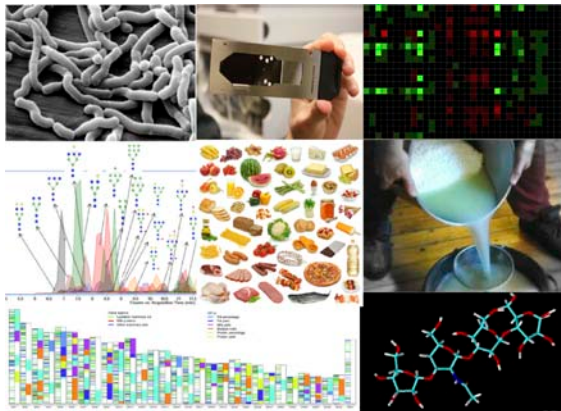


# Foods for Health Institute



Building the Science,  
Technologies and Education to  
Guide Diet and Health and  
create value for Agriculture  
in the 21<sup>st</sup> Century



**FOODS**  
**FOR HEALTH**  
**INSTITUTE**



# Evolutionary Nutrition

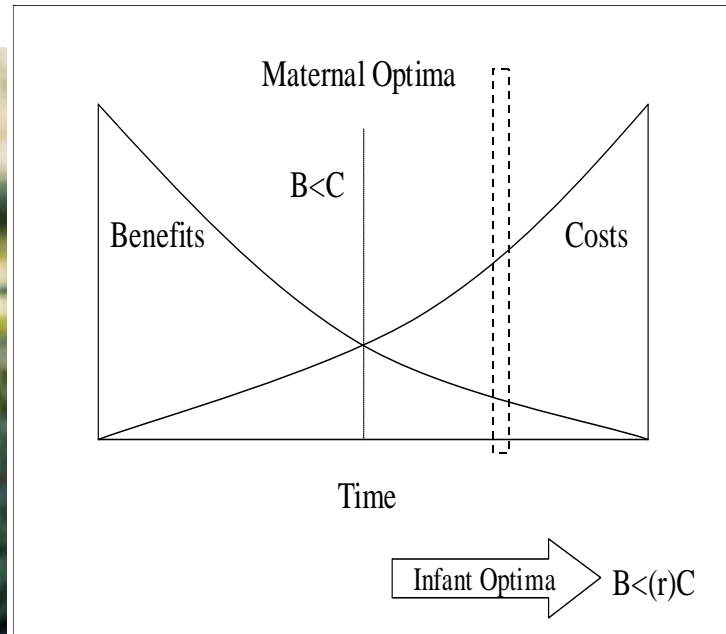


**What evolved under the Darwinian Pressure to be Nourishing?**

# Lactation

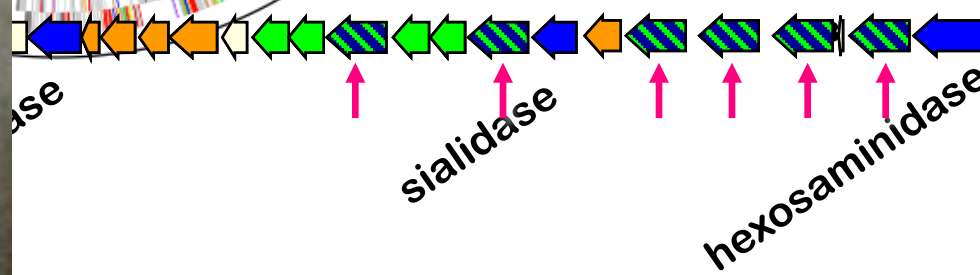
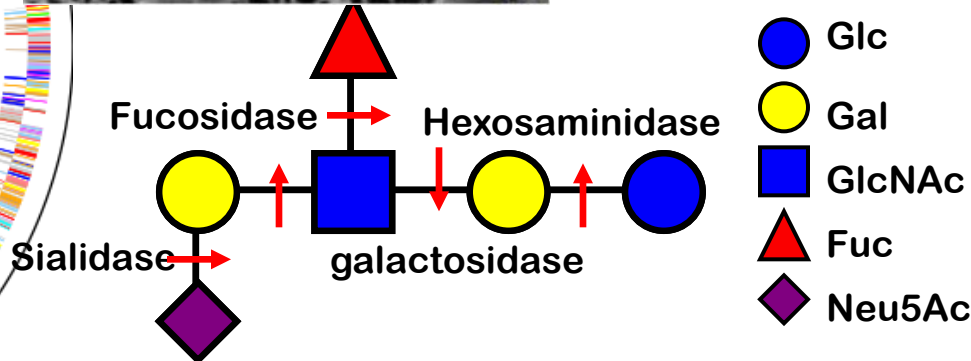
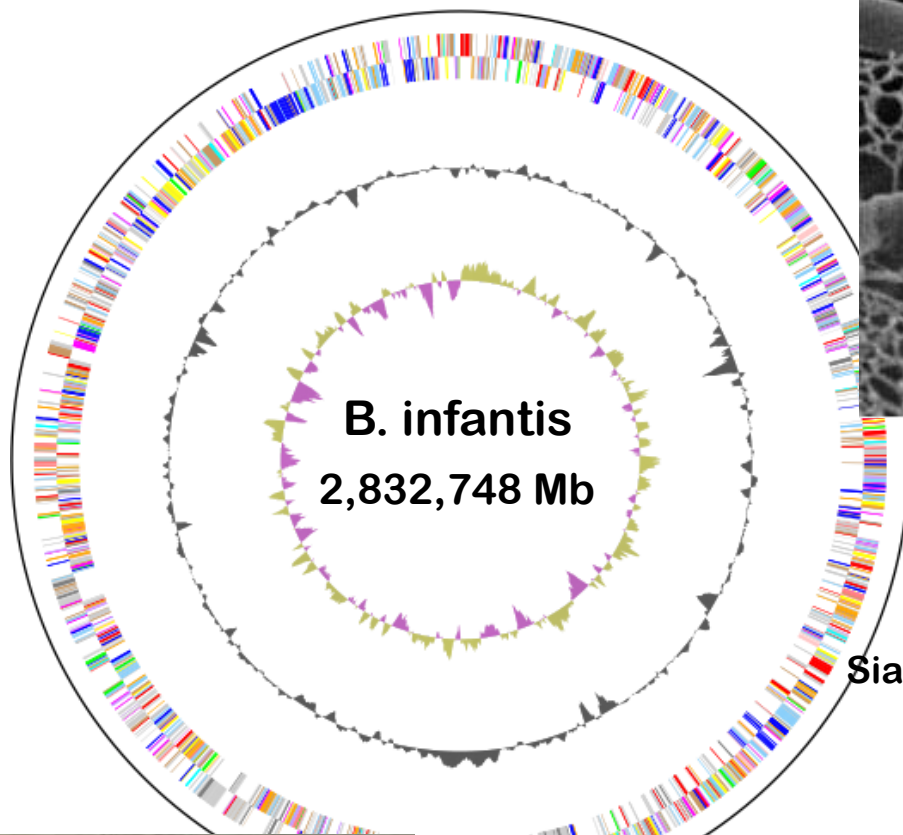
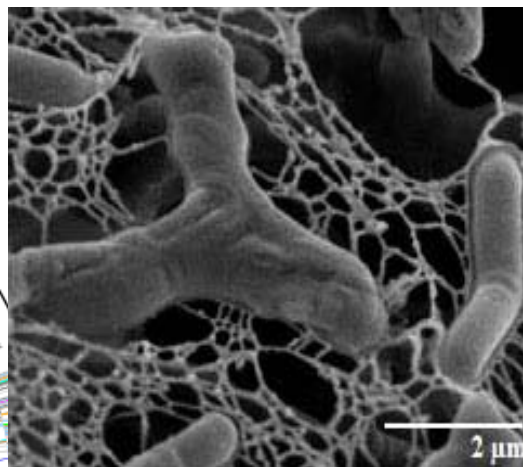


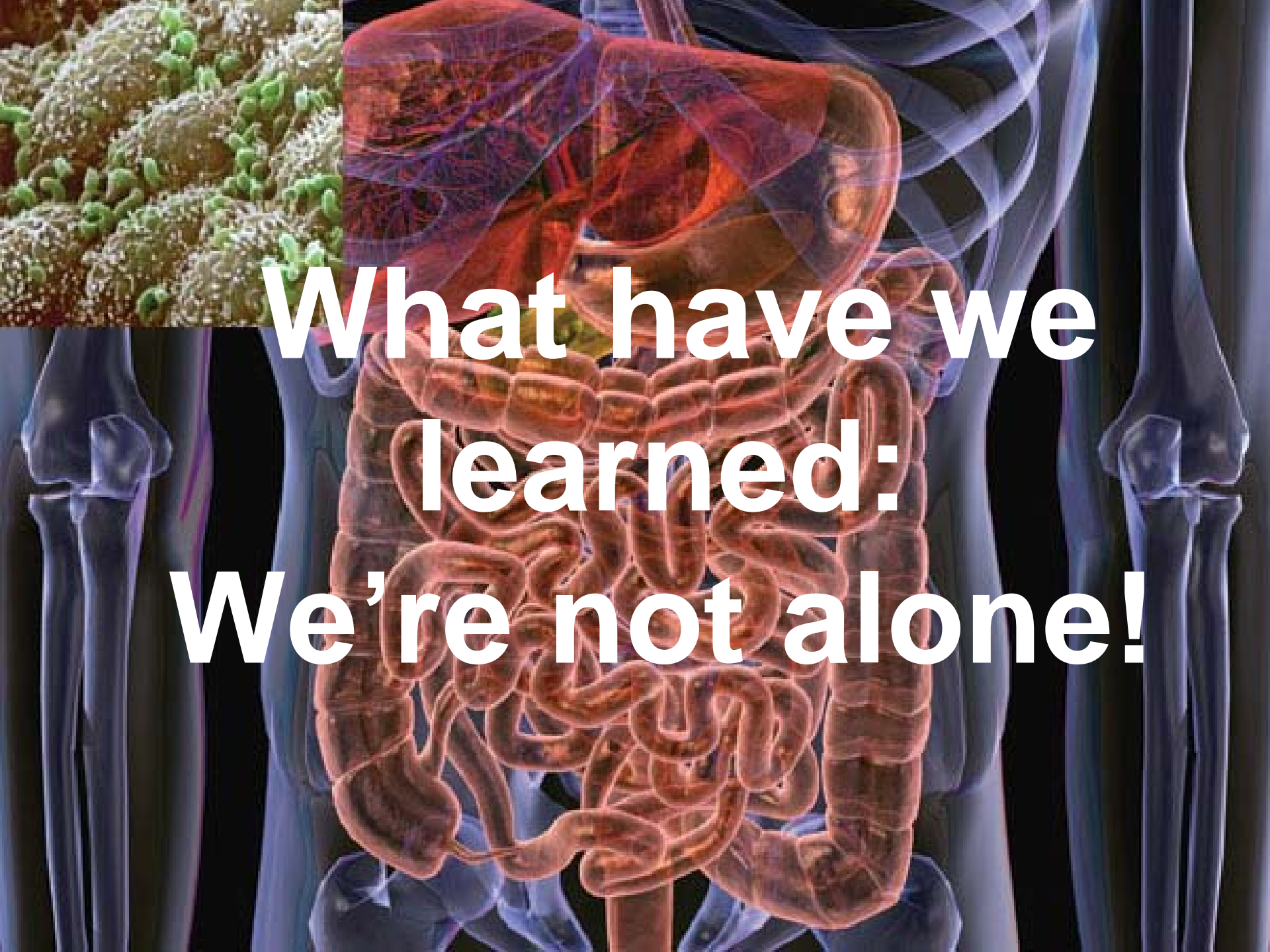
## The Darwinian Engine of Nutrition



Evolution of a cost – benefit solution for Health

# *Bifidobacterium Infantis*



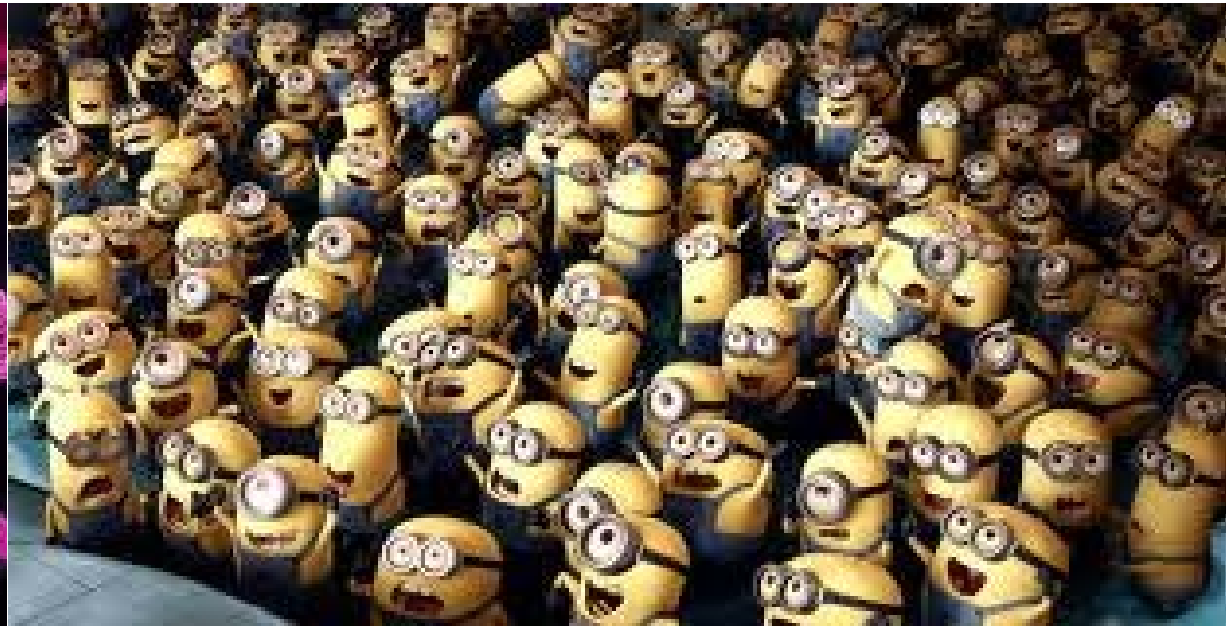
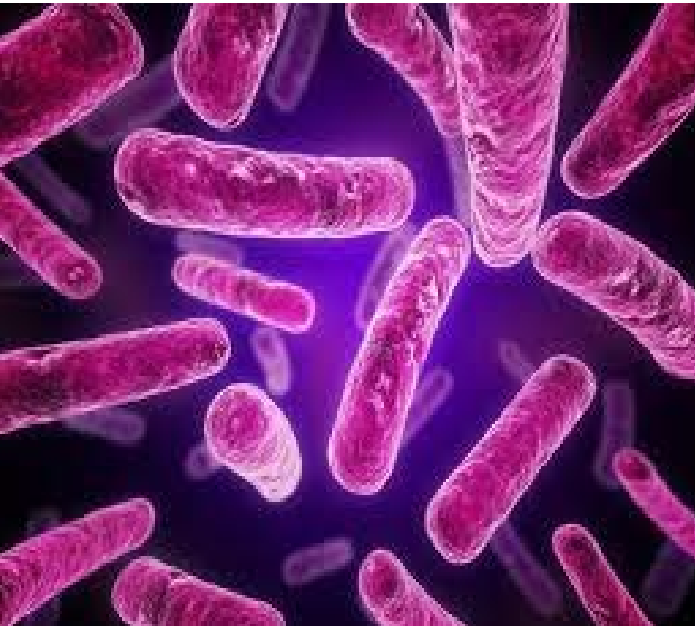


**What have we  
learned:  
We're not alone!**

# Opportunity: BioProfessionals



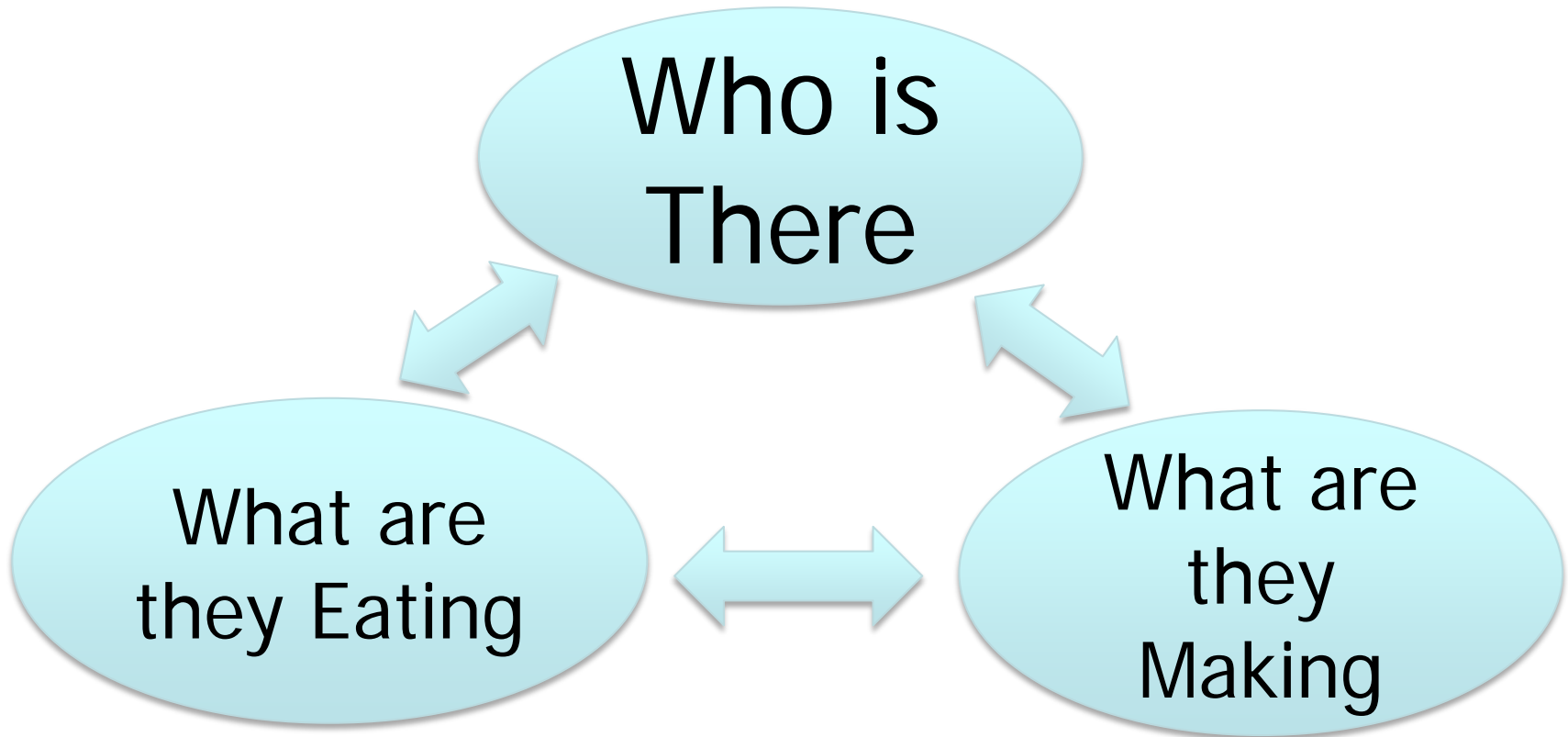
## Our minions!



**Business  
Opportunities**



# Science: How does a microbial ecosystem work?



3 Simple Principles

All 3 are highly integrated

# Ecosystems





# The Truth of the Intestine



- Its dark, wet, competitive
- Who eats - wins





# Where's the flaw



# Mammals have embraced bacterial transfer





# Modern Life has stopped microbial transfer





# The Human Premature Infant Microbiome and a Changing Paradigm in Infant Nutrition

David J. Kyle  
CEO

Evolve Biosystems Inc  
Davis, CA, USA

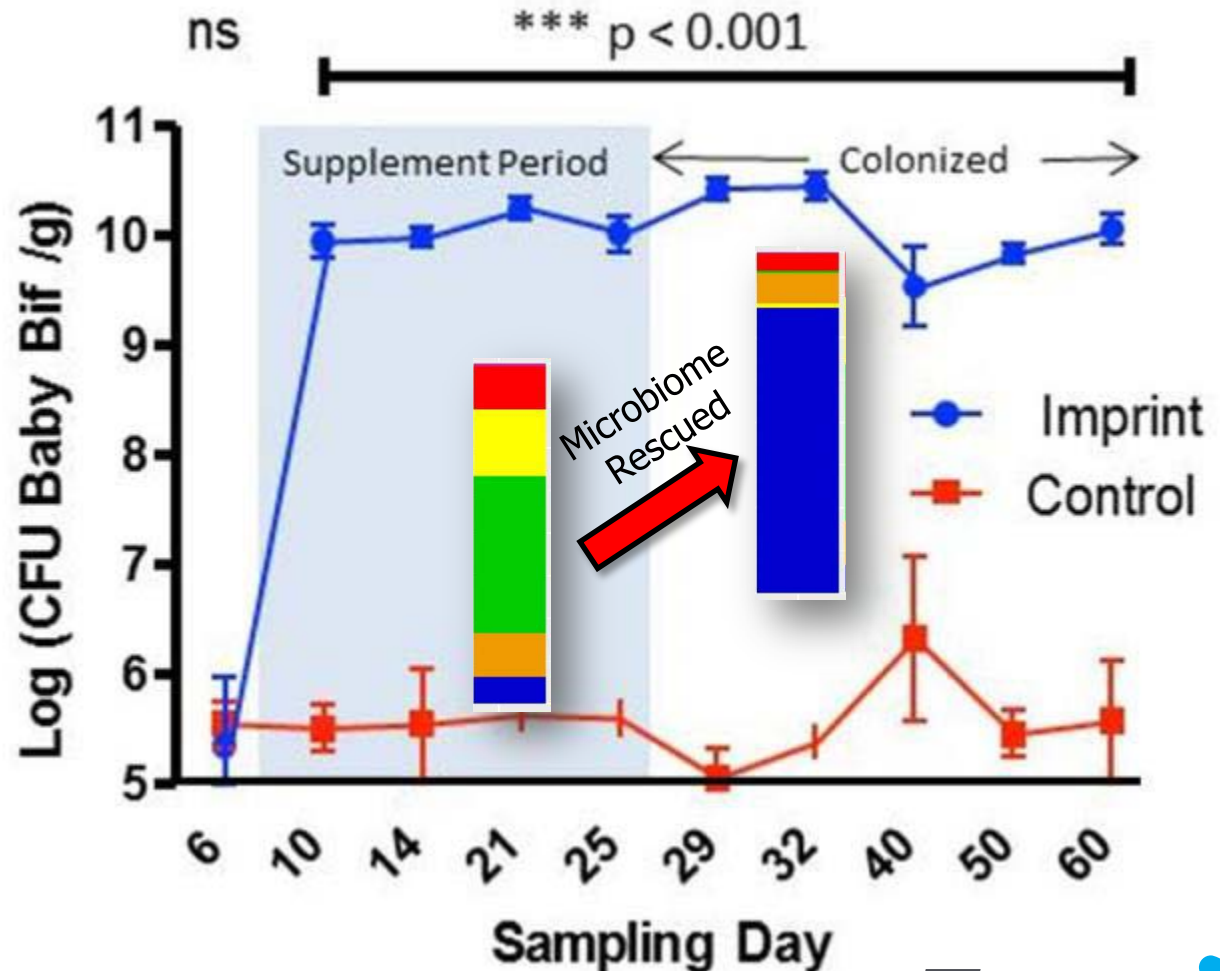


# Rescuing the Natural Microbiome

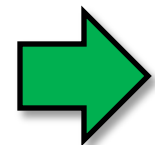
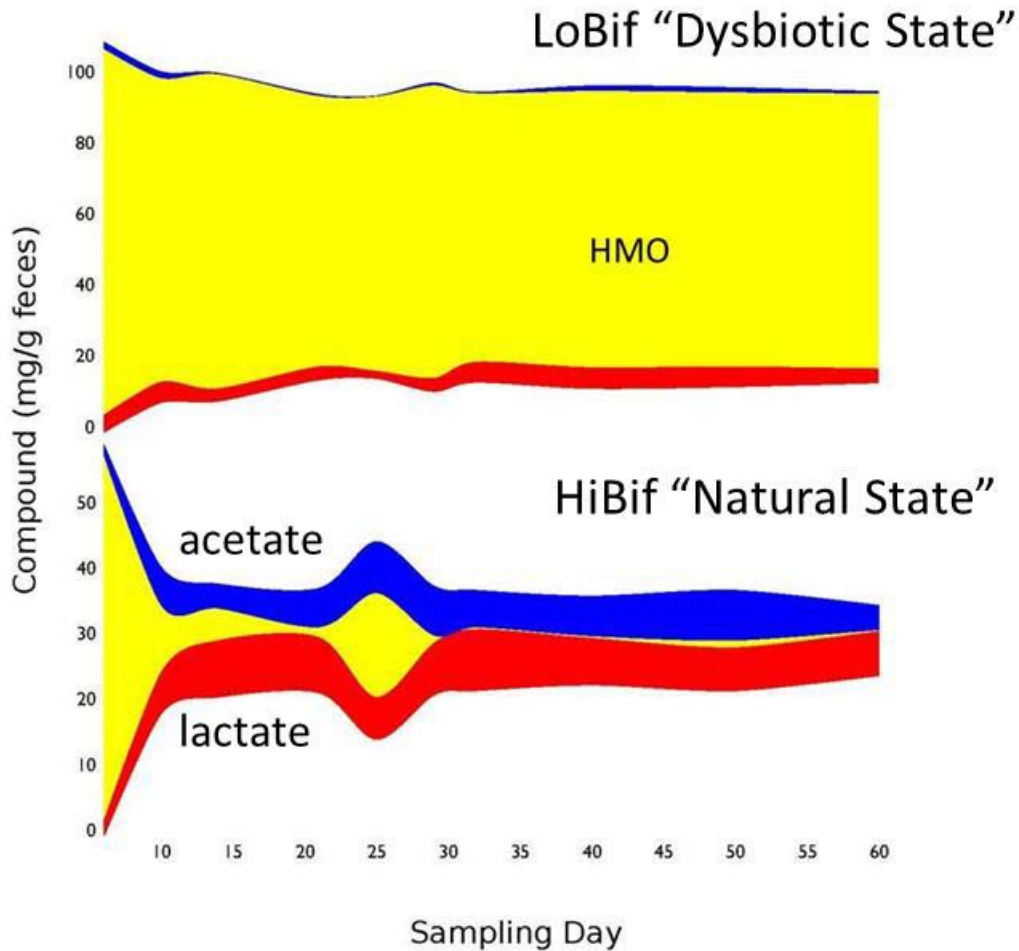
*Proof of Concept : adding back the Baby Bifidobacteria*

## IMPRINT Trial

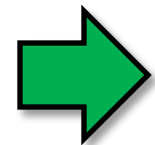
- 70 babies
- 30% C-Section
- 70% V-Delivered
- Treatment – Baby Bif
- Control – standard of care



# Hi-Bif babies: a different “colonic terroir”



pH = 6.0  
Stools: 33% watery  
Frequency: 4.0/d



pH = 4.5  
Stools: 20% watery  
Frequency: 1.8/d

Steve Frese, PhD  
Scientific Director

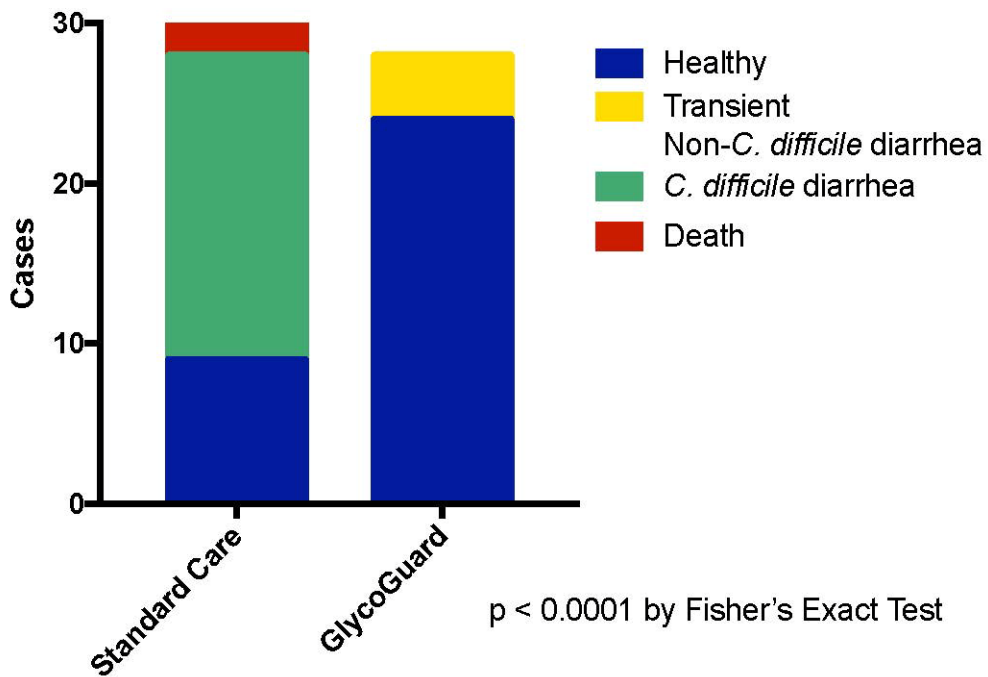


Confidential

# Gut Health Across Mammalian Species



### GlycoGuard Reduces *Clostridium difficile* Diarrhea in Nursing Foals



GlycoGuard to be launched at AAEP Dec 3-7 Orlando

Confidential



# Implications to Ag 2.0



- Selective Polysaccharides will become a new component of human diets.
- Estimate of daily dose ~ 10% of calories
- Total opportunity ~ 1 trillion calories per day worldwide
- A new quality target for agriculture: structure/function designed polysaccharides



# Opportunity: 'Bugs' of Delight



From chocolate to coffee, wine to beer, yogurt to cheese, bread



# Today



Half of agricultural production and one third of food is currently simply lost or wasted\* FAO 2011\*



# Food & Future



Diet is about to

*Change*

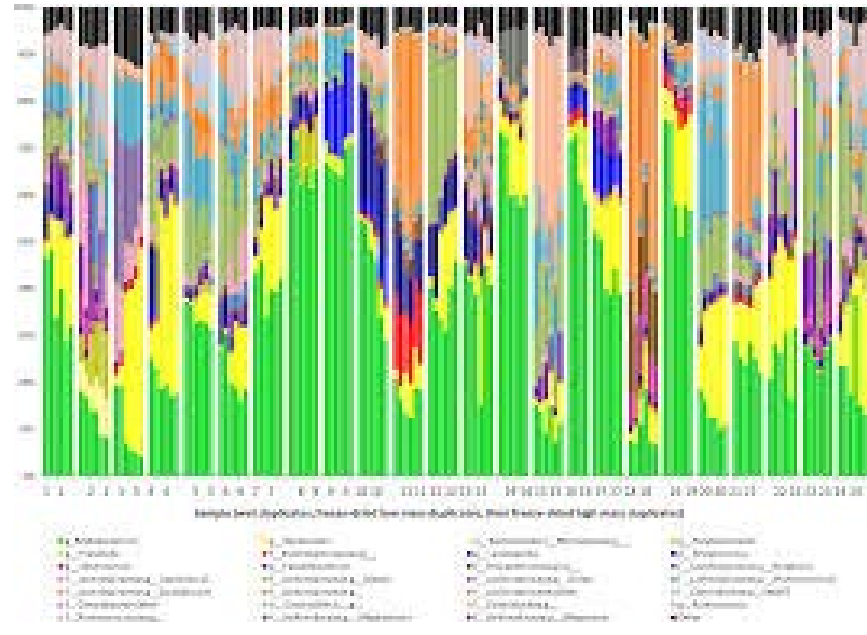
Why?

3 BIG advances

**disrupt** 



# 1 Detailed understanding and precision measurement of complex biological processes





# 2 Diet as an ensemble of molecular components and mechanisms





# 3 Computational Algorithms linking Cloud Big Data to Individual Users





# Modernization of Food

**Food will soon  
become a  
Knowledge  
industry**

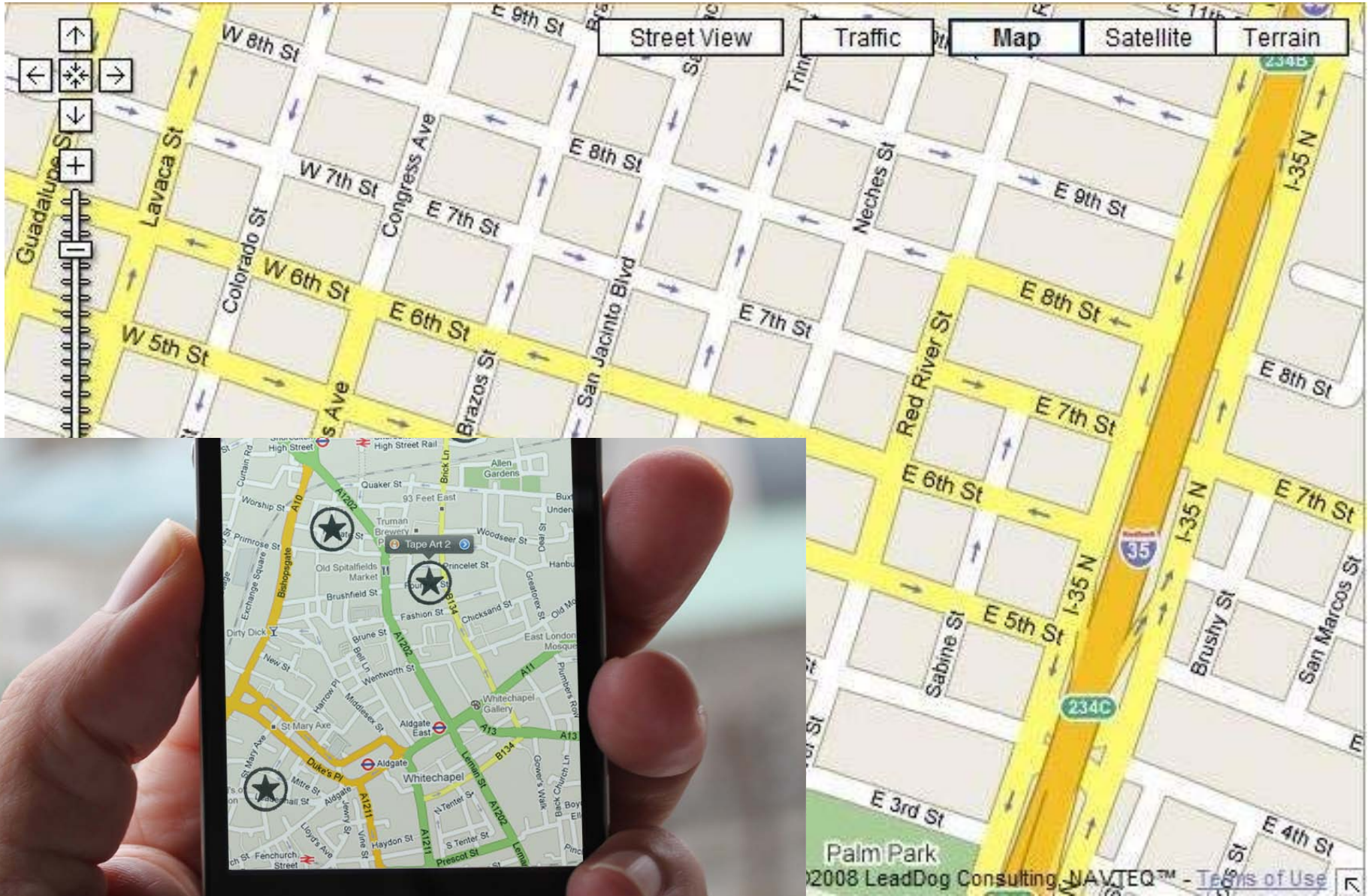


# Knowledge Based Diet & Health



**What does a knowledge based system look like**

# Transportation: Google Maps



# Transportation: Google Maps



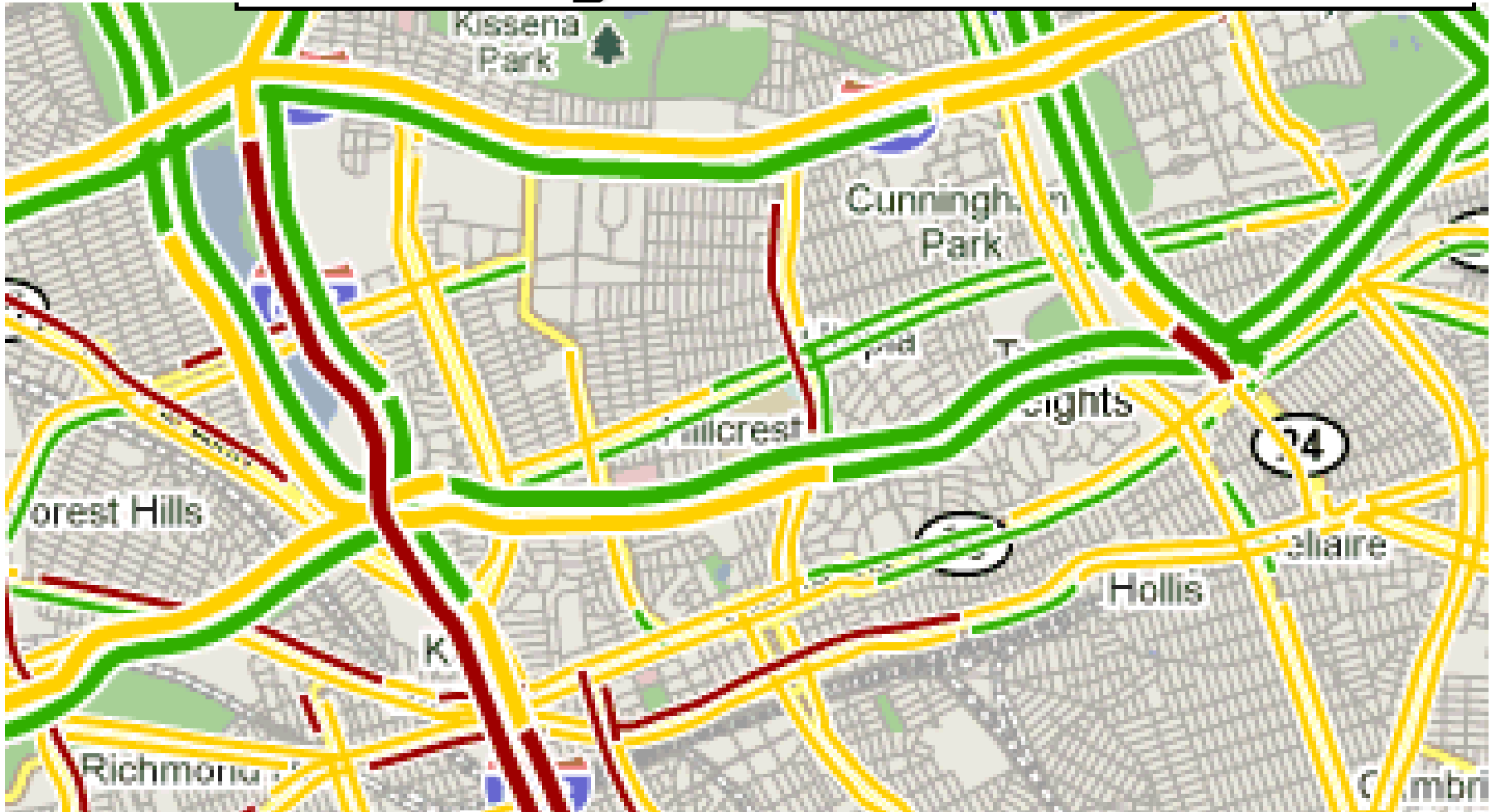
# Personal



# Transportation: Google Maps



## Dynamic





# Transportation: Google Maps

## Annotated

### hotels near New York, NY

Check-in  Nights

- A** **Peninsula Hotel** [- more info >](#) **\$129** ▼  


401 7th Avenue, New York, NY  
(212) 290-2224  
★★★★★ [2264 reviews](#)  
Sponsored  
[\\$129 Priceline](#)  
[\\$129 Expedia](#)  
"Before booking I informed with friends and never created a great ..."
- B** **Gramercy Park Hotel** [- more info >](#) **\$395** ▼  


2 Lexington Avenue, New York, NY -  
(212) 920-3300  
★★★★★ [350 reviews](#)  
"Positive: The staff and location were excellent. Room was very ..."
- C** **Millenium Hilton New York Hotel** [- more info >](#) **\$239** ▼  


55 Church Street, New York, NY -  
(212) 693-2001  
★★★★★ [1397 reviews](#)  
"It was overall a nice place to stay. Rooms were clean and views were ..."
- D** **Embassy Suites Hotel New York City** [- more info >](#) **\$289** ▼  


602 5th Avenue, New York, NY



Traffic More... Map Satellite Terrain

490 Weehawken

Central Park

Hoboken

Hamilton Park

Yonkers

New York

# Value Proposition of Google Maps



**Where am I?**

**Where do I want to go?**

**How do I get there?**



# Health Knowledge

**What is my Health Status  
now?**

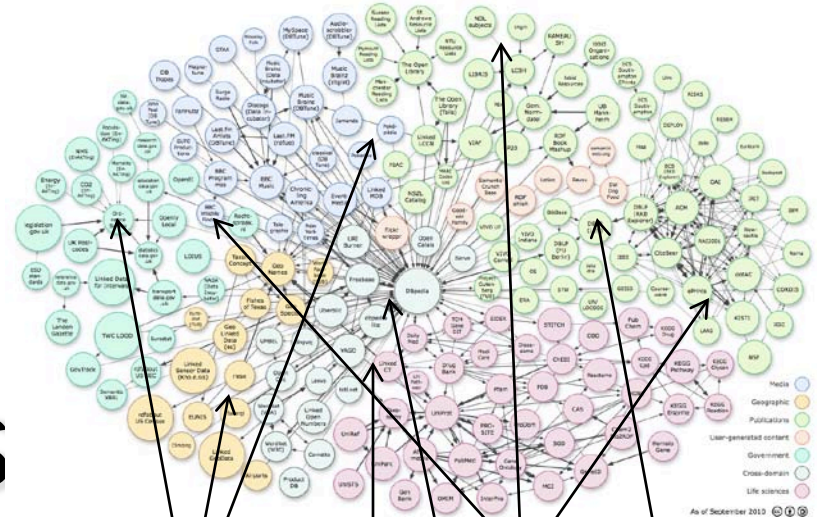
**What would I like it to  
be?**

**How do I get there?**

# How it works



Annotated  
Database of  
Food Chemicals



Interrogated by  
individual users



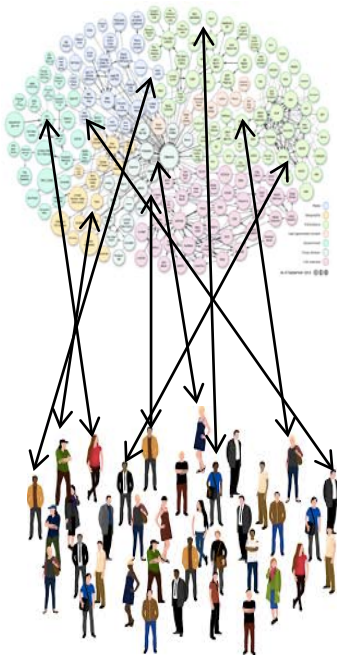


# What will we gain?



## Precision:

- ✓ Health
- ✓ Delight
- ✓ Safety
- ✓ Inventory
- ✓ Performance
  - ✓ Ethics
- ✓ Nourishment



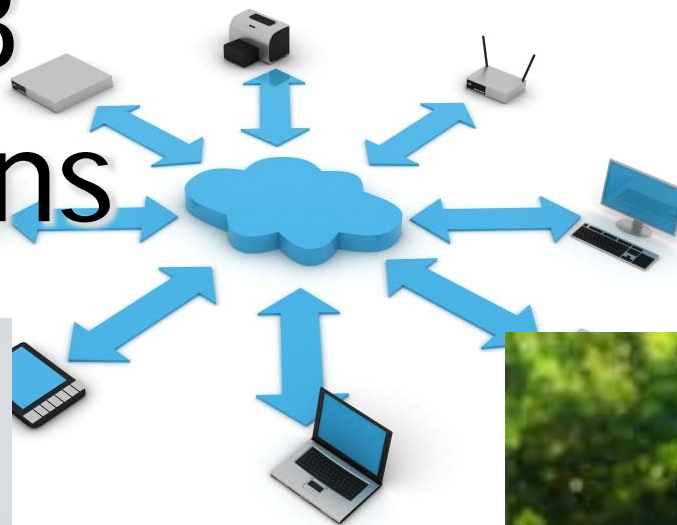


Thank You



# The Vision

Baby's Health  
linking 3  
generations



# Archeological Health



- Health effects so profound that future scientists can detect it when they dig us up

# Hunter Gatherers



## ■ Hunter Gatherer's lives:

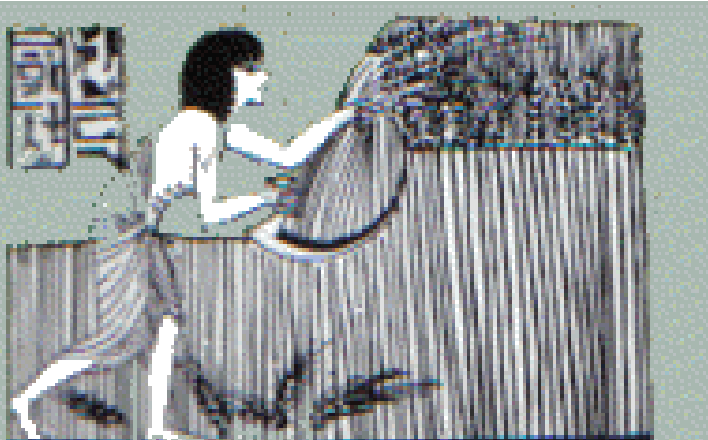
- Carnivorous
- Nomadic
- Athletic
- Short, brutal



# Agriculturalists



- Early Agriculture:
  - Cereal based
  - Poorly nourished
  - Feeble, thin, small





# Animal Domestication

## ■ Domestication lifestyle:

- Robust
- Healthy
- Dedicated
- Domesticated



# English Bowman



- Weapons of Mass Destruction:
  - Lifelong
  - Focused athleticism





# 20<sup>th</sup> Century Nutrition



- Lifespan extension:
  - 3 lifetimes
  - Healthy



# 21<sup>st</sup> Century - Future



- Lifestyle enhancement:
  - Diversity of Aspiration
  - Extending the Human Condition

