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Fecal transplant helps improve behavior in kids with autism

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In the first published example of how the gut may play a role in autism, scientists have found that a "fecal transplant" helped to substantially improve behavior and gastrointestinal health in children with the

neurodevelopmental disorder.

The research involved a very small number of children—18—with autism who also had severe gastrointestinal problems. Researchers at the Biodesign Institute at Arizona State University theorized that by rebooting the children's intestinal "microbiome," the flora that inhabits the gut, they would be able to improve symptoms of autism. To their surprise, rebalancing the bacteria in the gut had a lasting effect two years after the treatment for most of the participants, all of whom were under the age of 18.

Rosa Krajmalnik-Brown, lead author of the research at Arizona State, noted that results from the analysis add credence to the theory of a gut-brain axis in autism, which means bacteria in the intestines influence the brain.

Krajmalnik-Brown emphasized that fecal transplants are best left to professionals. "We do not want people to try this at home," she said.

The transplants did not involve actual fecal matter but highly purified "good" bacteria that had been extracted from feces and given to the children in what Krajmalnik-Brown described as a "chocolate-flavored drink."

Fecal transplants rebalance the microbial flora of the intestines—the gut microbiome—by providing recipients with bacteria derived from the stool of a healthy donor. Introducing new bacteria—which replicate—diversifies the bacterial communities flourishing in the gut. After the transplant, there was a particular abundance of two beneficial bacterial species—Bifidobacteria and Prevotella—the study found.

Similar transplants have helped rescue adult patients from Clostridium difficile—C. diff—infections. An estimated 500,000 people are affected

by C. diff annually in the United States, and 30,000 die of the infection, according to the Centers for Disease Control and Prevention.

Fecal transplants also hold promise to reboot the microbiome in severe gastrointestinal disorders, such as colitis and Crohn's disease.

One of the biggest battles underway in medicine is the fight between doctors and pharmaceutical companies over whether human feces should be considered a regulated drug or treatment that physicians can administer as they see fit.

All of the children in Krajmalnik-Brown's research had a history of stomach pain, frequent constipation and diarrhea, problems that long have been reported by parents whose children are on the autism spectrum. Up to 50 percent of children on the spectrum are believed to have severe gastrointestinal problems.

The Arizona fecal transplants, which Krajmalnik-Brown called "fecal transfers," were given as an initial high-dose followed by daily doses over an eight-week period. Findings were reported Friday in the journal *Scientific Reports*.

"First, they got two weeks of vancomycin," she said of the potent antibiotic, "to get rid of bacteria in the gut. Then they got a high-dose treatment, then the maintenance doses," which were the eight weeks of daily bacterial cocktails in a chocolate-flavored drink.

At the onset of the initial 18-week research period, 83 percent of the children were found to have what Krajmalnik-Brown described as severe autism. Two years later, only 17 percent could be described as having severe symptoms of the neurodevelopmental disorder while 39 percent were found to have mild or moderate symptoms. Forty-four percent were below the cutoff for mild autism symptoms. Along with an

improvement in behavioral issues, gastrointestinal problems diminished substantially for most of the youngsters, she said.

The CDC estimates that 1 in every 59 children in the United States has an autism spectrum disorder.

"What was so exciting was the lasting effect," Krajmalnik-Brown said, referring to improved symptoms two years after treatment.

Doctors not connected with the research said the findings are promising, but require additional data.

"Although researchers have long suspected that there is a relationship between the gut and the brain in children with autism, this study provides some—albeit imperfect—support for this belief," said Dr. Andrew Adesman, chief of developmental and behavioral pediatrics at Cohen Children's Medical Center in New Hyde Park.

"The fecal transplant was the novel and the presumed major reason for the observed clinical improvement," Adesman said, noting it's possible that "other elements of the initial treatment regimen, such as the child getting two weeks of an antibiotic, actually altered the gut bacteria."

Adesman said he's also concerned there was no placebo in the Arizona research that would allow a comparison of the observed benefits.

Krajmalnik-Brown said additional research is planned, including a placebo-controlled study. However, the next fecal transplant project, she said, will involve adults with autism.

"We don't have all of the answers at this point," she said, adding that she and her team have only a hypothesis to explain why children's behavior improved after the fecal transplant. Perhaps because the gastrointestinal

discomfort was relieved, Krajmalnik-Brown said, the children simply felt better.