



Obesity and the Bugs That Live Inside You



Dr. Kate Thomsen and Silky

There are some serious caloric restriction studies being done using many different species and all coming up with similar findings. Caloric restriction of 25 – 40% (providing high quality protein is still available) has been shown to increase lifespan, decrease diseases like osteoarthritis and diabetes and delay the age of onset of late-life diseases. One study of dog pairs – one on calorie restriction and one not, showed that the dogs on calorie restriction were processing fat differently. The researchers believed this was due to a different milieu of bacteria in their intestines – their gut microflora.

The composition and functions of human intestinal bacteria has not been well understood. The National Institutes of Health has recently initiated the Human Microbiome Project to help identify and characterize the bugs that live in us. Most researchers and many clinicians believe that the gut microflora play a major role in health and disease. Alterations in this gut microbial environment caused by

modern food production, rich diets, and the overuse of antibiotics may be associated with many of our chronic health issues, including obesity.

We humans carry over 3 pounds of bacteria inside of us. The microbiome of the human gut is the highest density natural bacterial ecosystem known. There are more bacteria in the colon than there are human cells in our bodies. This bacterial milieu is estimated to contain up to 100 trillion microbial cells including more than 1,000 species and more than 60,000 genes (twice as many as found in the human genome). We believe this ecosystem co-evolved with humans for mutual benefit. Some functions carried out by these bacteria include:

- Making enzymes that humans need to digest food. These break down plant sugars (from grains, fruits and vegetables) which we could not otherwise digest
- Synthesizing vitamins
- Assisting in regulation of our immune responses

More than 90% of the microbes found in the intestinal tracts of humans and mice belong to two groups – the Bacteroidetes and the Firmicutes. In a recent study, researchers took gut microbes from human feces and transplanted them into the intestinal tracts of genetically bred germ-free mice. The mice were then divided. Some were fed a high fat-high sugar (HFHS) diet and

others were fed the usual low fat-plant rich mouse chow. The mice fed the HFHS diet gained more fat as predicted. But more interestingly, their gut microbial population was restructured. In less than 24 hours the proportions of the various microbial species changed. The shift was toward less Bacteroidetes and more Firmicutes. The researchers then performed a second “transplantation.” This time, the microbial community that had formed in the HFHS fed mice was transplanted into another set of germ-free mice. These mice were also divided into two groups. One group was fed the usual low fat-plant based mouse chow and the other was fed the HFHS diet. This time all the mice gained fat tissue – regardless of the fat content of their diet. This implies that eating a high fat-high sugar diet can select for gut bacteria that are able to get more of the calories out of the food we eat. In theory, you can eat the same exact meals as your neighbor, but you may gain more weight if you have a distorted microbial community in your gut.

A human study looked at the gut microbes in 12 obese patients as they were losing weight. Six of these patients would consume a low calorie/low fat diet and six would consume a low calorie/low carbohydrate diet. Their gut microbial community initially looked the same as was seen in the obese mice - relatively less Bacteroidetes and more Firmicutes. Over one year, as

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the participants lost weight, their gut microbes shifted towards more Bacteroidetes and less Firmicutes. This occurred irrespective of the diet they were on.

These preliminary research studies are showing that obesity may be related to Firmicutes bacteria. These bacteria may be able to extract more calories from the food you eat. You may make more of them by eating a high sugar/high fat diet. Losing weight may shift your bacteria back to the Bacteroidetes predominant microbial community. The overuse of antibiotics in our modern world may be

preventing our naturally evolved microbial residents from working on our behalf. Stay tuned for more information on “the bugs that live inside you” next time.

Dr. Kate Thomsen has a holistic health practice in Pennington, NJ. She is board certified in Family Medicine and in Integrative/Holistic Medicine. For more information visit online at www.drkatethomsen.com. For information about appointments or our upcoming group programs, call the office at 609-818-9700.

“Our plans miscarry if they have no aim. When a man does not know what harbor he is making for, no wind is the right wind.”
– SENECA