

DEBUGGING

How millennials will save us all

Jennifer Block

October 23, 2014



📷 A rebellion is brewing. (Reuters/Peter Thomas)

Millennials get a bad rap for loading up on debt, mooching off their parents, and hiding behind technology. But there's one problem that they may be particularly suited to tackling: our shrinking microbiome.

The microbiome, you may [have already heard](#), is the trillions of microbes that have

evolved along with humans—on our skin, in our guts, up our noses and everywhere else. Research keeps showing that these organisms are key to our metabolism and immune-system functioning, and that their absence is linked to almost every “modern” ailment on the public health agenda: obesity, diabetes, asthma, allergies, autoimmune diseases, even autism and mental health disorders.

“As a result of modern life, our ancient friends are disappearing,” Dr. Martin Blaser, a professor of medicine at New York University and author of *Missing Microbes: How the overuse of antibiotics is fueling our modern plagues*, told Quartz. These microbes help us digest; they absorb nutrients and are capable of producing vitamins; they defend against pathogens; they essentially train our immune systems and even affect gene expression, playing a role in whether disease takes hold or not.

Blaser co-authored [a recent study](#), published in the journal *Cell*, which shows that early antibiotic exposure in mice essentially reprogrammed their metabolism, predisposing them to obesity. Other studies suggest that babies who aren’t exposed to their [mother’s vaginal microbiome](#) at birth are more likely to develop asthma, allergies, and autoimmune disorders, while other research is showing that [breastmilk not only feeds](#) an infant’s good bacteria but is teeming with them. There’s even evidence that our [bacteria affect our moods](#).

Yet for the past century or so, we’ve been at war with these tiny cohabitants, lumped together under the feared banner of “germs.” As the title of his book suggests, Blaser blames antibiotics for most of the destruction. But the “[hygiene hypothesis](#),” as it’s known, suggests that it’s also our overly sanitized lives that have contributed to the demise of the microbiome. “Our challenge is to understand what have we lost and then find ways to give it back,” he says. “And giving it back is not necessarily the probiotics you can buy at the health food store.”

The scientific community is aflutter with trials and conferences and general

excitement to map this out, similar to the Human Genome Project, which, in terms of offering answers and cures was a big disappointment. But if the microbiomic hypotheses continue to bear themselves out, “medical science may be on the trail of a Grand Unified Theory of Chronic Disease, at the very heart of which we will find the gut microbiome,” Michael Pollan wrote not long ago in the [New York Times](#).

Some bacteria, like *Lactobacillus* and *Bifidobacterium*, tone and protect the intestinal tract and proliferate in healthy people, while the dominance of others, like *Firmicutes*, are associated with obesity and diabetes. Researchers have been collecting samples around the globe and have found that the microbiota in hunter-gatherers are much more biodiverse and robust with the health-promoting species than the typical American microbiome, and they see those samples as characteristic of our pre-industrial microbial heritage. Ecologically speaking, biodiversity is survival.

To appreciate how revolutionary this moment is, consider the premise of modern medicine, often expressed in military terms: genetics are our fixed armies, illness the result of invading pathogens. Instead, as one of the microbiome’s [first researchers has said](#), this new paradigm “has more in common with park management than it does with our current practice of trying, in the broadest way possible, to kill microbes.”

This good news is that millennials are willing to get their hands dirty, leading a renaissance of urban gardening and composting and DIY pickling. Restoring the microbiome is also going to take a certain amount of rebellion, which the generation that brought us Occupy should embrace. “The main thing that people can do is to work with their healthcare professionals to minimize ongoing damage,” says Blaser, ie resisting the overuse of antibiotics and cesarean sections. He also told Quartz that we need to quit buying “antibacterial” everything and toss the hand sanitizers unless its flu season or we work in a hospital.

Still, germophobia persists among the masses. We are [scared of superbugs](#). We scrub

with antibacterial soap and douse ourselves and our kids in hand sanitizer. But our ailing microbiome “is the other side of antibiotic resistance,” Blaser points out. In other words, we need to worry about our own weakened systems as much if not more than the scary superbugs we’ve created. And we need to worry not only for ourselves, but for future generations, whose cells [are epigenetically connected](#) to the way we are living now.

It turns out we’ve been starving our microbial dinner companions, to the point that some have stopped coming around. But there’s reason to hope for more lively gatherings: [Food industry reports](#) show that millennials are poised to turn grocery stores upside down with their penchant for fresh, organic vegetables and artisanal everything. They are buying less of the processed, starchy, sugary foods that are feeding the unsavory microbes—and they’re going to pass the foodie habit on to their kids. In effect, they’re already bolstering a microbial boom.

It’s a matter of feeding the good microbes, [or your “gut garden,”](#) as Dr. Robynne Chutkan, a DC-based gastroenterologist and author of *Gutbliss*, puts it. What do they like to eat? Kale, of course, leafy greens and vegetables of all sorts, fermented sauerkraut and kimchi, she says. In her practice, she’s seen complete reversals of Crohn’s disease and ulcerative colitis achieved by diet. In other words, when you eat you are feeding your “friends” as much as yourself. “If people aren’t eating the right diet, no amount of probiotics will make them better,” she says.

What’s promising is that our microbiomes are constantly changing and somewhat malleable. Chutkan cites a Harvard study that found that gut bacteria can completely shift in less than two days in response to diet. And if a species is missing entirely, it can theoretically be replaced with [little more than a turkey baster](#). Fecal transplants have proved 95% effective in curing people of antibiotic resistant *C. difficile* infection. (Last week, [one researcher blogged](#) his DIY transplant from a hunter-gatherer in Tanzania.) There may be an easier way to do this [with frozen pills](#).

We also need better diagnostics and narrow spectrum antibiotics, which would zero-in on true “invaders” rather than slashing and burning the whole village. With better, cheaper, quicker tests, doctors and patients wouldn’t be so keen to turn to antibiotics “just in case.”

Meanwhile, parents who have 20-somethings living back at home, take heart: families [tend to share microbes](#).

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