

# Gut bacteria differ between obese and lean youth

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Children and teenagers who are obese have different microorganisms living in the digestive tract than their lean counterparts, according to a new study published in the Endocrine Society's *Journal of Clinical Endocrinology & Metabolism*.

The study is the first to find a connection between gut microbiota, also called gut flora, and fat distribution in children and teenagers.

Obesity affects 17 percent of children and teens nationwide, according to the U.S. Centers for Disease Control and Prevention. Childhood obesity is associated with an estimated \$14.1 billion in additional prescription drug, emergency room visit and outpatient visit costs each year, according to the Society's Endocrine Facts and Figures Report.

"Our findings show children and teenagers with obesity have a different composition of gut flora than lean youth," said the study's senior author, Nicola Santoro, MD, PhD, Associate Research Scientist in the Department of Pediatrics at Yale University in New Haven, CT. "This suggests that targeted 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."

The study examined gut microbiota and weight in 84 children and teenagers who were between 7 and 20 years old. The participants included 27 youth who were obese, 35 who were severely obese, seven who were overweight and 15 who were normal weight. Researchers

analyzed the participants' gut microbiota. The participants underwent an MRI to measure body fat partitioning, provided blood samples and kept a three-day food diary.

The researchers found eight groups of gut microbiota that were linked to the amount of fat in the body. Four of the microbial communities tended to flourish in children and teens with obesity compared to their normal-weight counterparts. Smaller amounts of the other four microbial groups were found in participants who were obese compared to children and teenagers of normal weight. The gut microbiota found in youth who were obese tended to be more efficient at digesting carbohydrates than the gut flora of [teenagers](#) and children of normal weight.

In addition, the children with obesity tended to have higher levels of short chain fatty acids in the blood than children of normal weight. The study found short chain fatty acids, which are produced by some types of gut bacteria, are associated with the production of fat in the liver.

"Our research suggests that short chain fatty acids can be converted to fat within the liver and then accumulate in the fat tissue," Santoro said.

"This association could signal that [children](#) with certain gut bacteria face a long-term risk of developing obesity."

The study, "Role of Gut Microbiota and Short Chain Fatty Acids in Modulating Energy Harvest and Fat Partitioning in Youth," will be published online ahead of print.

Other authors of the study include: Martina Goffredo of Yale University in New Haven, CT, and Universita' Milano Bicocca in Milan, Italy; Kendra Mass, Emily Ann McClure and Joerg Graf of the University of Connecticut in Storrs, CT; Elizabeth J. Parks of the University of Missouri in Columbia, MO; David A. Wagner of Metabolic Solutions Inc. in Nashua, NH; and Mary Savoye, Bridget Pierpont and Gary Cline

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**More information:** "Role of Gut Microbiota and Short Chain Fatty Acids in Modulating Energy Harvest and Fat Partitioning in Youth," [press.endocrine.org/doi/10.1210/jcem.2016-1797](http://press.endocrine.org/doi/10.1210/jcem.2016-1797)

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