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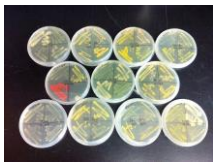
WHAT DOES DIVERSITY MEAN?

Healthy Gut

Slide 2

Diversity

- There is a lot of talk about the diversity of the microbiome
- That we should have it
- And why we don't have it
- But what does it mean?



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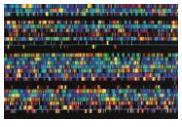
Why The Talk Now

- Thanks to computer scientists, geneticists and a new mapping technique, gut bacteria turns out to be much more diverse than researchers thought
- Previously, bacteria was studied in a lab setting
- Vast numbers of bacteria cannot grow in a traditional lab medium
- Therefore, they have gone unstudied
- Modern gene sequencing techniques have allowed researchers to discover diverse cultures of bacteria growing everywhere
- It also allows us to look at the gut diversity of individuals



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Diversity

- Refers to the overall quantity of bacteria on our body – both good and bad
- It also refers the different types of strains and the greater the number of different types, the better
- This is based on looking at the diversity and amount of strains in people from western cultures and comparing it to those in rural indigenous populations
- And then looking a the incidence of disease in both cultures

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Bacteria Taxonomy

- Taxonomy refers to the classification system

	Human	*B. fragilis*	*C. difficile*
Kingdom	Animalia	Bacteria	Bacteria
Phylum	Chordata	Bacteroidetes	Firmicutes
Class	Mammalia	Bacteroidia	Clostridia
Order	Primates	Bacteroidales	Clostridiales
Family	Hominidae	Bacteroidaceae	Clostridiaceae
Genus	*Homo*	*Bacteroides*	*Clostridium*
Species	*Homo sapiens*	*Bacteroides fragilis*	*Clostridium difficile*

Diversity refers to how many types of species as wells as diversity of strains and quantity
Strains: Many B. Fragilis strains – we may each have different version of the species

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Diversity

- Rural Africans have greater diversity because they are exposed to more dirt and nature and lower incidence of common intestinal disorders as well as lower levels of heart disease, cancer and diabetes, obesity and allergies
- When the colon bacteria is examined, they have more parasites and other negative microbes than westerners
- Yet they have more diversity and quantity of their beneficial microbes
- Exposure to pathogenic microbes builds resiliency' – makes our beneficial bacteria "fitter"
- Also, the majority rules – pathogenic bacteria learn to conform

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Diversity

- Exposure to the outside world increases diversity
- We are too clean
- The residential bacteria amount develops in each of us by the age of two
- Many factors determine how well we develop our microbiome when we are infants
- Stress, diet, lifestyle, drugs especially antibiotics all play a role in how we maintain our microbiome

- We lose diversity and microorganisms when we are older but should we?

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What is a MAC diet?

- It is not a diet of eating Big Mac's
- MAC = Microbiota-accessible carbohydrates
- Where are MACs found?
- In foods with resistant starch and other types of prebiotic fiber
- A MAC diet is consider ideal for maintaining diversity of strain and quantity (but you have to have it first)

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New Research

- Junk food (low MAC) decreases diversity and number of strains
- One study of mice found that diversity and number of strains decreased significantly when they were fed a diet without fibre
- The diversity did not immediately return when the mice were fed their normal fibre-filled chow
- Mice that continued on the "junk food diet" passed on the lack of diversity to the next generation and subsequent generations
- Over several generations – it was not reversible.

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Junk Food

- Another study of rats found that a low Mac diet intermittently with high MAC diet still lowered overall diversity and number of strains
- This means that eating well during the week and then partying with junk food on the weekend may not allow you to still benefit from the high MAC food consumed during the week or even "break even"
- Early research info also indicates it only takes 10 days to 2 weeks of eating junk food to significantly lower gut bacteria in both number of strains and diversity

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Building Diversity

- Eat prebiotics to grow the number of the strains that you have currently in you (even if you have lost diversity)
- Exposing yourself to the outdoors – touch the tress and the dirt – breath in the air in the forest
- Open the windows in the house to let the air from outside in
- Don't be afraid to touch people – shake hands, give hugs, especially if they are healthy family members

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Building Diversity

- Have pets and pet them often (or pet other people's pets)
- Eat fermented foods and/or take probiotics - they will help do some of the work while they are there and take pressure off your system to help your own bacteria grow
- Do not use chemical cleansers and anti-bacterial soaps
- Showering less often
- Take measures to improve the quality of the gut lining so native strains can reproduce more effectively

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Helping Clients

- First establish and educate the client about the importance of the gut in relation to their health concerns
- Second, use this to frame the conversation about eating high MAC foods
- Start with one prebiotic, fibre-rich food at a time (some people have issues with prebiotic foods so go slow)
- Consider a prebiotic fiber supplement, if needed
- Educate the about the “clean” issues and other aspects of diversity
- Other strategies for gut health may be needed