

# New public gut bacteria study expected to reach around world

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Ever wondered who is living in your gut, and what they're doing? The trillions of microbial partners in and on our bodies outnumber our own cells by as many as 10 to 1 and do all sorts of important jobs, from helping digest the food we eat this Thanksgiving to building up our immune systems.

In association with the Human Food Project, researchers at the University of Colorado Boulder along with researchers at other institutions around the world are launching a new open-access project known as "American Gut" in which participants can get involved in finding out what microbes are in their own guts and what they are doing in there.

The project builds on previous efforts, including the five-year, \$173-million NIH-funded Human Microbiome Project, to characterize the microbes living in and on our bodies, said Associate Professor Rob Knight of CU-Boulder's BioFrontiers Institute. But unlike other projects that have focused on carefully chosen [test subjects](#) with a few hundred people, this project allows the public to get involved and is encouraging tens of thousands of people to do so, Knight said.

"Galileo saw outer space through his telescope, and we want to see the inner space of your gut through modern genetics," said Rob Dunn, a scientist at North Carolina State University and a collaborator on the project. The new project will be "crowd-funded" by individuals interested in learning more about their own [gut bacteria](#) and by others

who simply want to contribute to the project, said Dunn.

"By combining the crowd-funding model with the open-access data [analysis model](#) that we pioneered with the Earth Microbiome Project, we can finally give anyone with an interest in his or her microbiome an opportunity to participate, whether by contributing samples or by looking at the data," said Knight, also a Howard Hughes Medical Institute Early Career Scientist.

Public interest is immense, says the research team. 18,000 people have already signed up to receive more information by email about the project when it launches. "The American Gut project builds on the Human Microbiome Project by allowing anyone to participate, and will let the public join in the excitement of this new field," said Lita Proctor, program director for the Human Microbiome Project. "We can expect this to lay the groundwork for all sorts of fascinating studies in the future, that others will in turn build on."

The American Gut project is an opportunity for the "citizen scientists" working with team of leading researchers and labs throughout the United States to help shape a new way of understanding how diet and lifestyle may contribute to human health through each person's suite of trillions of tiny microbes, say the researchers. A key aspect of the project is to understand how diet and lifestyle, whether by choice—like athletes or vegetarians—or by necessity, including those suffering from particular autoimmune diseases or who have food allergies, affect peoples' microbial makeup, said Knight.

"This will be the first project of its kind that might be able to address this question at such a large scale," said Jeff Leach, founder of the Human Food Project and co-founder of American Gut. The gut microbiome has been linked to many diseases, including obesity, cancer, and inflammatory bowel disease—all of which are much more common

in Western populations, he said.

"We should start thinking about diets not only from the perspective of what we should eat, but what we should be feeding our entire gut microbial systems," said Leach. A key aspect of the project is to integrate studies of Americans of all shapes and sizes with studies of people living more traditional lifestyles in Africa, South America and elsewhere, he said.

The steep decline in the cost of DNA sequencing and recent advances in computational techniques allow for the analysis of microbial genomes orders of magnitude cheaper than was possible only a few years ago, said Knight. Sequencing is now getting cheap enough—participants who donate \$99 or more can expect to get tens of thousands of sequences from [microbes](#) in their gut—that participants can include their families and even their pets, Knight said.

Doctoral student Daniel McDonald is one of several CU-Boulder students who will be involved in the effort. "I am excited to have the opportunity to develop new computational tools in order to further explore this frontier," said McDonald, who is in the Interdisciplinary Quantitative Biology program at the BioFrontiers Institute.

"I am pleased to participate in this pioneering effort that marries the vast interest of the public in science with questions that are worth answering about human health and nutrition," said Martin Blaser, chair of the Department of Medicine and professor of microbiology at New York University. "Through this consortium, the technical and intellectual resources are there to lead to important new knowledge."

The project will seek to build on a growing canine and feline database as well. "The majority of data we currently have on the dog and cat microbiomes has come from a handful of small studies in research or

clinically ill animals," said Associate Professor Kelly Swanson of the Department of Animal Sciences and Division of Nutritional Sciences at the University of Illinois at Urbana-Champaign. "This study will apply the technology to free-living pets, where diet, genetics, and living environment are quite different from household to household.

"This research may identify important trends not possible with lab-based studies, and help guide us on how to feed our pets in the future," said Swanson.

The backdrop to the project is the radical decline in the cost of DNA sequencing, which allows analysis of microbial genomes orders of magnitude cheaper than was possible only a few years ago, and recent advances in computational techniques. Participants in the project include many of the key players in the Human Microbiome Project and research facilities around the world.

**More information:** To learn more about participating in or contributing to the project visit [www.indiegogo.com/americanangut](http://www.indiegogo.com/americanangut). For a list of additional collaborators on the project visit [humanfoodproject.com/the-people/collaborators/](http://humanfoodproject.com/the-people/collaborators/).

Provided by University of Colorado at Boulder

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