

Nonpathogenic viruses transferred during fecal transplants

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Communities of viruses can be transferred during fecal transplants, according to a study published this week in *mBio*, an online open-access journal of the American Society for Microbiology. Fortunately for patients who use this procedure, the viruses found to be transmitted in this study appear to be harmless to humans.

Fecal transplants are widely used for treating refractory *Clostridium difficile* infection, offering more than a 90% cure rate. The [procedure](#) is being tried for other gastrointestinal ailments such as irritable bowel syndrome and ulcerative colitis. During a fecal transplant, stool collected from a donor who has a healthy gastrointestinal tract is mixed with a solution (often saline), and then placed by colonoscopy, endoscopy, sigmoidoscopy, or enema into a patient with a gastrointestinal ailment. This transfers potentially "good" bacteria into a patient. Similar to blood donations, the donating candidate is tested for high-risk [viruses](#) such as HIV.

"Fecal transplants are widely used in medicine now and they work, but you might ask what viruses are moved along with the desirable bacteria?" said principal investigator of the new study, Frederic Bushman, PhD, chair of the Department of Microbiology, Perelman School of Medicine, University of Pennsylvania. "The donors are screened very extensively for GI diseases and other infectious diseases, however you worry about the unknown unknowns, infectious agents that might be bad, but not screened for."

In the new study, the researchers analyzed the [fecal transplants](#) from a single, healthy donor to three children with chronic ulcerative colitis. The children received intensive treatment, a course of 22 to 30 transplants. The researchers purified viral particles from the poop of the donor and the recipients and conducted deep genomic sequencing to determine whether any viruses were transferred.

"We could see bacterial viruses moving between humans and we were able to learn some things about transmission, but we did not see any viruses that grow on animal cells that may be of concern for infecting and harming patients," said Dr. Bushman. "We saw mostly temperate bacteriophages."

A temperate virus does not always cause immediate lysis following entry to a host, but can adopt a latent state, replicating its genome along with the host's genome after integration. These latent viruses can induce during times of stress, burst the cell, and liberate new viral particles into the environment. Some temperate bacteriophages can be of medical concern, such as ones that carry toxin genes or contribute to antibiotic resistance, but they are much less of a concern than animal cell viruses.

Temperate phages appeared to be transferred preferentially during fecal transplants. "We speculate that the temperate replication style exists, in part, to promote virus dispersal, to allow viruses to reach new environments where they can flourish," said Dr. Bushman.

More information: The full study can be read online at: mbio.asm.org/content/7/2/e00322-16

Provided by American Society for Microbiology

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