ASU experts follow gut reaction in autism treatment study

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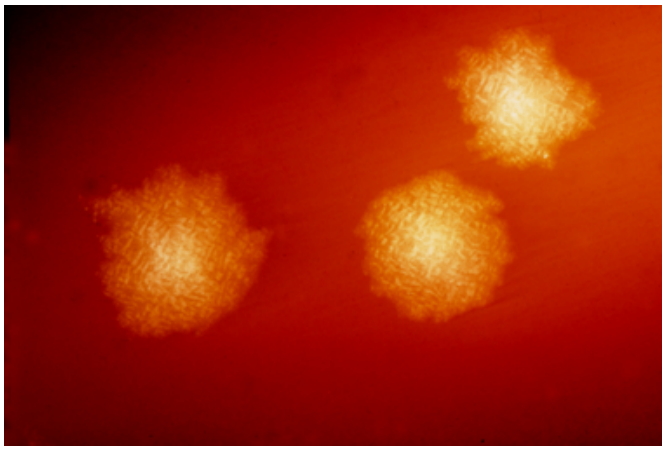

Clostidium difficile in the gut. The overgrowth of this dangerous bacteria can cause serious, life-threatening infections. Credit: Wikimedia Commons

About half of all children and adults with autism suffer from chronic gastrointestinal problems, causing frequent pain, discomfort and irritability. Research out of Arizona State University suggests these gastrointestinal (GI) complications may be due, in part, to abnormal gut bacteria.

A new study approved by the U.S. Food and Drug Administration and led by Arizona State University will examine a novel treatment – called fecal microbiota transplant (FMT) – for GI problems in children with autism. The treatment involves transferring about 1,000 different species of live gut bacteria from a healthy donor that then act like a broad-spectrum probiotic treatment to restore normal gut bacteria.

FMT has been used to treat serious Clostrium difficile infections that kill up to 15,000 people each year in the United States. Determining the safety and tolerability of using FMT to treat GI problems in children with autism is driving the study.

The FDA has approved a pilot treatment study of 20 children with autism, ages 7 to 17 years, and moderate to severe gastrointestinal problems.

Missing bacteria

Led by professor Rosa Krajmalnik-Brown, an expert on evaluating the composition of gut bacterial communities, and professor James Adams, director of the ASU Autism/Asperger's Research Program, the ASU research team published a scientific paper last year demonstrating that children with autism were missing several hundred species of gut bacteria compared to typical children.

"Our initial work found major differences in the gut bacteria of children with autism compared to typical children, and our subsequent work has confirmed those findings," said Krajmalnik-Brown. "Children with autism seem to be missing hundreds of beneficial gut bacteria."

"Many children and adults with autism have chronic gut problems, sometimes lasting for many years and seriously affecting their quality of life," said Adams. "We think this treatment may be helpful."

The team's hypothesis is that FMT will "reseed" the gut with beneficial bacteria that will help diminish GI problems and possibly reduce autistic symptoms.

Several studies show that FMT may also be helpful in treating other GI problems, such as ulcerative colitis, Crohn's disease, inflammatory bowel disease, irritable bowel syndrome and chronic constipation.

Beneficial versus harmful

The human gut typically contains more than 1,000 different species of bacteria – most of them beneficial. These bacteria help with digesting food, making certain vitamins, improving GI function and protecting against pathogenic bacteria.

However, there are a few dangerous bacteria, such as Clostidium difficile (C. difficile), which can cause serious, life-threatening infections. C. difficile kills about 15,000 people per year in the U.S., but a single dose of FMT has been shown to cure C. difficile with 92 percent effectiveness, usually within a few days.

Collaborating with Northern Arizona University and University of Arizona, the ASU team will lead the treatment portion of the study, with the help of Sharon McDonough-Means, a developmental pediatrician involved in the care of children with autism and previous research studies. Greg Caporaso at NAU, an expert in computational and statistical methods for studying communities of microorganisms, will analyze the effect of FMT on gut bacterial communities, and Matthew Sullivan at UA will investigate the viruses that infect gut bacteria, and thereby affect bacterial populations in the gut.

The new initiative is a follow-up to a previous study that demonstrated that treatment with a powerful oral antibiotic, vancomycin, led to a temporary improvement in both gut symptoms and symptoms of autism, presumably because it killed off harmful bacteria in the gut. However, when the treatment was stopped, the benefits were lost, presumably because there was insufficient "reseeding" of the gut with beneficial bacteria.

More information: More information on the study can be found at autism.asu.edu.

Provided by Arizona State University