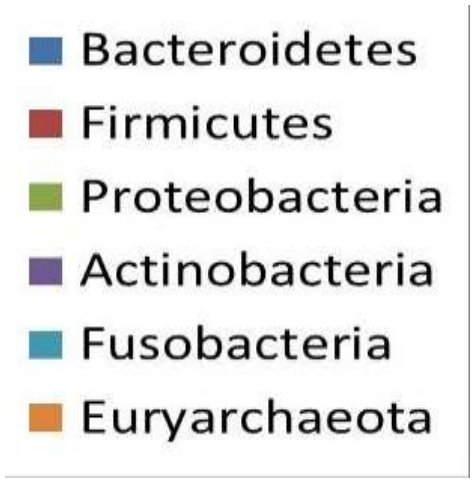




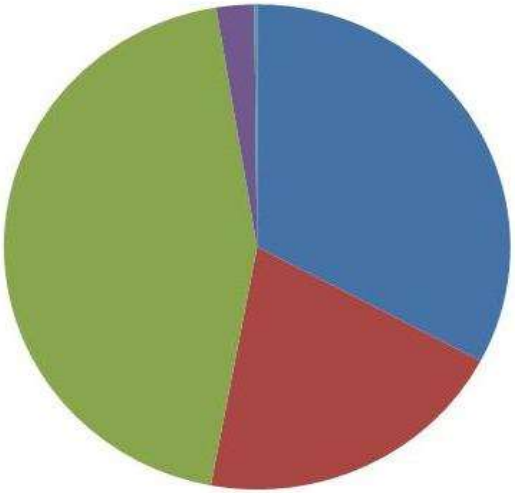
We Find Major Shifts in Microbial Ecology Between Healthy and Two Forms of IBD

Ave. Healthy

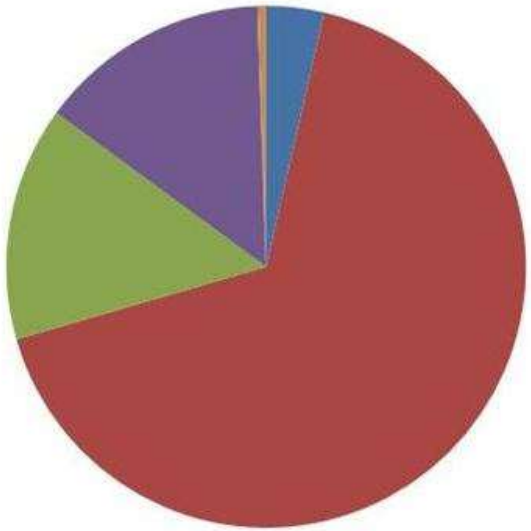




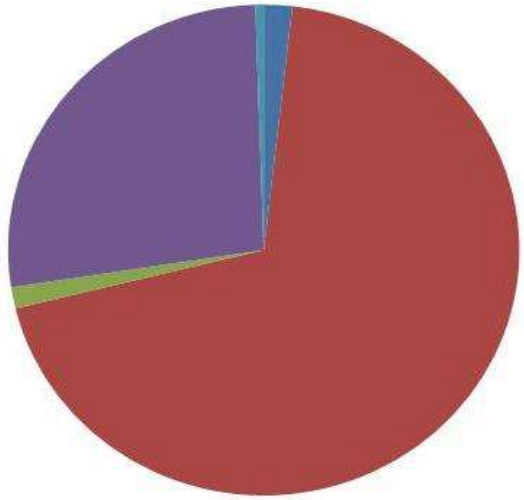
Ave. Ulcerative Colitis



LS Apr 2012



Ave. Crohn's

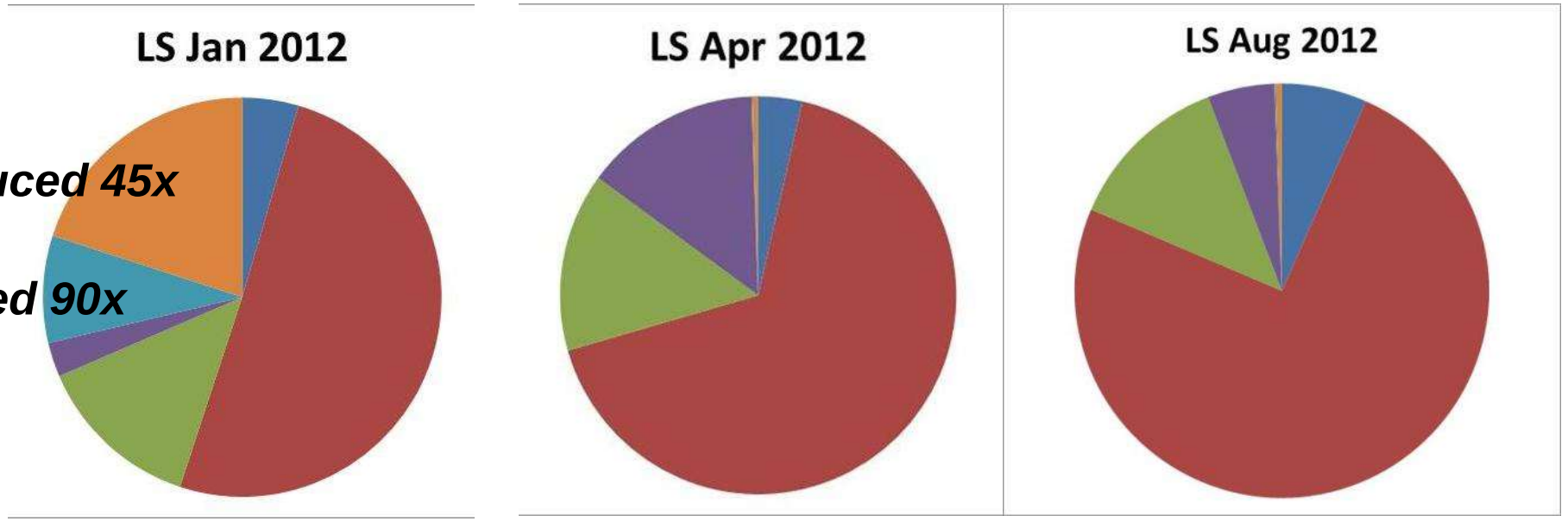


Explosion of Proteobacteria

Collapse of Bacteroidetes

Source: Larry Smarr, Calit2

I Can Track Changes in My Microbiome Before and After 1 Month Antibiotic & 2 Month Prednisone Therapy



Therapy Greatly Reduced Two Phyla, But Massive Reduction in Bacteroidetes And Large % Proteobacteria Remain

Small Changes With No Therapy

I am Trapped in a Local Ecological Equilibrium "Far from Healthy"

Source: Larry Smarr, Calit2