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IBM: Your Computer Can Help Scientists Study Connection Between Body Bacteria and Autoimmune Diseases

IBM Corporate Citizenship teams up with Broad Institute of MIT and Harvard, Massachusetts General Hospital, University of California San Diego, and the Flatiron Institute

ARMONK, N.Y., Aug. 23, 2017 /[PRNewswire](#)/ -- The general public's help is being enlisted in what's thought to be the biggest study of the human microbiome—the bacteria that live in and on the human body – and are believed to affect health.

The [Microbiome Immunity Project](#) is a new, IBM-facilitated (NYSE: [IBM](#)) citizen science project by scientists from the [Broad Institute of MIT and Harvard](#), [Massachusetts General Hospital](#), [University of California San Diego](#), and the Simons Foundation's [Flatiron Institute](#). It will use the surplus processing power on volunteers' computers to conduct millions of virtual experiments on behalf of the researchers. These experiments aim to map the three million bacterial genes found in the human microbiome and predict the structure of their associated proteins. The project will begin with the analysis of the microbiome in the digestive system.

This study aims to help scientists better understand the microbiome's interaction with human biochemistry and determine how that interaction may contribute to autoimmune diseases such as Type 1 diabetes, Crohn's disease, and ulcerative colitis—illnesses that affect hundreds of millions of people worldwide, and that are being diagnosed with increasing frequency. With better understanding, scientists might be able to more easily prevent and treat these diseases.

Because studying the entire human microbiome would be almost impossible with traditional methods, massive supercomputing processing power is being crowdsourced via IBM's [World Community Grid](#). Anyone in the world can help by simply volunteering to provide compute power. Here's how it works: People download a secure software program that automatically detects when a computer can offer spare processing power, then taps it to run virtual experiments on behalf of researchers.

The resulting data from millions of these experiments will be analyzed by the project's research team. The researchers will make that data publicly available to other scientists, accelerating the advancement of scientific knowledge –and ultimately improved treatments –of autoimmune diseases.

"This type of research on the human microbiome, on this scale, has not been done before," said Dr. Ramnik Xavier, Institute Member and Co-Director of the Infectious Disease and Microbiome Program, Broad

Institute of MIT and Harvard; Chief, Gastrointestinal Unit, Massachusetts General Hospital; and Director, Center for the Study of Inflammatory Bowel Disease, Massachusetts General Hospital. "It's only possible with massive computational power."

According to Dr. Rob Knight, Professor in the Departments of Pediatrics and Computer Science & Engineering and Director of the Center for Microbiome Innovation at UC San Diego, "Had World Community Grid not existed, we wouldn't have even contemplated this project. By harnessing the efforts of volunteers, we can do something that exceeds the scale of what we have access to by a factor of thousands. For the first time, we're bringing a comprehensive structural biology picture to the whole microbiome, rather than solving structures one at a time in a piecemeal fashion. "

The project's third principal investigator, Dr. Rich Bonneau, Group Leader for Systems Biology at the Center for Computational Biology at the Flatiron Institute in New York City, and Professor at New York University, ran World Community Grid's first project, which studied the folding of proteins in the human body and has been cited by other experts in the field of protein function.

Anyone with a computer and an internet connection can join World Community Grid and sign up to support the Microbiome Immunity Project.

Since its founding in 2004, World Community Grid has supported 29 research projects in areas such as cancer, HIV/AIDS, Zika, clean water, renewable energy and other humanitarian challenges. To date, World Community Grid, hosted by IBM Cloud, has connected researchers to \$500 million U.S. dollars' worth of free supercomputing power. More than 730,000 individuals and 430 institutions from 80 countries have donated more than one million years of computing time from more than three million computers and Android devices. Volunteer participation has helped researchers to identify potential treatments for childhood cancer, more efficient solar cells, and more efficient water filtration.

To learn more about World Community Grid and volunteer to contribute your unused computing power, please visit <https://www.worldcommunitygrid.org/>

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