

Understanding intestinal microbiota to regain balance in the gut

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Fecal transplants heal infections by increasing microbial diversity

The human gut is its own ecosystem, hosting close to a thousand microorganisms, many of which are helpful and necessary.

When you take antibiotics, some of the beneficial germs can be wiped out, leaving you more vulnerable to diarrheal infections—infections, in some cases, that are antibiotic resistant and life-threatening.

Fecal transplants are proving to be a highly effective, antibiotic-free tool to cure *Clostridium difficile*, known as C diff, often a health care acquired infection that is more common among the elderly or those who take frequent antibiotics.

Colleen Kraft, medical director of Emory's clinical microbiology laboratory and assistant professor in

the Department of Pathology and the Division of Infectious Diseases, started the intestinal microbiota program to treat and understand these infections. "Now that we as a medical community have a better understanding of the damage we do to the intestinal microbiota with [antibiotic therapy](#), this understanding became the motivation to restore the balance to improve health," Kraft says.

In a [fecal transplant](#), a sample is taken from a healthy donor, mixed with saline, and transplanted into the small intestine or colon of the ill patient, where the good bacteria repopulates and restores the healthy microbiota. Tanvi Dhere, director of inflammatory bowel diseases at the Emory Clinic, performs the transplant via colonoscopy and follows up with the [patients](#) in the Emory GI clinic. There have been 81 fecal transplants since the program began in 2012.

Donors need to meet stringent requirements, including not having school-aged children, not traveling internationally, and not having taken any antibiotics for at least one year; the sample is screened for HIV/AIDS, hepatitis, STDs, parasites, and more. Patients are offered the option of having a family member screened for donor eligibility, but few have requested this after the standardized donor program was started.

Pathology residents Ryan McCormick and Drew Davis are two of Emory's donors.

"During clinical rotations, we saw C diff cases on the wards," Davis says. "It's important to recognize how bad conditions like C diff and colitis actually are."

"For the record, I don't think it's as gross as it sounds," McCormick says, laughing. "My reason for donating is to have more direct involvement in patient care."

Of the 336,000 C diff cases in the US each year,

14,000 result in death, often because the standard course of antibiotic treatment failed.

Kraft and Dhere are enrolling participants for a clinical trial in which they will examine the microbiome of the sample at the mucosal level. "A patient's gut microbiome is changed after undergoing a fecal transplant," Dhere says. "We want to know what specifically is allowing patients to recover."

Collaborative research with other departments is ongoing, including a study with the Department of Surgery on the efficacy of fecal transplants in treating pouchitis, a gastrointestinal condition that may require chronic [antibiotics](#) and affects more than 40% of patients with ulcerative colitis who have had a colonic resection. The team, led by Virginia Shaffer, has been granted an investigational new drug designation from the FDA. Fecal transplantation is also showing promise for treating C diff in organ transplant recipients, who must take drugs to keep their immune systems from rejecting the transplanted organ.

The intestinal microbiota program has a success rate of more than 90%. "We receive a lot of thank-you cards from patients and their families," Dhere says. "The quality of life that patients get after the procedure speaks volumes for this treatment."

Provided by Emory University

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