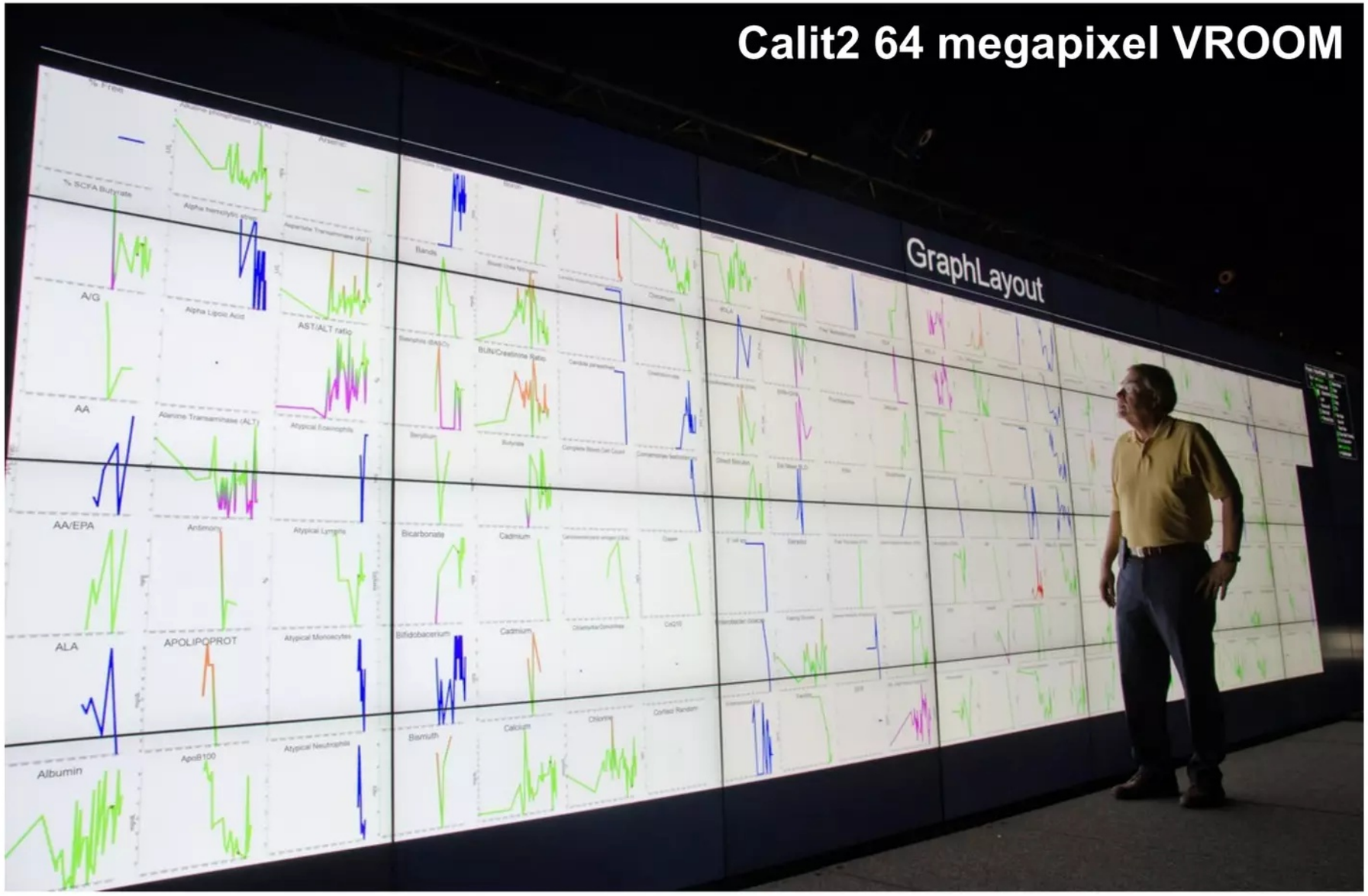
An MRI Showed My Sigmoid Colon Wall Was Thickened and Inflamed

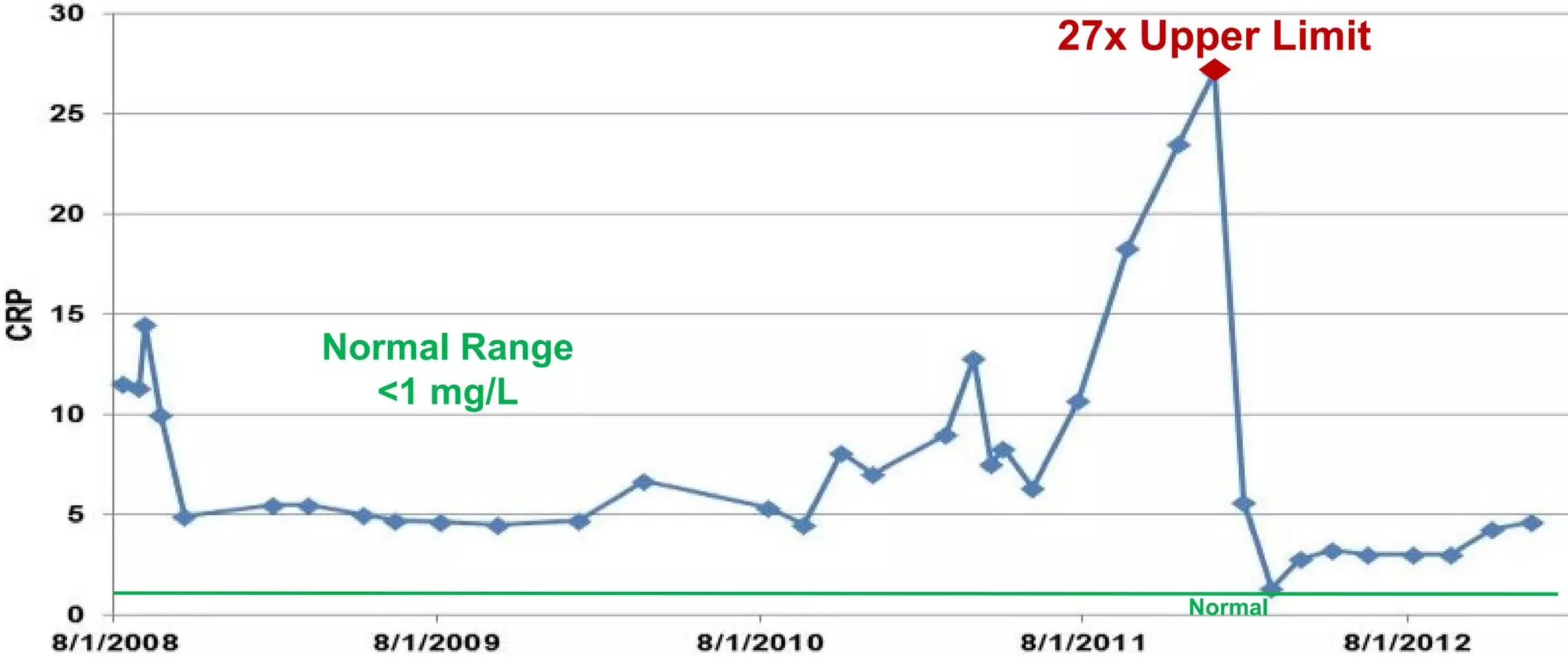


I Got a Copy
of My MRI Data &
Used Calit2 Software
to Enable Me
to Fly Through
My Internal Organs

I Searched for Clues Among
My 150 Blood and Stool Variables, Each Graphed Over 5-10 Years

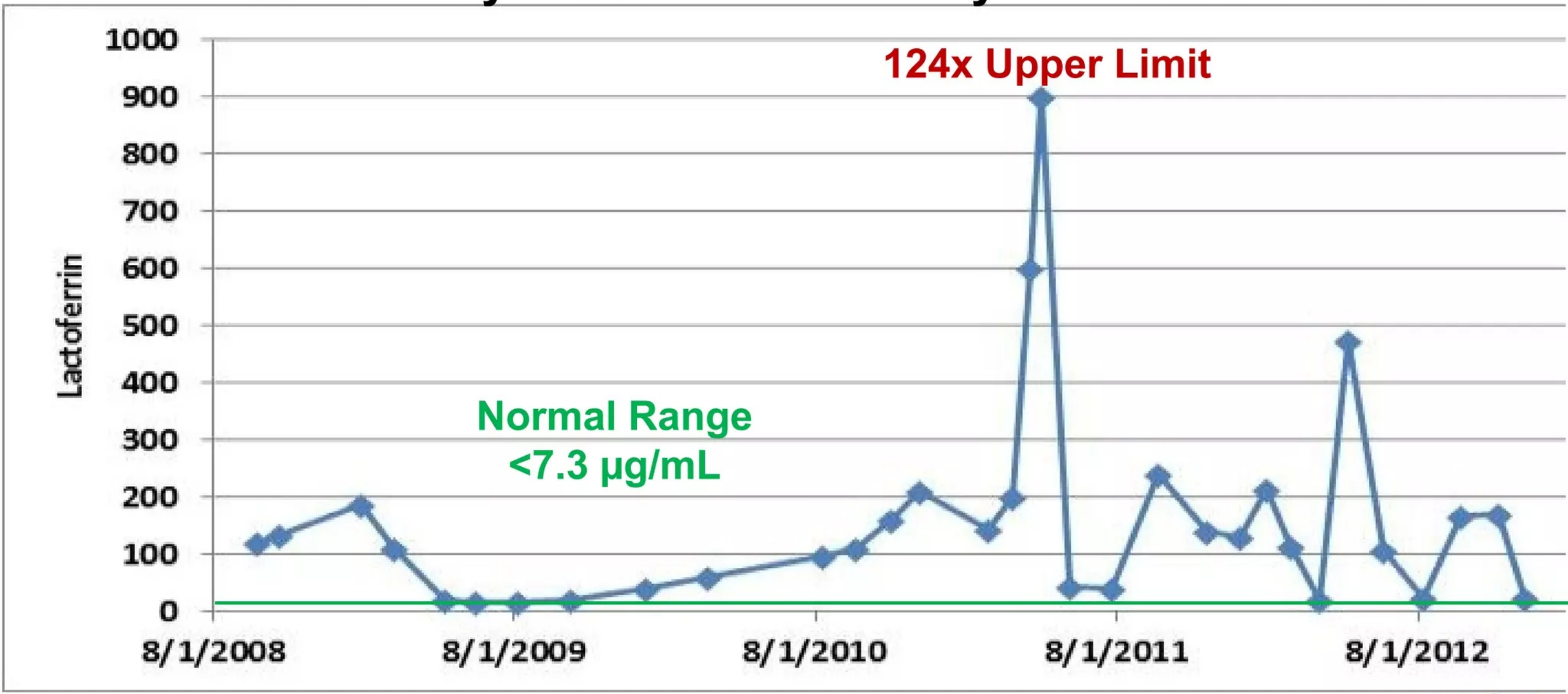


Only One Variable Was Far Out of Norm-
Complex Reactive Protein From Blood Sample



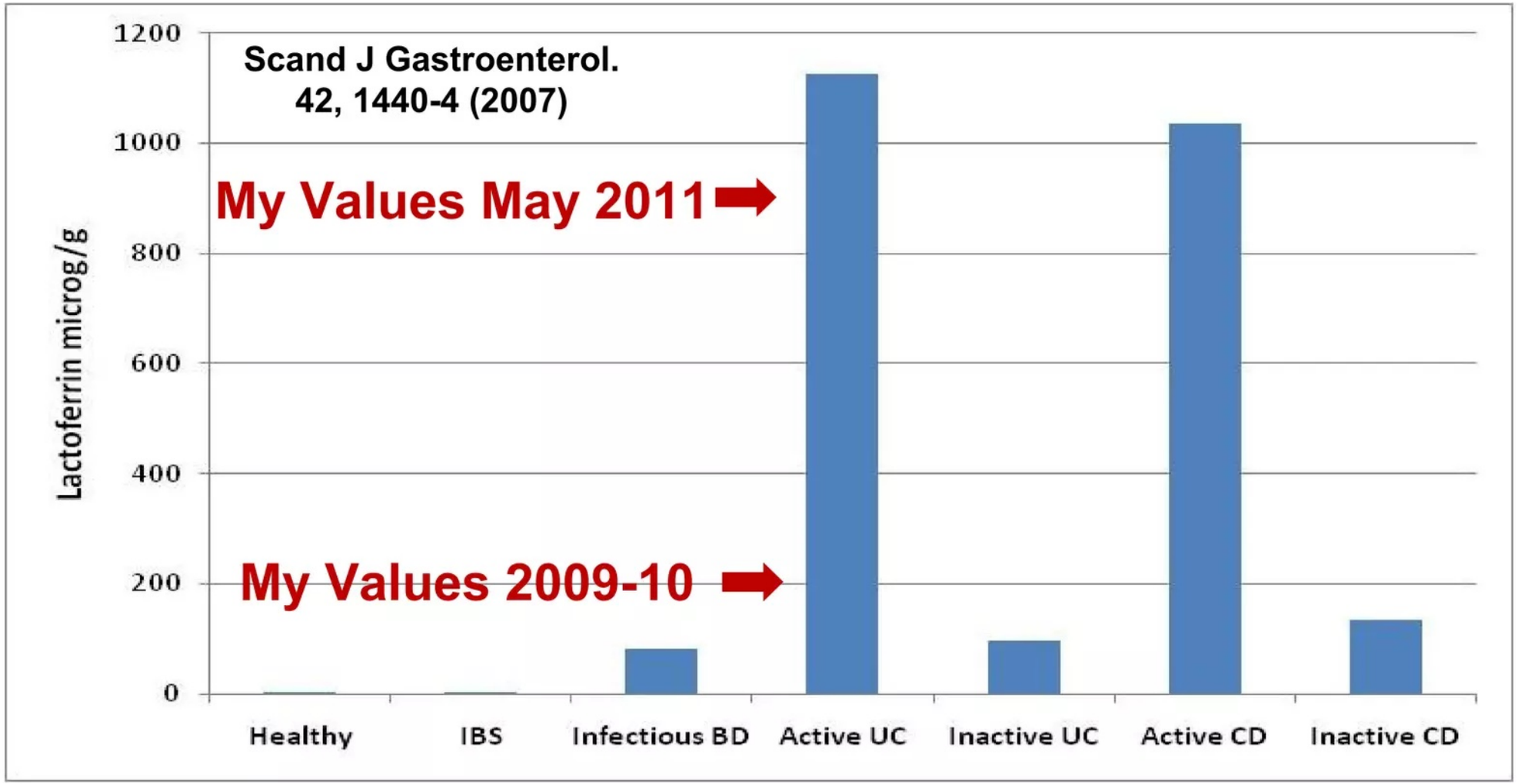
CRP Indicates Chronic Episodic Inflammation

By Looking at Stool Samples Over Time
I Discovered My Lactoferrin Was Very Far Above Normal



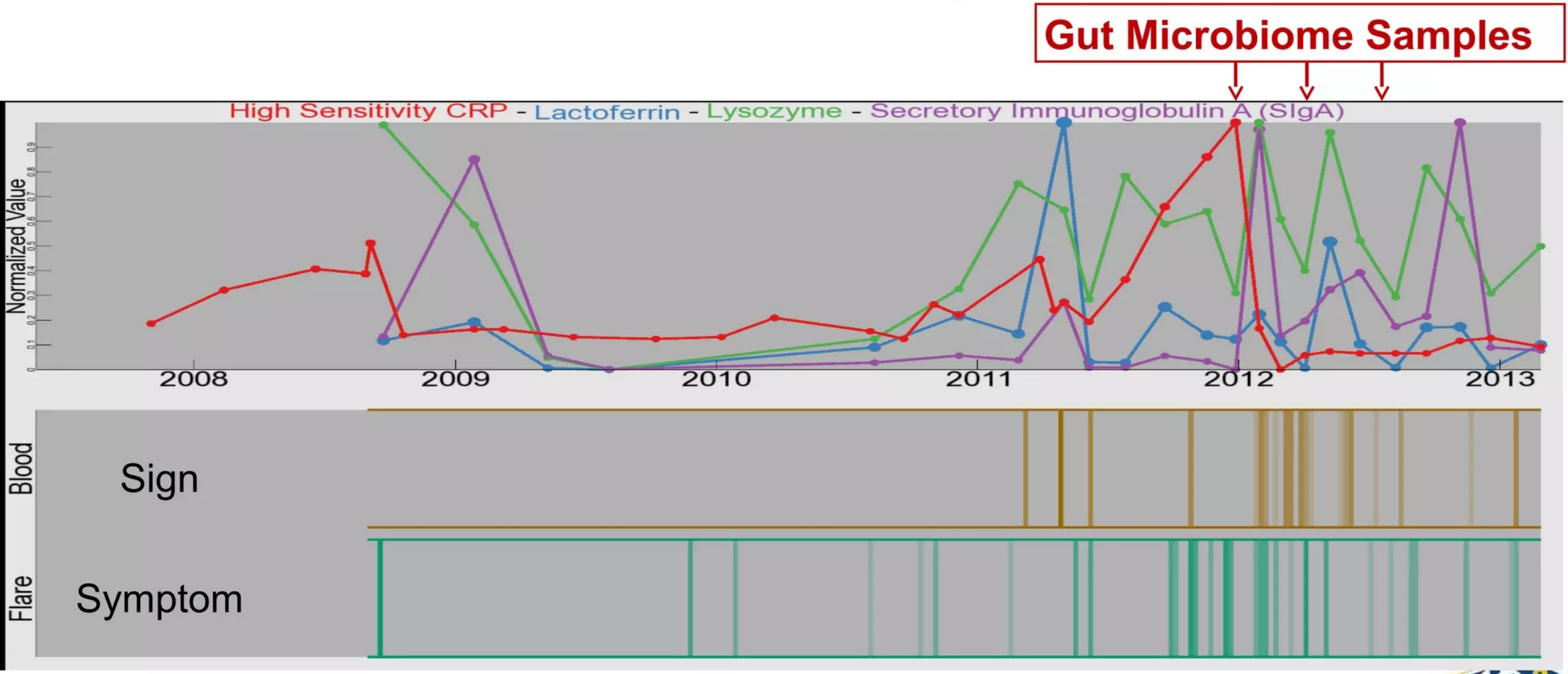
Lactoferrin Is an Indicator of White Blood Cells Attacking Your Colon

High Lactoferrin Biomarker Values Led Me to Hypothesize I Had Inflammatory Bowel Disease (IBD)



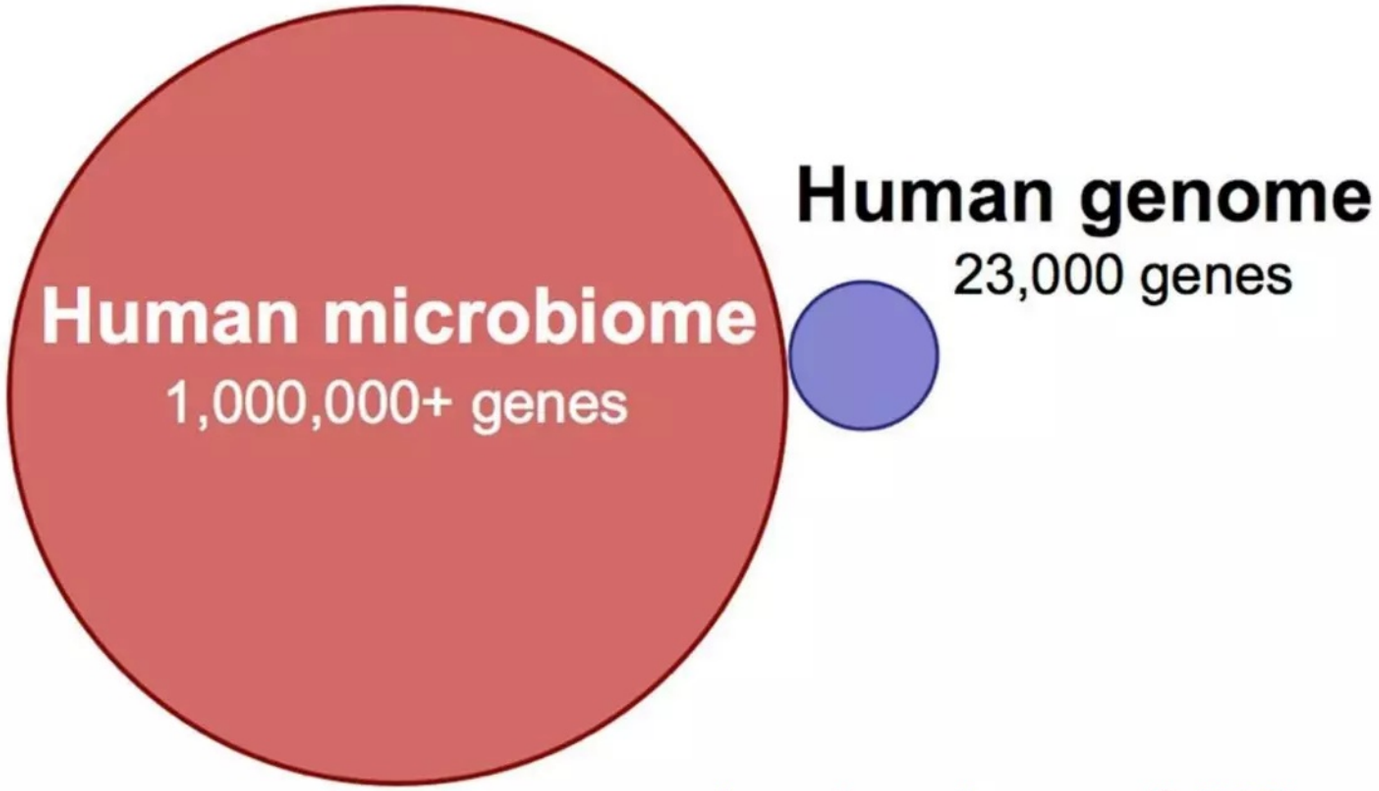
IBD is an Autoimmune Disease Which Comes in Two Subtypes: Crohn's Disease and Ulcerative Colitis

Tracking Multiple Immunological Biomarkers Over Time Lets Me Record the Immune System "Dance"



Source: Calit2 Future Health Expedition Team

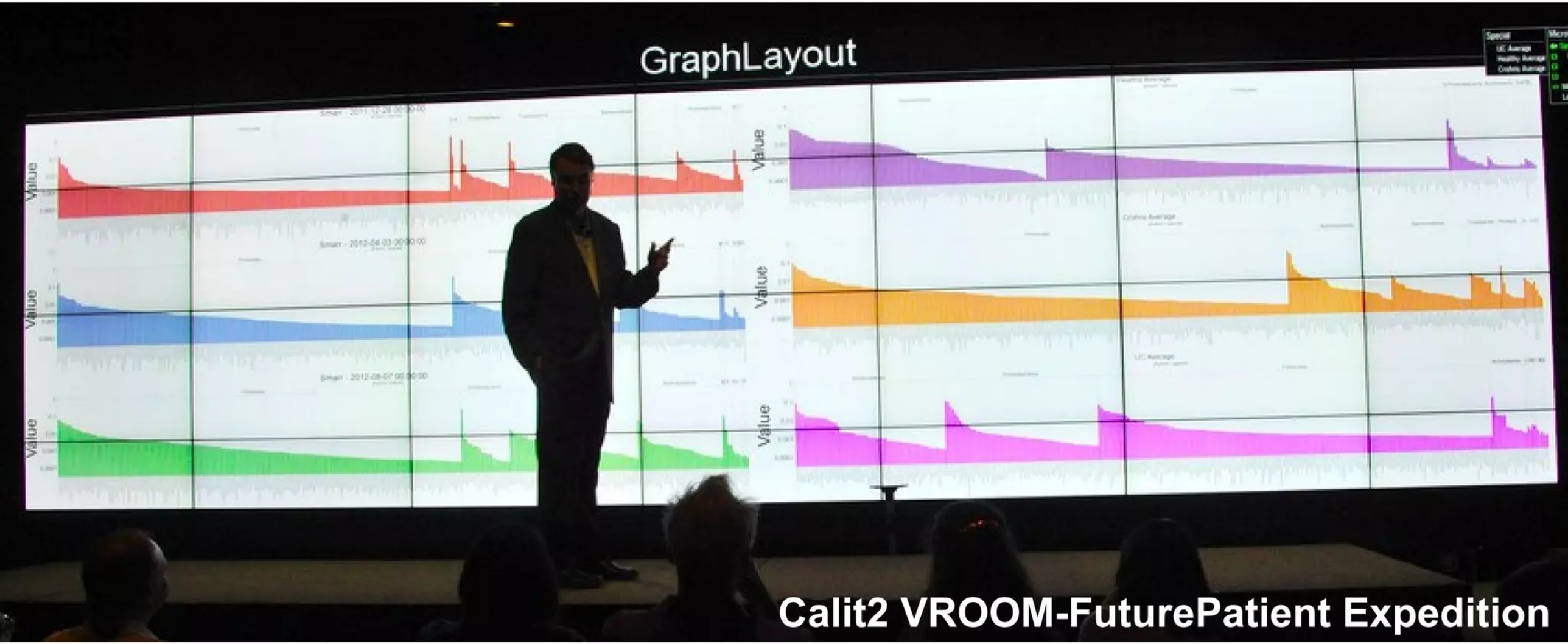
Exploring the Dance Inside Your Superorganism Between Your Microbiome and Human Immune System



Your Body Has 10 Times As Many Microbe Cells As Human Cells

Inclusion of Microbiome Will Radically Change Medicine

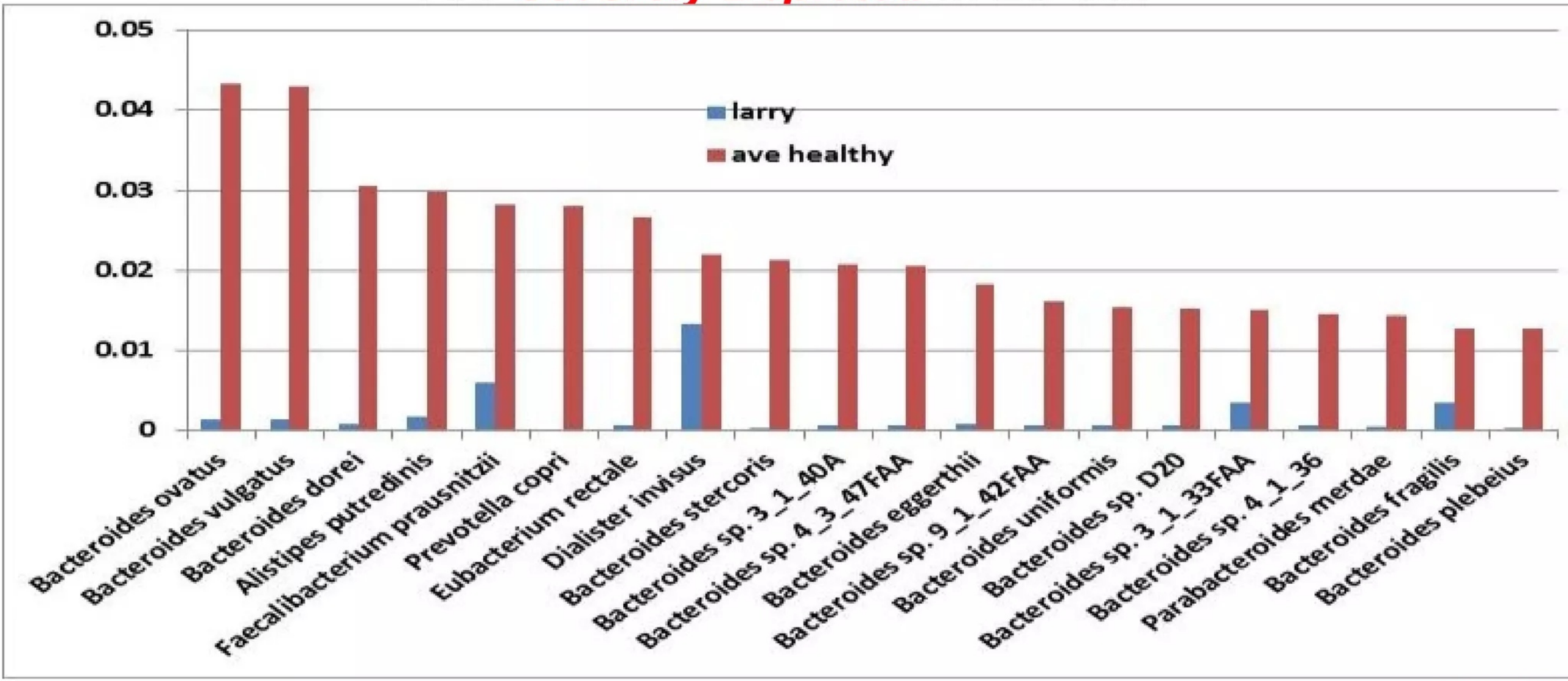
Computing and Visualizing the Genomic Dance of the Microbes



Calit2 VROOM-FuturePatient Expedition

Sequencing by JCVI or Human Microbiome Program Required 25 CPU-Years on SDSC Gordon Supercomputer

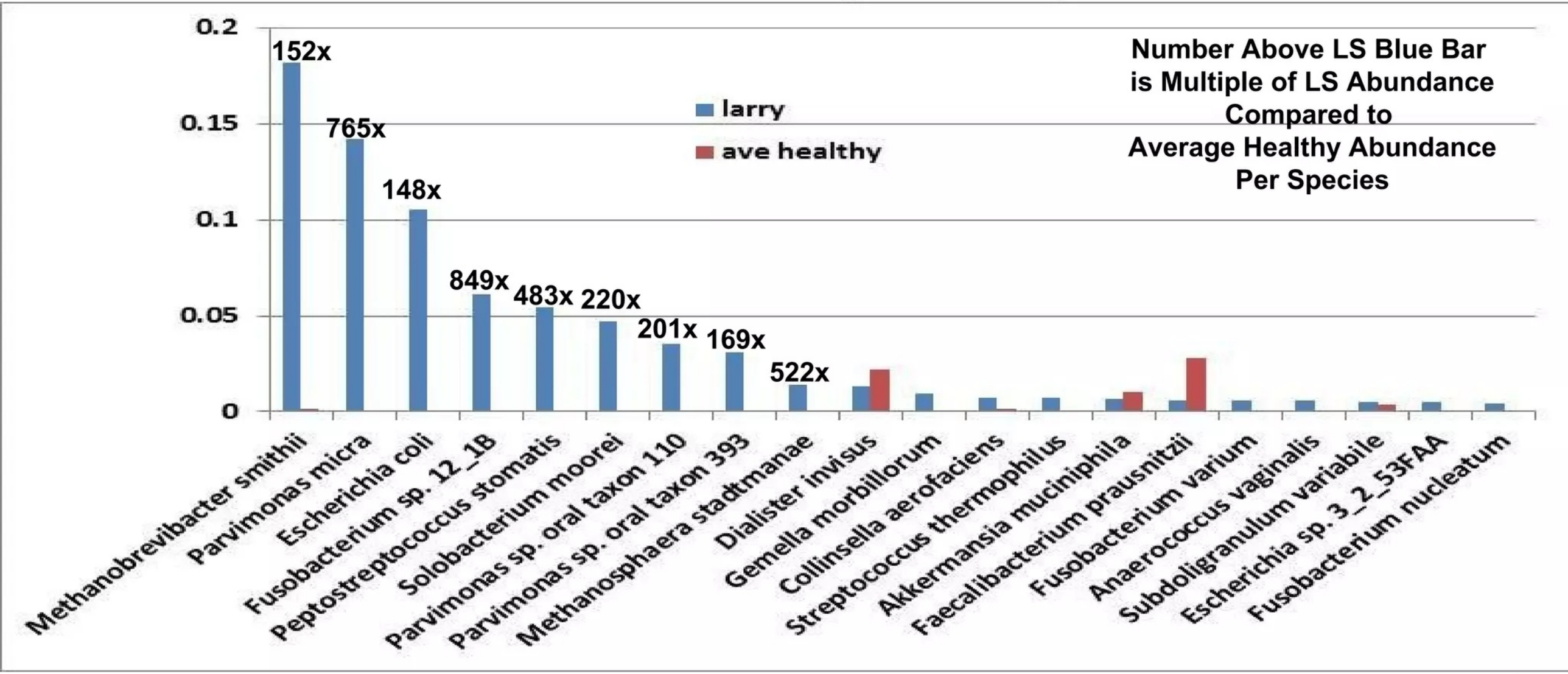
Almost All Abundant Species (≥1%) in Healthy Subjects Are *Severely Depleted* in LS Gut



Source: Sequencing JCVI; Analysis Weizhong Li, UCSD; HMP, NIH; UCSD SOM

LS December 28, 2011 Stool Sample

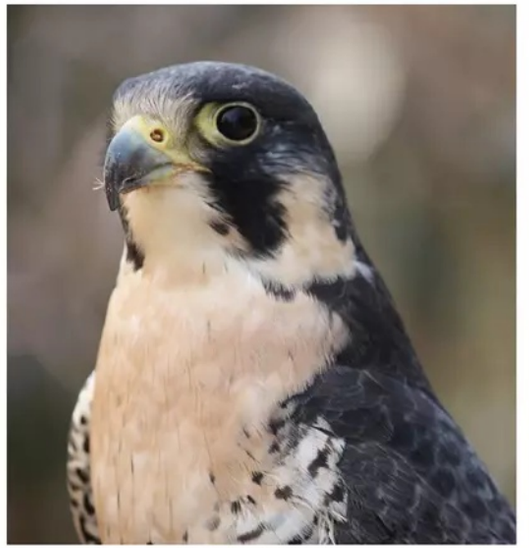
Rare Species Take Over the Altered Microbial Ecology In LS vs. Average Healthy



Source: Sequencing JCVI; Analysis Weizhong Li, UCSD, HMP, NIH
LS December 28, 2011 Stool Sample

When We Think About Biological Diversity
We Typically Think of the Wide Range of Animals






But All These Animals Are in One SubPhylum Vertebrata of the Chordata Phylum

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Think of These Phyla of Animals
When You Consider the Biodiversity of Microbes Inside You



Phylum
Chordata



Phylum
Cnidaria



Phylum
Echinodermata



Phylum
Annelida



Phylum
Mollusca



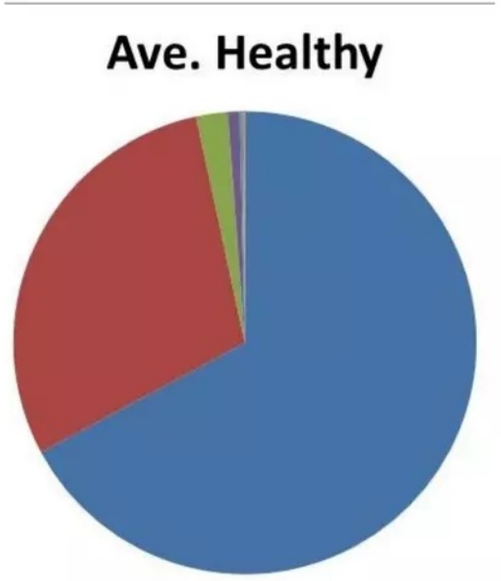
Phylum
Arthropoda

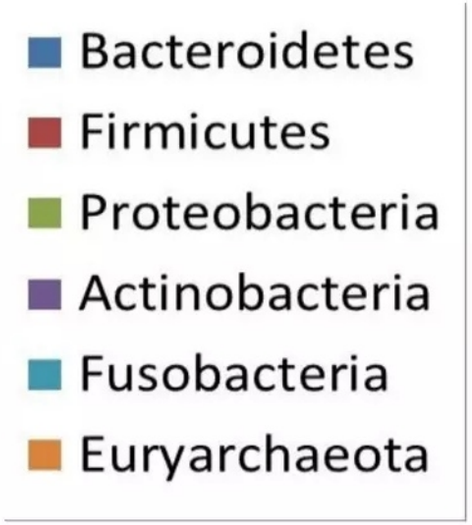
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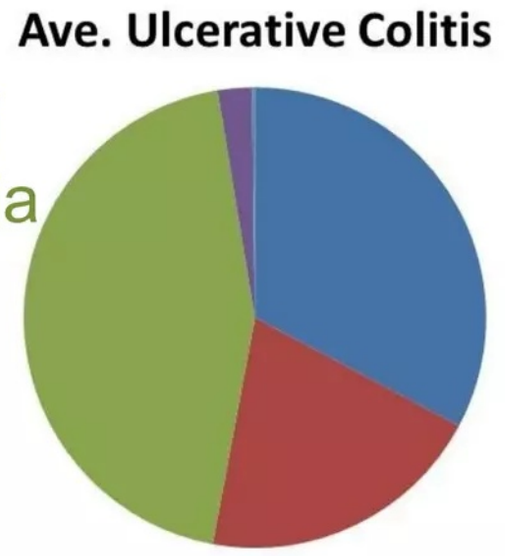
We Found Major Shifts in Microbial Ecology Phyla Between Healthy and Two Forms of IBD

Microbiome “Dysbiosis” or “Mass Extinction”?

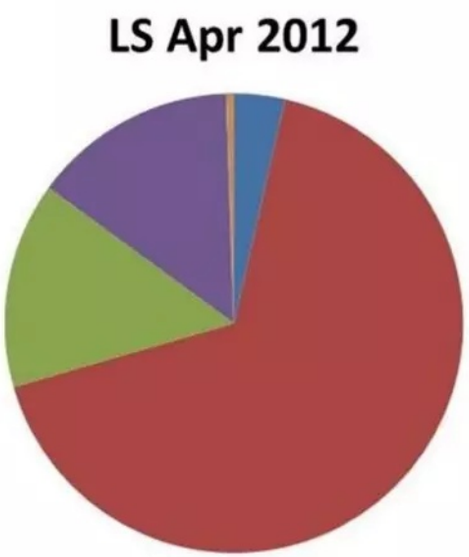


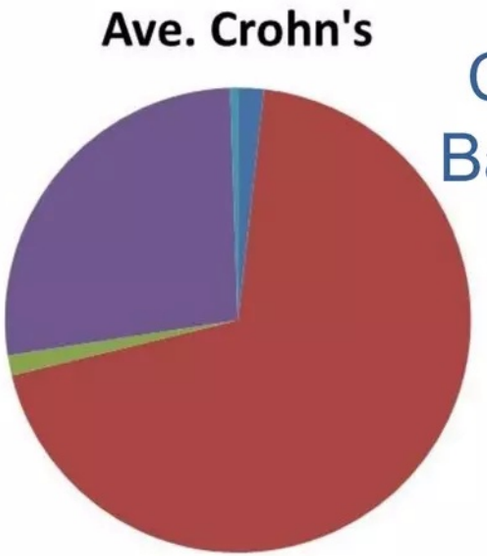


Most Common Microbial Phyla



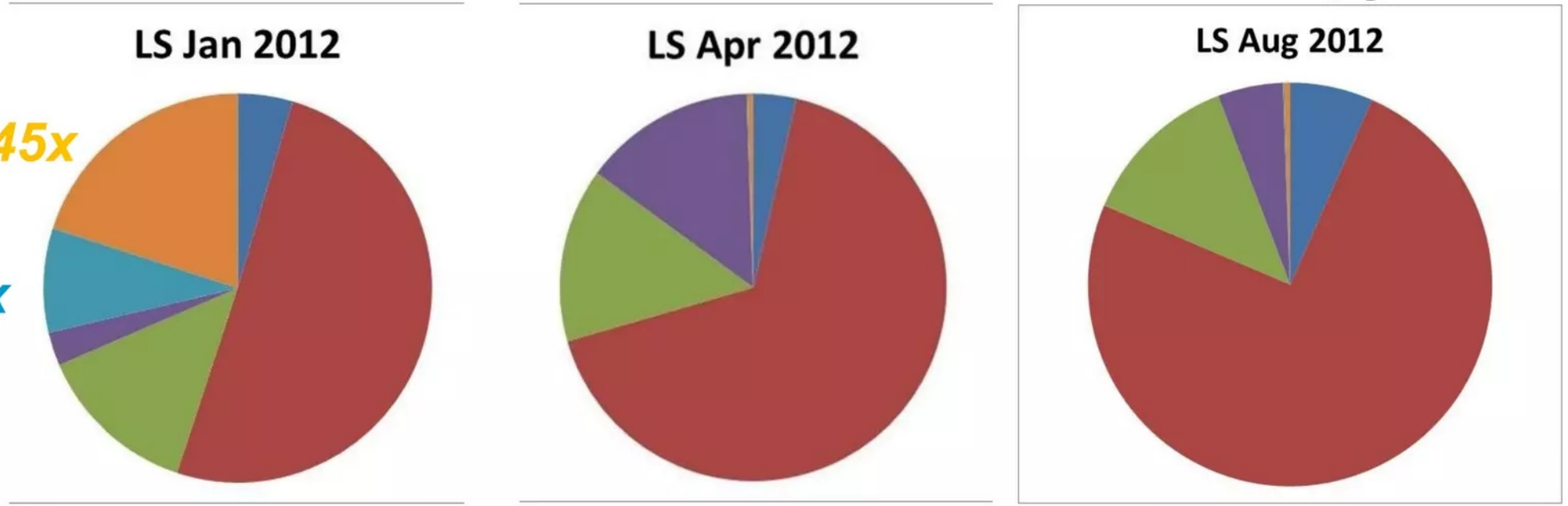
Explosion of Proteobacteria





Collapse of Bacteroidetes

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 Home"

Refining the Dance

- I Now Know Where I Am
- And Where I Need to Get to
- Startups Enable Tracking the Dance
- Novel Interventions Become Possible

Where There is Data
There is Hope