WHAT'S LURKING IN YOUR SHOWERHEAD

By Nicola Twilley
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A new citizen-science initiative is cataloguing the weird microbes that live among us.
PHOTOGRAPH BY NEIL SETCHFIELD / ALAMY

On a recent autumn morning, I did something that I have never done before, something that had never even occurred to me as a thing that I might do or should feel embarrassed about not doing: I cleaned my showerhead. It's possible, I hope, that others of you are similarly negligent. If so, I am here to report, dear readers, that it was gross. I am the proud owner of a handsome matte-black rainfall-style showerhead. When I unscrewed it and peered inside, I was confronted with a slimy, slightly clotted dark film covering the stainless-steel interior. I sprayed it with everything I had and left it to marinate in a bucket of bleach while I called my mother to verify that showerhead cleaning was not something she'd told me to do years ago. (It wasn't.)

My sudden showerhead conniption was set off, indirectly, by Rob Dunn, an evolutionary biologist at North Carolina State University. Dunn's laboratory is focussed on getting to know humanity's most intimate microbial neighbors—the invisible army of bacteria, fungi, mites, and molds that live on our skin, clothes, and household surfaces. Earlier this year, as part of that mission, Dunn and his colleagues launched the Showerhead Microbiome Project, sending five hundred sampling kits to volunteers across the United States and Europe. (The team is still recruiting; you can sign up online here.) My kit was

No. 260. It came with a pair of blue nitrile gloves and a questionnaire that probed my cleaning and showering habits. “We’re great at inspiring shame,” Dunn said. The sampling process took about five minutes: I rubbed a cotton swab over the showerhead’s inner surfaces while trying not to gag, then used a few paper strips to test the chlorine, nitrate, iron content of my tap water, and its pH. And then, before I walked to the mailbox, I got to cleaning.

Dunn and his collaborators hope to be able to tell me sometime in the next few months which microbes I eradicated. Their first step will be to sequence the DNA present in my swabbed gunk, in order to identify what classes of organism are generally present. Since showerheads are extreme environments—Dunn called them “the desert washes of your home,” alternately soaking wet and bone dry—he expects their inhabitants to include not only bacteria and fungi but also more unusual creatures like amoebae, algae, and protists. “You may have worms,” Dunn told me. “There’s even some evidence in the Netherlands of little crustaceans.”

The scientific literature on showerheads is relatively slim, but much of it has been authored by another member of the project, Jennifer Honda, a microbiologist based at the University of Colorado Anschutz Medical Campus. She will be looking at my sample to see whether it contains nontuberculous mycobacteria (N.T.M.), a pathogen that can cause lung disease in individuals with weakened immune systems, and that, based on her previous research, seems to abound in showerheads. Honda is testing the hypothesis that, in more tropical climates, where the showerhead has less of a chance to dry out between uses, N.T.M. is quite common, while in more temperate regions it is usually absent.

But if Honda is primarily concerned with the ways in which invisible shower bugs might cause harm, Dunn is interested in how they may benefit the human immune system. “There’s a growing awareness that we do need exposure to a diversity of microbes,” he said. “It’s possible that this is one of the few places where we’re getting exposed to lots of weird things.” Dunn is curious to see whether differences in water systems might explain differences in showerhead microbial communities, and is especially keen to recruit volunteers from Europe, where many municipal authorities follow less stringent chemical-treatment regimes than their counterparts in the United States do. Once the first round of the project is complete, Dunn plans to examine the showerheads of a smaller subset of volunteers more closely. “Right now, we’re so ignorant that we have to have that big picture. Otherwise, we won’t be asking the right detail questions,” he said. “How important are you to what’s in your showerhead, and how important is that to you?”

Versions of that question have driven much of Dunn’s previous research. His publications include a survey of belly-button microbial diversity, an analysis of the population dynamics of facial mites, and a study of the arthropods resident in different kinds of North Carolina homes. In 2011, Dunn and two of his colleagues, Noah Fierer, a microbial ecologist at the University of Colorado Boulder, and Holly Menninger, the director of public science at N.C. State, launched Wild Life of Our Homes, a multi-year survey of household dust. Among the team’s early findings: the kinds of fungi in a home

are largely determined by geography, whereas your bacterial housemates are, for better or for worse, a reflection of you.

Dunn's most recently launched study, the Sourdough Project, examines the same intersection of water, bodies, microbes, and climate as the Showerhead Microbiome Project—to the point that he frequently lumps the two together under the moniker "showerdough." "Although superficially it's kind of gross even to think about them in the same title, the questions are very similar," he said. Scientists and bakers have a fairly good idea of which microbes to expect in a sourdough starter, also known as a mother, but they often disagree on how the organisms got there. "There are people who swear that it's climate, and so you can only make good sourdough in San Francisco," Dunn said. "There are others who swear it's the water." And then there is the unknown human contribution. In some Scandinavian communities, Dunn noted, sourdough has traditionally been the province of women. He suggested that the female reputation for making tastier bread may derive from the fact that the skin on women's hands is more likely to be colonized by fermentation-friendly lactobacilli from their vaginas.

Dunn aims to settle these questions with another citizen-science initiative. In the coming months, thousands of volunteers in Europe and the United States will send him their own starters for genetic analysis. Then, as in the showerhead study, he and his colleagues will examine a few hundred of the most interesting samples more closely, culturing their microbial members individually in order to understand what each species contributes to the resulting loaf. The next phase of the experiment will take place in Brussels in July, and will involve a few volunteers undergoing intimate swabs before making several batches of sourdough. "There are some parts that are easier to do in Europe than in the U.S.," Dunn said. "We're not going to do a project with a vaginal and a food component in North Carolina." Beyond differences between the sexes, there may be a genetic component to how skin influences sourdough; Dunn suspects that the genes responsible for wet earwax and stronger underarm odor, which are common among bakers of Caucasian and African descent, may well have an impact on bread flavor. Finally, Dunn and his collaborators will look at sourdough genealogy. They have already put out a call for heritage starters—those passed down through the generations—and have promised that the most microbially unique will be archived at a sourdough library in Brussels, "for the benefit of humanity and bread." (Claus Meyer, the celebrated Danish restaurateur, has expressed interest in baking with them.)

Though Dunn and his colleagues operate at the smallest scales and in the most niche of environments, their work has a certain nobility. "Really, what we're doing is helping people understand how their behavior influences their surroundings," he said. That understanding may mean a future filled with healthier showerheads and tastier bread. In the meantime, mind your mycobacteria.

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