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Case ID:M10-035L
Published: 10/10/2012

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Reducing Obesity in Overweight Humans by Altering their Acetate and Energy Uptake through the Management of their Intestinal Microbial Communities

Obesity is epidemic in the United States, and it is increasingly a problem in much of the developed world. The health care costs associated with obesity and obesity-related diseases are a significant and increasing fraction of total healthcare spending.

Currently, the most effective means to reverse obesity is surgical intervention: gastric bypass or gastric binding. Both of these procedures are invasive, expensive, and present significant risks to the patient. There is a need then, for a simpler, non-invasive means to inhibit, reverse, or even prevent altogether the development of obesity.

Researchers at the Biodesign Institute of Arizona State University in collaboration with researchers at the Mayo Clinic have discovered methods to decrease the energy (caloric) uptake of obese humans by changing the microbial communities in their intestine. By decreasing absorption of acetate?which is converted to fat?from food digestion, energy uptake can be reduced and obesity diminished.

The researchers discovered that removal of H2 by methanogens leads to increased production of acetate. Therefore, ways to scavenge acetate, include using probiotics such as acetate oxidizing bacteria or acetoclastic methanogens, and enhancing the growth of acetate-scavenging microbiota are desirable. Similarly, a microbial electrolysis cell comprising of an acetogenic bacterium and/or acetoclastic methanogen can be implanted in the gut to control the microbial population. These methods avoid surgical risks, reduce nutritional impact, and are reversible in the case that side effects are encountered.

Potential Applications

- Treatment for obesity

Benefits and Advantages

- Fewer adverse health effects
- Non-invasive treatment
- Relatively low cost

For more information about the inventor(s) and their research, please see Dr. Rittmann's directory webpageDr. Krajmalnik-Brown's directory webpage