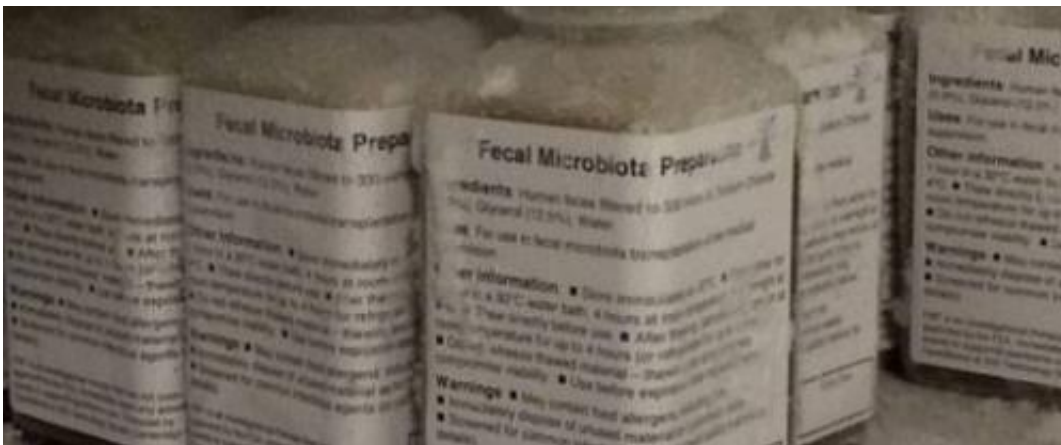


# Startup tackles nasty infection with first public stool bank

November 4 2014, by Elizabeth Thomson

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Credit: OpenBiome

Mark Smith PhD '14 vividly remembers the first conversation he and a colleague had with venture capitalists through MIT's Venture Mentoring Service about the concept that would lead to OpenBiome, the nation's first public stool bank for the treatment of a deadly bacterial infection. While two of the three businessmen they consulted with were supportive, the third was incredulous.

"That third guy was actually pretty helpful, too, in that he showed us that there were people we needed to convince," Smith, an OpenBiome founder and a postdoctoral associate in MIT's Department of Biological Engineering, told MIT Spectrum.

They appear to have succeeded. In just over a year OpenBiome has gone from treating its first patient to working with more than 130 hospitals in 34 states. That's a considerable way toward meeting the nonprofit company's ultimate goal: enabling safe universal access to fecal microbiota transplantation (FMT) therapies, in which a stool sample is transplanted into a patient's gut.

Although people have practiced rudimentary forms of FMT for hundreds of years, it didn't attract much attention in recent history until 2013. That's when a study published in the *New England Journal of Medicine* showed that the therapy was more effective than antibiotics in treating patients with *Clostridium difficile*, or *C. difficile*, a nasty stomach bug that infects some 500,000 Americans every year, killing around 14,000.

"Most people will recover from *C. difficile* after one course of antibiotics, but others will face recurrent infections that do not respond to antibiotic therapy," according to the OpenBiome web site. Those are the patients who can benefit from FMT, which reintroduces into the gut the beneficial bacteria that usually keep *C. difficile* in check.

Smith was introduced to *C. difficile* when a friend's cousin suffered from a recurrent infection. That person quickly recovered after FMT, but "I was struck by how crazy the process was for him, how inefficient it was and how difficult it was for him to find access," says Smith. "To me it seemed like a real failure of our public health system—that we have a treatment that we know is 90 percent effective for a serious disease and nobody was making it available."

The challenge, Smith found, involved finding donors, getting them screened, and processing the material. "It seemed obvious that we needed to set up a stool bank to make this work," he said.

OpenBiome fills that need. It collects samples from carefully screened donors who first fill out a questionnaire with 107 questions "that basically excludes you if you've done anything too interesting in your life," Smith says. Each sample is then tested for 26 different infectious agents like HIV or hepatitis, as well as biomarkers that could indicate additional problems. Once screened, the material is held in quarantine for 60 days—then screened again. Frozen samples are then sent to clinicians, who can save quite a bit of time and money for each procedure they perform. Rather than paying for the screening of many individual donors, OpenBiome screens a few whose samples are then used by many.

"We originally thought we'd serve some of the hospitals in the Boston area, but demand has really grown quickly," Smith says. The company, which began in a corner of Eric Alm's laboratory on the MIT campus, has since relocated to a larger space in a Boston suburb. Alm, an associate professor in the Department of Biological Engineering, is Smith's advisor at MIT and a member of the OpenBiome team.

Other members of the team with an MIT connection include: James Burgess, who has taken a leave from the MIT Sloan School of Management to launch OpenBiome; Andrew Noh, an MBA candidate at Sloan; Allison Perrotta, a graduate student in the Alm lab; and Zain Kassam, a postdoctoral fellow in the Alm lab.

Smith notes the important role that MIT played in making OpenBiome a reality. In addition to help from Alm, the Venture Mentoring Service, and the Clinical Research Center (where some of the initial donor screening took place), he lauds the Institute's entrepreneurial culture of "really trying to translate science into real-world applications."

He concludes, "It's been really exciting to have such a big impact on a lot of patients in a relatively short amount of time."

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