The microbes in our guts have been linked to everything from **arthritis** to **autism**. Now, scientists say they can even tell us about our future health. Two new studies find that our “microbiome”—the mix of microbes in our gut—can reveal the presence of many diseases better than our own genes can—and can even anticipate our risk of dying within the next 15 years.

“I am hopeful and enthusiastic that the community will reach a point where we’re able to develop microbiome-based therapeutics and diagnostics,” says Samuel Minot, a microbiome researcher at Fred Hutchinson Cancer Research Center who was not involved in the research. “I think that this is within the realm of possibility.”

In the first study, researchers reviewed 47 studies looking at associations between the collective genomes of the gut microbes and 13 common diseases. These included schizophrenia, hypertension, and asthma—all of which are considered “complex” because they are caused by both environmental and genetic factors. They then compared these studies with 24 genome-wide
association (GWA) studies, which correlate specific human genetic variants with diseases.

Overall, the genetic signature of gut microbes was **20% better at discriminating between a healthy and an ill person** than a person’s own genes, the team reports in a paper posted this month on the preprint server bioRxiv. The microbiome was 50% better than GWA studies at predicting whether someone had colorectal cancer. A person’s own genetic profile only outperformed the microbiome for predicting whether someone had type 1 diabetes.

Though study author Braden Tierney, a computational biologist at Harvard Medical School, admits the analysis is preliminary, he says the work could ultimately benefit people. “We can use both the microbiome and human genetics in the clinic to improve patient quality of life.” The goal, he says, is to identify key markers in both sets of genomes that could help diagnose these complex diseases.

Still, microbiome researcher Jeroen Raes of the VIB-KU Leuven Center for Microbiology, says scientists don’t know nearly as much about the microbiome as they do about how our genes work. So comparing the two at this point is “risky.”

One advantage of the microbiome, however, he says, is that it’s impacted by a person’s environment: what they eat and how much they exercise, for example. As such, it may be a better predictor of diseases like type 2 diabetes, which tend to have large environmental components.

In the second study, researchers looked at the link between a person’s microbiome and their life span. The analysis took advantage of a Finnish study that has been collecting health data from thousands of participants since 1972. In 2002, participants donated stool samples that were sequenced 15 years later. The data reveal that individuals with an abundance of *Enterobacteriaceae* bacteria—a family of potentially infectious bacteria that includes *Escherichia coli* and *salmonella*—are **15% more likely to die in the next 15 years** the team reports this month on the preprint server medRxiv.

The link between the gut bacteria and increased risk of death held across the eastern and western Finnish populations, which have different genetic backgrounds and lifestyles.

Minot says he’s impressed with the study because such long-term analyses are rare and hard to replicate. “I’d love to see more of them in the future.”
For both studies, it’s still unclear why the microbiome is linked to death and disease. It’s possible the microbes are causing disease or shortening someone’s life span in some way. But it’s also possible they’re just reflecting whatever else is going on in the body.

Either way, doctors and scientists that want to help prevent and treat human disease should be paying a lot more attention to the tiny residents in our guts, Tierney says.