The human body is inhabited by many microbes, most of which reside in our gut.

In fact, microbial cells outnumber all other cells in the human body ten to one! The microbes are an integral part of our digestive system and are critical to body physiology. Some of these functions have been known for a long time, such as digestion of certain foods and production of some vitamins. Other functions have only recently been recognized. For example, the gut microbes can regulate the body energy metabolism.

Gut microbes talk to our brain and may influence our appetite. They also communicate with the liver and muscles to fine-tune responsiveness to insulin. They may even send messages to our fat cells to let them know whether energy should be stored or released.

If you are interested, please contact the study coordinator at fmtstudy@umn.edu

For more information about The University of Minnesota’s Microbiota Therapeutics Program visit: www.microbiota-therapeutics.umn.edu

Are you pre-diabetic and struggling with your weight?
In recent decades we have seen increasing prevalence of obesity and diabetes. Undoubtedly, abundance of energy-rich foods and sedentary life styles have contributed to this trend. However, we now suspect that our altered lifestyle has also led to changes in the composition of gut microbes. These changes were driven by widespread use of antibiotics and a diet that is high in processed foods, which can cause extinction of specific microbes within individuals in our society. In fact, it is now recognized that lean people harbor greater diversity of microbes in their intestines than obese people.

Here is how we think microbes can influence obesity and body handling of glucose. In humans the gut microbes reside at the very end of the digestive tracts. That means that the microbes feed on leftovers. Nutrients from processed foods are absorbed very quickly in the small intestine and do not reach the microbes that reside in the colon. The colon microbes remain hungry and send messages to the brain to eat more. Unfortunately, we are surrounded by highly palatable, energy rich foods. We eat more, but little reaches the gut microbes because these foods are highly processed. The vicious cycle continues and the body tries to conserve energy by increasing resistance to insulin, which causes weight gain and diabetes.

We will test this idea in this study. Participants will receive implants of microbes isolated from healthy, lean donors. This procedure is currently called Fecal Microbiota Transplant. In the course of the study we will monitor the composition of microbes in stool, measure individuals' glucose tolerance by standardized tests, and perform functional MRI imaging to learn if the brain responsiveness to food stimuli change when gut microbes are altered.

If you are interested, please contact the study coordinator at fmtstudy@umn.edu

Eligibility: Subjects have to be pre-diabetic (elevated blood glucose or hemoglobin A1C), but not fully diabetic requiring medications.

Major Exclusions: Individuals will not be able to participate if they:
- Have serious food intolerances
- Have intestinal diseases, e.g., Crohn's disease, Ulcerative Colitis, Irritable Bowel Syndrome.

What is involved? This is an intensive study that will examine all aspects of energy metabolism
- The study will last for 10 weeks
- A study nutritionist will monitor food intake
- Visits to the University will be required at least weekly
- Direct measurement of insulin sensitivity
- Functional brain MRI scanning to examine the activity of appetite centers
- Indirect calorimetry to measure basal metabolic rate
- DEXA scanning to determine body fat and water composition
- Blood tests
- Collection of stool and urine samples
- Colonoscopy