Obese children have a different population of microorganisms living in their intestinal tracts, compared with lean children, researchers have found. These microorganisms appear to accelerate the conversion of carbohydrates into fat, which then accumulates throughout the body, the researchers said.

The study is the first to find a connection between the gut microbiota and fat distribution in children. The gut microorganisms in obese children are similar to those seen in previous studies of obese adults, providing evidence that bacteria play a role in excess weight gain starting at an early age.
The researchers could not determine why the microbiota differ between obese and lean people, but speculated that different diets likely contribute to the growth of one kind of bacteria compared to another. [Body Bugs: 5 Surprising Facts About Your Microbiome]

"In our study, we hypothesize that a diet high in carbohydrates might favor the growth of fermenting bacteria and favor accumulation of extra energy" in the form of body fat, said Dr. Nicola Santoro, an associate research scientist in the department of pediatrics at Yale University in New Haven, Connecticut, who led the study. Fermentation is a process by which gut bacteria break down carbohydrates and convert them into other compounds, including fats, Santoro told Live Science.

Approximately 17 percent of American children and teens are obese, a percentage two to four times higher compared to 30 years ago, according to the Centers for Disease Control and Prevention (CDC). Obese children are more likely to become obese adults and have a higher risk for health problems such as heart disease, type 2 diabetes, stroke, several types of cancer and osteoarthritis, according to CDC data.

In Santoro's study, published today (Sept. 20) in the Journal of Clinical Endocrinology & Metabolism, researchers examined gut microbiota in 84 children and teenagers between ages 7 and 19. These included 27 youth who were obese, 35 who were severely obese, seven who were overweight and 15 who were of normal weight. The participants also underwent MRIs to measure body fat distribution.

The researchers identified eight groups, or phyla, of gut microbiota that were associated with carbohydrate fermentation and fat accumulation. Four of these phyla flourished in obese children and teens, particularly the most obese, compared to their normal-weight counterparts. Smaller amounts of the other four microbial groups also were found in the study participants who were obese. These bacteria were largely absent or were present in only low numbers in lean youth.

In general, the gut microbiota found in obese youth tended to be more efficient at converting carbohydrates to fat compared to the gut flora of normal-weight individuals. This suggests that even with similar caloric intake, obese youth are accumulating more fat compared to lean youth as a result of the composition of their gut microbiota.

"[T]argeted modifications to the specific species composing the human microbiota could be developed and could help to prevent or treat early onset obesity in the future," Santoro said.

Santoro declined to speculate on what these modifications could be. Aside from dietary changes, which could alter the gut flora, some researchers are considering fecal transplantation. This would entail swallowing pills of freeze-dried feces from lean donors with the hopes of transplanting a different population of gut bacteria — bacteria less likely to promote fat accumulation. [5 Things Your Poop Says About Your Health]

Researchers at Massachusetts General Hospital in Boston led by Dr. Elaine Yu have begun a clinical trial on such a technique, recruiting 20 obese adults. Last week, researchers at McMaster Children's Hospital in Ontario, Canada, led by Dr. Nikhil Pai announced that they are recruiting participants for the first study of fecal transplants on children. This will study the transplants' use in the treatment of inflammatory bowel disease, which is strongly associated with both obesity and gut microbiota populations.
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The make-up of the bacteria found in human faeces may influence levels of dangerous fat in our bodies, say researchers from King’s College London.

Their analysis of stool samples in a study of more than 3,600 twins found evidence that some of this bacteria is inherited.

What is contained in faeces bacteria could therefore partly explain why obesity passes down through families.

The study is published in Genome Biology.

The research team extracted information from study participants about the human faecal microbiome - the bacteria present in faeces samples - and compared these to six different measures of obesity, including body mass index (BMI) and different types of body fat.

**iWonder - What does your poo say about you?**

The researchers found the strongest links with visceral fat, where participants with a high diversity of bacteria in their faeces had lower levels of visceral fat.

This type of body fat is bad news because it is stored in the stomach area around important organs such as the liver, pancreas and intestines and is linked with higher risks of cardiovascular disease and diabetes.
More investigation

Dr Michelle Beaumont, lead study author from the department of twin research and genetic epidemiology at King’s College London, said although the study showed a clear link, it was not yet possible to explain why it existed.

One theory is that a lack of variety in faecal bacteria could lead to the domination of high levels of gut microbes which are good at turning carbohydrates into fat.

Dr Beaumont said: "As this was an observational study we cannot say precisely how communities of bacteria in the gut might influence the storage of fat in the body, or whether a different mechanism is involved in weight gain."

And she indicated more research was needed to investigate how microbes in our guts and in our faeces can influence our health.

But there is a growing body of evidence to suggest that gut bacteria may play a role in obesity.

It is known that at least 50% of human faeces is made up of bacteria shed from the gut.
Dr Beaumont said that eating a broad diet including a variety of different types of food - much like that of the early hunter-gatherers - could increase the diversity of microbes in our faeces.

If the theory that microbes are passed on down the generations is correct, she said they may play an important role in how fat develops around the body and the health risk it presents.
Sugar fed bad bacteria in the gut can take over your brain like an alien presence.