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HEART DISEASE, DIABETES AND OBESITY



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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

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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



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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



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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



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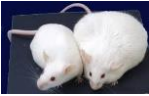
Diabetes and Obesity

- 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



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Obesity

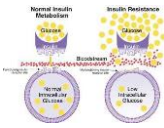


- In one study, microflora from obese mice and lean mice was transplanted in to germ-free mice
- After 2 weeks " mice with the "obese" microflora started eating more and gained weight while the mice with the "lean" microflora did not
- Analysis of 12 obese people found they had lower levels of good bacteria 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

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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



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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



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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.