WHAT, WHY, WHERE, HOW WHEN, ... microbiota?

Doom or Dream for health

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• Earth:
• Bacteria appeared 3.5 billion y ago
• Homo sapiens 100,000 y ago
• We depend on each other for survival
To study microbiota the researchers rely on scrutinizing microbiota genes and the microbiome.
Getting to know your gut microbiota

A huge quantity (hundreds of trillions) of bacteria and other microorganisms inhabit your intestines fulfilling key functions for your health and wellbeing.

- Gut microbiota's weight can reach up to 1 to 2 Kg.
- The GI tract surface is as big as 2 tennis courts: 400 m².
- 95% of our bacteria located in the gastrointestinal (GI) tract.
- In our body, microbes outnumber human cells by 10:1.
- Laid end to end, our body's bacteria would circle the Earth 2.5 times.
- Bacteria are 10 to 50 times smaller than human cells.

Healthy microbiota = Healthy body
• Dys-nutrition -> Dysbiosis -> OBESITY
• Microbiota different in lean & obese
• Microbiota different with & w/o DM
HOW does it work?

- Bacteria produce a toxin called LPS
- LPS -> gene activation and deactivation
- LPS -> inflammation
- LPS -> accumulation of body fat -> OBESITY
Double-hit

• Steatosis = fat at the wrong places
• Inflammation = “-itis”
• steato-pancreatitis -> DIABETES
• steato-artheritis -> HEART ATTACK
• steato-hepatitis -> CIRRHOSIS
• *Enterobacter cloacae* B29
• in man weighing 385 lbs.
• This bad bug made up 35% of his gut microbiota.
• A specific diet eradicated *Enterobacter*

He lost 113 lbs in 23 weeks

Zhao L Int Soc Microb Ecology J 2013
• Obese people with *Akkermansia muciniphila* -> **better metabolic status** than obese with less Ak.
• In a mouse study: giving the mice Akk. -> lowered mice weight & **improved metabolic status**

• The metabolic status:
  • glucose
  • triglycerides
  • body fat distribution.

Dao et al. Gut 2015;
Cani P et al. Proc Natl Acad Sci U S A. 2013
• Microbiota transplanted
• from lean people to people
• with metabolic syndrome* ->
• glucose level has become more healthy
• *a condition of obesity and high glucose

TLC
WHAT can you do?

**Pre-biotics**
- Food for bacteria!
- Prebiotics are substances that can only be metabolised by the gut bacteria, and not the human host.

**Syn-biotics**
- Synbiotics are a combination of both pro and prebiotics.

**Pro-biotics**
- Live bacteria!
- Probiotics are active bacterial cultures.
**WANTED: GOOD BACTERIA**

Want to look and feel your very best? Start enjoying more foods naturally high in probiotics — and in the fiber-rich prebiotics that help those good bugs thrive.

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### PROBIOTIC-RICH FOODS

- **DAIRY SOURCES**
  - Yogurt
  - Kefir
  - Buttermilk
  - Crème fraîche
  - Lassi, a drink made from yogurt and water
  - Aged cheeses, such as bleu, Gouda and cheddar

- **FRUIT AND VEGETABLE SOURCES**
  - Brined pickles
  - Tangy chutneys
  - Brined olives
  - Sauerkraut and its ethnic variations — kimchi (Korean), tsukemono (Japanese), choucroute (French)
  - Sauerruben (fermented sour turnips)
  - Pickled beets

- **SOYBEAN SOURCES**
  - Miso
  - Tempeh
  - Natto
  - Soy sauce
  - Tamari

- **GRAIN SOURCES**
  - Traditional sourdough breads

### PREBIOTIC-RICH FOODS

- **VEGGIES**
  - Tomatoes
  - Artichokes
  - Onions
  - Chicory
  - Greens (especially dandelion greens)
  - Asparagus
  - Garlic
  - Leeks

- **FRUIT**
  - Berries
  - Bananas

- **WHOLE GRAINS**
  - Oatmeal
  - Barley
  - Flaxseeds
  - Wheat

- **LEGUMES**
  - Lentils
  - Kidney beans
  - Chickpeas
  - Navy beans
  - White beans
  - Black beans

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“biotics” for “biota”

- Don’t play to **win**
- Play not to lose it

- **WHAT:** biota
- **WHEN:** daily
- **HOW:** fresh
Fermented food

• Decreased CVD mortality: 34,409 FU 15 yrs (1)
• Decreased stroke risk: meta-analysis 764,635 (2)
• Decreased all-cause mortality: 4,526 FU 10 yrs (3)
• Decreased cancer risk: 3,158 FU 18 yrs (4)

WHAT, WHY, WHERE, HOW, WHEN...?

- Fiber = 25 to 50 g
- Yogurt 3 cups
- Pickled vegies plenty

**How Can EXERCISE AFFECT Your GUT BACTERIA?**

2001: A SPACE ODYSSEY
“Moveable Feast” = A synbiotic a day keeps the doctor away