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The Gravity of Weight

Gut Reaction: Can G.I. Bacteria Cause Weight Gain or Loss?

Changing the flora of our intestinal tract to regulate weight

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Our G.I. track contains trillions of bacteriaSource: istock.com/Eraxion/used with permission

Our gut bacteria may play a significant role in obesity.
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No one really knows why overweight and obesity rates have skyrocketed to epidemic proportions in most of the world over the past thirty or so years. What we do know is that excess fat accumulation results from an energy imbalance or disequilibrium (increased caloric intake and/or decreased caloric expenditure) and is the result of an extraordinarily complex interaction of genetic, neuro-chemical, metabolic, behavioral, psychosocial, and other environmental factors. There are many theories regarding the burgeoning increase in the prevalence of obesity in the past thirty or so years. One of my previous blogs (1/1/13) highlighted top ten contributors to the growing obesity epidemic. Included in that list is the possibility that viruses or even bacteria may play a role. Here I focus on the role of bacteria in our gut. Could there be a connection between the flora in our intestinal tract and human obesity?

According to researchers Christina A. Tennyson and Gerald Friedman, writing several years ago in the journal *Current Opinion in Endocrinology, Diabetes, and Obesity*, the intestinal tract of an

adult human may contain as many as 100 trillion micro-organisms (with from 15,000 to 36,000 bacterial species represented), called our "microbiota." Though they are found throughout our small and large intestines, they are most predominant in our colon, and they perform many beneficial functions, including aiding metabolic functioning and our immune system.

Since human fetuses are sterile while *in utero*, how do we acquire all these microorganisms? Infants first gain exposure to their mother's bacteria by vaginal delivery, and the more prolonged the delivery, the greater the exposure. Those born by Caesarian section can acquire them through general maternal contact such as breast feeding or being kissed and even by contact with nursing staff and other infants. It is ultimately the job of our immune system to differentiate harmful bacteria from the majority of those that are beneficial to us.

Million and Raoult report, in a recent (2013) issue of the journal *Current Infectious Disease Reports*, that it has been a common practice in agriculture in industrialized countries for years to change the gut flora in pigs, calves, and chickens, by administering "growth promoters"--low-dose antibiotics or probiotics-- for the purpose of inducing weight gain in farm animals. Probiotics are live micro-organisms that change intestinal flora and may lead to health benefits when given in sufficient amounts either to animals or humans. Probiotics can be purchased in health food stores as dietary supplements and taken as capsules, but they (e.g. *Lactobacillus* and *Bifidobacterium*) are also increasingly added to yogurts and other fermented products.

What researchers are increasingly finding is that both animals and humans may either gain or lose weight when their gut microbiota are manipulated either by exposure to antibiotics, probiotics, or even prebiotics. Tennyson and Friedman report that prebiotics, such as bran or psyllium (e.g. Metamucil), are "dietary components that stimulate the growth and metabolism of these beneficial organisms" and hence change the ratios of some bacteria to others. It has been found that lean people are more apt to have a significantly greater proportion of *Bacteroidetes* relative to *Firmicutes*, the two most prevalent *phyla* in our intestinal tract, and when obese people lose weight, they reverse that ratio so that they have more *Bacteroidetes*. Even obese mice have a greater proportion of *Firmicutes* than lean mice, and these obese mice have "extracted calories more efficiently." In other

Some yoghurts contain probiotics.

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words, it is as if obese people (and mice), because of the percentage of certain flora in their G.I. tract, are eating more calories from the same food! There is likely a genetic component as well.

Could certain probiotics, though, also cause a decrease in weight, and even be used as anti-obesity agents? There have been studies in humans to suggest that probiotics may affect glucose and fat metabolism and even result in weight loss. The underlying mechanisms, however, are not entirely known and may be complex and multi-determined. There is clearly a need, as well, for more research on the safety of probiotics. Million and Raoult, for example, note that research on probiotics is subsidized or sponsored by the food industry, and unlike the pharmaceutical industry, the food industry, to date, does not have to reveal any financial conflicts of interest. As a result, perhaps we should interpret some of this research on the positive effects of probiotics cautiously.

Changing ratios of certain bacteria may have a role in weight.

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At this point, it remains to be seen whether probiotics have a place in the treatment of overweight and obesity. Whether there is an infectious component to weight control is an intriguing idea but many may still have an initial gut reaction of skepticism.

About the Author

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In Print: *The Gravity of Weight: A Clinical Guide to Weight Loss and Maintenance*

Online: my own website