HEART DISEASE, DIABETES AND OBESITY

Heart Disease

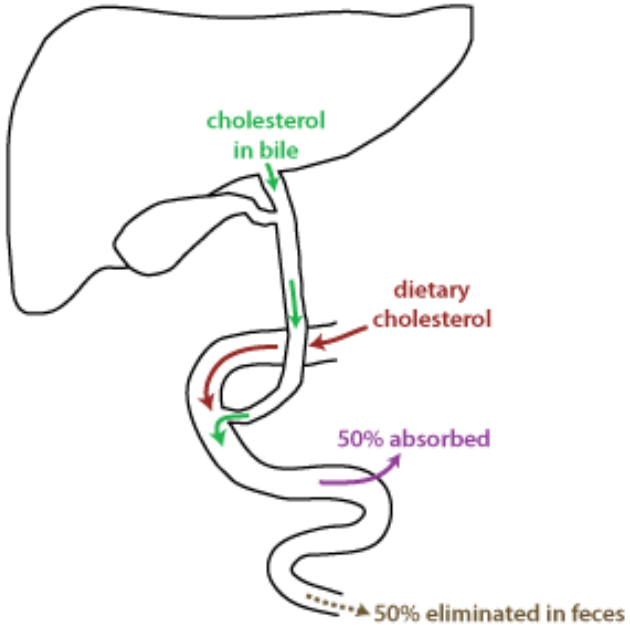
- For years factors for heart disease focused on elements that occurred inside the body
- Recent research has started focusing on the gut as a source of what may occur inside the body
- From this perspective, new strategies for prevention can be developed
- Cholesterol has benefits to the microflora itself as it has mild antibacterial properties, inhibiting bad bacteria when excrete in the colon
- Plant sterols increases the ability of cholesterol in food being excrete as opposed to being absorbed into the body, keeping the system for the benefits of the microflora

Cholesterol

- Cholesterol Lowering
- *B. longum* SPM1207 reduced serum total cholesterol and LDL levels significantly, and slightly increased serum HDL. B. longum SPM1207 also increased fecal LAB levels and fecal water content, and reduced body weight and harmful intestinal enzyme activities.
- As well, studies have found Lactobacillus helveticus and Saccharomyces cerevisiae lowered LDL and raised HDL
- Other strains also have similar benefits

Cholesterol

- High cholesterol is related to chronic inflammation
- High blood pressure has also been linked to inflammation
- Good bacteria regulates inflammation in the body
- Bifidobacterium longum 5022 can inhibit factors that cause narrowing of the arteries followed by L. delbrueckii ssp. bulgaricus 1368, L. casei 15286, S. thermophilus 1275, and L. acidophilus 4461



Stroke

- TMAO – is a compound that is link to clogging arteries and has been linked to heart disease and stroke
- Bad gut bacteria such as *Clostridia*, *Proteus*, *Shigella*, and *Aerobacter* can convert lecithin in egg yolks and carnitine in red meat to TMAO increasing risk of heart attack and stroke
- Good gut bacteria can prevent this (prebiotics recommended)
- Gut bacteria produce t-regulatory cells that can protect the brain after stroke

Diabetes and Obesity

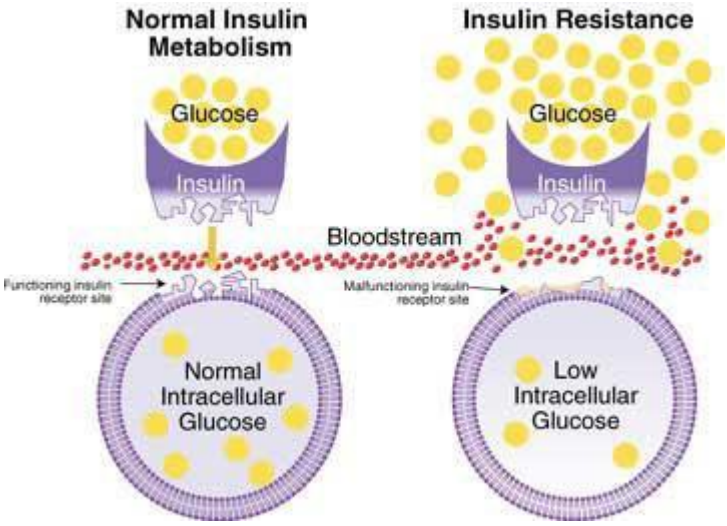
- Both conditions are rising at an alarming rate
- It is hard to separate them from a gut microflora perspective
- The mechanisms of the gut flora is connected to both
- The Western diet promotes a gut microflora that promotes both obesity and diabetes
- There is some evidence that dybiosis leads to obesity and is present prior to weight gain, meaning a preventative approach can be taken
- L. plantarum and L. gasseri are associated with weight loss

Obesity

- In one study, microflora from obese mice and lean mice was transplanted in to germ-free mice
- After 2 weeks “ mice with the “obese” microflora started eating more and gained weight while the mice with the “lean” microflora did not
- Analysis of 12 obese people found they had lower levels of good bacteria and higher levels of bad bacteria
- Another study of 124 individuals, including set of twins showed similar results as well as lack of bacterial diversity in those who were obese.
- This means there is a different microbial composition for obese versus lean

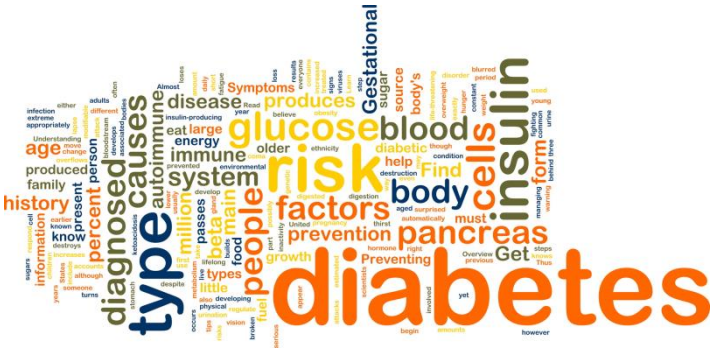
Diabetes

- Lactic acid bacteria produce substances that prevent the digestion of carbohydrates and therefore, the impact of the of carbs in the blood
- A specific fungus (aspergillus niger) has the ability to convert starch molecules to oligosaccharides and feed the good bacteria (instead of being absorbed as glucose)
- Staphylococcus aureus produces a toxin that causes insulin resistance



Diabetes

- One study of 345 people showed that patients with Type 2 diabetes had a decrease in butyrate-producing bacteria and an increase in opportunistic pathogens.
- A Swedish study of 145 women found that the genes in intestinal bacteria predict diabetes more accurately than waist-to-hip ratio or body-mass index (a measure of weight relative to height).
- Diabetes II has been linked to chronic inflammation and good bacteria is a key player in regulating inflammation



So…

- Diabetes, obesity and heart disease have all been linked to a bad diet
- But the question is the bad diet a factor of these conditions or is the bad diet a factor in poor gut bacteria balance and this poor balance is causing these conditions
- Research will eventually sort it out but in the meantime we can focus on our gut health both if we have these conditions or to help us prevent developing them.