

HEART DISEASE, DIABETES AND OBESITY



Heart Disease

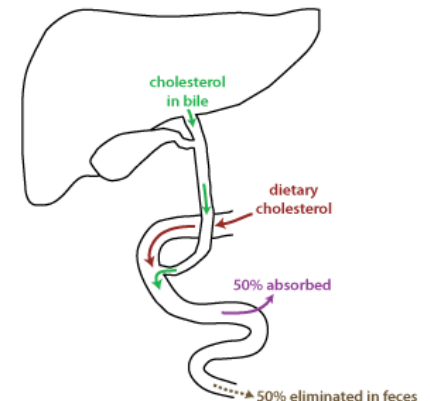
- For years factors for heart disease focused on elements that occurred inside the body
- Recent research has started focusing on the gut as a source of what may occur inside the body
- From this perspective, new strategies for prevention can be developed
- Cholesterol has benefits to the microflora 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
- Good bacteria regulates inflammation in the body lowering IL6 and increasing IL 10
- L. Acidophilus has been shown to free up cholesterol from bile salts by assisting in de-conjugating the bile salt in vitro but fermented milk products have not been shown to lower serum cholesterol
- L. Casei removes cholesterol by means of destabilizing cholesterol micelles while deconjugating bile salts at pH less than 6.0.



Hypertension

- A lot of interest in probiotics for regulating blood pressure
- C-reactive protein – an inflammatory marker is considered a precursor to the development of hypertension
- CRP, as a pro-inflammatory agent, it is associated with with the release of interleukin-6 and is a factor in IBD
- The microflora lowers IL-6 and increases IL-10 (an anti-inflammatory marker)
- IL-6 has been indicated as a factor in hypertension

Hypertension

- ACE (Angiotensin-Converting Enzyme) is an enzyme that produces angiotensin II which cause the narrowing of arteries and release hormones that can raise blood pressure
- Certain Peptides (from protein) fermented by good bacteria are known as ACE inhibitors.
- Bifidobacterium longum 5022 showed the highest ACE inhibitory potential, 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
- Phosphatidylcholine in the gut can also play a role in TMAO in the presence of the same bacteria
- Good gut bacteria can prevent this (prebiotics recommended)

Stroke

- Regulatory T cells protect the brain after stroke
- Pro-inflammatory cytokines are released in the brain and blood after the onset of stroke
- T – reg cells help contain damage to the brain after a stroke
- Gut bacteria increase T-reg cells levels which produce IL10 – anti-inflammatory (L. casei and L. reuteri)

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 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
- Alpha-glucodase inhibitors prevent the digestion of carbohydrates and therefore, the impact of the of carbs in the blood
- Lactic acid bacteria possessed the ability to inhibit alpha-glucodase activity, which gives them an antidiabetic property
- 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)

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

Protocol strategies

- Enhance SCFA production or take SCFA for anti-inflammatory benefits
- Take probiotics and fermented foods for blood sugar stabilizing effects
- Consume prebiotics to support residential gut health
- Consume phytonutrients (which will be potentiated by the good bacteria)
- Continue with other strategies linked to the specific conditions.