Trust your gut
Crohn’s Disease

-an autoimmune disorder that causes inflammation of the intestinal tract along with unpredictable, often incapacitating episodes of abdominal pain and bloody diarrhea.

Affects 700,000 Americans

Like other autoimmune disorders, is poorly understood
Crohn’s Disease

Standard treatments often don’t work, or work only temporarily, and many have serious side effects.

When the disease cannot be managed by drugs, surgery to remove part of the colon is often the only option.
Patients often experience years of debilitating symptoms, as well as a shifting regimen of enemas, suppositories, shots, supplements, and, for several months, intravenous infusions of Remicade, a potent immunosuppressant, at a cost of more than $12,000 each.
Crohn’s Disease

Normal

Right colon

Appendix

Small bowel

Crohn’s Disease

Narrow inflamed ileum-ileitis
New treatment for Crohn’s?

Fecal transplantation

stool from a healthy person is transferred to the colon of someone who is sick.
The official term is **fecal microbiota transplantation**, or FMT

ulcerative colitis- evidence can recover following fecal transplant

No one knows how many people have undergone fecal transplants
New research suggests that the microbes in our guts—and, consequently, in our stool—may play a role in conditions ranging from autoimmune disorders to allergies and obesity, and reports of recoveries by patients who, with or without the help of doctors, have received these bacteria-rich infusions have spurred demand for the procedure.
People are doing at home (not recommended). How to book on Amazon.

Need...
blender, a rectal syringe, saline solution, surgical gloves, Tupperware containers.

A year and a half ago, a few dozen physicians in the United States offered FMT. Today, hundreds do...
Cleveland Clinic named fecal transplantation one of the top ten medical innovations for 2014
Biotech companies are competing to put stool-based therapies through clinical trials and onto the market. In medicine, at any rate, human excrement has become a precious commodity.
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For every cell we have, there are ten bacterial (microbial) cells

10% human, 90% poo

this invisible population is known as the gut microbiome, and lately it has become an object of intense scientific interest

stool- by dry weight is roughly 40% microbes
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FMT - the primary medical application of microbiome research to date

Still at a rudimentary stage.
FMT has been proven to work only in the case of a single disease: a bacterial infection known as *Clostridium difficile*.  

C Dif.
Symptoms similar to Crohn’s
Afflicts more than 500,000 per year
Kills 15,000 per year
Almost all are hospital patients who received antibiotics
C Dif.

Broad-spectrum antibiotics-prescribed prophylactically to patients undergoing surgery, can destroy gut flora, making it easier for C. difficile to take hold.
C Dif.

standard treatment

Vancomycin—an antibiotic

often ineffective against new strains of C.Dif
Scattered case reports in the medical literature described *C. difficile* patients, some on their deathbeds, who received fecal transplants and recovered, often within hours.
January 2013-The New England Journal of Medicine first randomized controlled trial with FMT comparing the therapy to treatment with vancomycin for patients with recurrent disease.
Trial was ended early when doctors realized that it would be unethical to continue: fewer than a 1/3 of the patients given vancomycin recovered, compared with 94% of those who underwent FMT—the vast majority after a single treatment.
The first known account of fecal transplantation dates to a 4th century Chinese handbook by the physician Ge Hong, who prescribed “yellow soup”—a fecal suspension—as a remedy for severe diarrhea.
In the USA, the first description of FMT appeared sixteen centuries later, in 1958, when Ben Eiseman, a surgeon at the V.A. Hospital in Denver, published 4 case reports in the journal Surgery.
At the time (late 1950’s) stool was then widely assumed to be mainly a source of disease; there was little empirical support for the notion that bowel bacteria were important for health.
Several of Eiseman’s patients had become deathly ill after the requisite preoperative course of antibiotics. He concluded that the drugs were destroying normal gut flora.
He sent a resident to collect stool specimens from a nearby maternity ward, reasoning that pregnant women were likely to be young and healthy and to have avoided antibiotics. The stool, transferred to Eiseman’s patients, saved their lives.
For years, virtually the only proponent of FMT was Thomas Borody, a gastroenterologist in Sydney, Australia. In 1988, after reading Eiseman’s paper, tried a fecal transplant on a patient who had contracted an intestinal ailment in Fiji.
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The patient recovered, and Borody estimates that he has since performed the procedure 5000 including, with stool supplied by his father, on his mother, who suffered from crippling constipation
In addition to *C. difficile* patients, Borody says that he has successfully treated people with autoimmune disorders, including Crohn’s and multiple sclerosis.
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In the case of *C. difficile*, the impact of a fecal transplant is straightforward:

normal gut bacteria overwhelm and suppress the pathogen
In patients suffering from other conditions, the effects of FMT are harder to predict or to explain, and until rigorous trials are undertaken reports of spectacular recoveries are merely anecdotes, without scientific value.
First study to show that a disease trait could be transmitted from one animal to another through the microbiome.

FMT on lean mice from obese donor- lean mice got obese
St. Louis Obesity twin study
Stanford microbiologist

Have a less diverse microbiome now

Microbiome has undergone radical changes in response to shifts in our diet, our antibiotic use, and our increasingly sterile living environments
Western diet-notoriously light on the plant fiber that serves as fuel for gut microbes.
Less fuel means fewer types of microbes and fewer of the chemical by-products that microbes produce as they ferment our food.
Western Diet effects?

Research in mice suggests that microbiome products help reduce inflammation and regulate the immune system.

Rates of Western diseases—including heart disease & autoimmune disorders & T2DM—All involve inflammation
Where do we go from here?

Need more studies

FDA reluctant to approve FMT in clinical trails

Future may circumvent FMT and can eat or take pill with good microbes
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