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NEW RESEARCH SHEDS LIGHT ON HOW POPULAR PROBIOTIC BENEFITS THE GUT

Study Suggests the Bacteria May Work By Lending a Hand to Other Microbes

Baltimore, Md., April 14, 2015 – In recent years, research into the benefits of gut bacteria has exploded. Scientists across the globe are examining how these microbes can help improve health and prevent disease.

One of the most well-known of these is *Lactobacillus rhamnosus* GG (LGG). This strain of bacteria, which is part of many popular probiotic products, has a reputation as a helpful microbe. Researchers have found evidence that it can help with intestinal problems, respiratory infections and some skin disorders. Some research suggests that it may even help with weight loss.

But a key question has remained unanswered: How does LGG actually produce benefits?

Now, researchers at the University of Maryland School of Medicine (UM SOM) have come up with an explanation. It appears that LGG may act as a facilitator, modifying the activity of other gut bacteria. This is the first time this mechanism has been described; the discovery could eventually help scientists create more effective strategies to foster a healthy gut. The paper was published in the latest issue of the journal *mBio*.

Claire M. Fraser, PhD, professor of medicine at the UM SOM, as well as director of the Institute for Genome Sciences, studied the effect of LGG on a group of elderly subjects “This species of bacteria has a reputation for being really useful to humans,” says Prof. Fraser. “So we wanted to better understand how it might work in the human intestine.”

She and her collaborator, Dr. Patricia Hibberd at Massachusetts General Hospital, tested 12 subjects, who ingested LGG twice a day for 28 days. She analyzed gut bacteria before and after this regimen, and found that ingesting LGG led to increases several genes that foster several species of gut bacteria, including *Bacteroides*, *Eubacterium*, *Faecalibacterium*, *Bifidobacterium* and *Streptococcus*. These microbes have been shown to have a range of benefits in humans, including the promotion of a healthy immune system. (Fraser notes that LGG may also have direct effects, in addition to its ability to modify the overall ecosystem.)

“This is a new idea, that some probiotics may work by affecting the overall ecosystem of the gut,” said Prof. Fraser. “Previously we tended to think that LGG and other probiotics worked directly on the host. I think this finding has many exciting implications.” For one, Fraser says, it lends support to the idea that we need to look at the microbes in the gut as an interconnected ecosystem rather than a series of solitary bacteria. Modifying the behavior of microbes already in the gut may be just as important as adding any single species to this population.

Prof. Fraser and her colleagues used an innovative method for enumerating gut bacteria; this approach, known as metagenomic analysis, allows for a much more comprehensive view of what the microbes are



actually doing in a given person's intestines. Previous methods do not provide nearly the same level of detail as this method.

"Dr. Fraser's study is not only fascinating, but it will help advance a rapidly emerging research area," said Dean E. Albert Reece, MD, PhD, MBA, who is also the vice president for Medical Affairs, University of Maryland, and the John Z. and Akiko K. Bowers Distinguished Professor and Dean of the School of Medicine. "In coming years, scientists will learn a great deal about the microbes that exist within us. I'm sure that Prof. Fraser, the Institute and the School of Medicine will be deeply involved in these trailblazing efforts."

The research was funded by the National Institutes of Health.

About the University of Maryland School of Medicine

The University of Maryland School of Medicine was chartered in 1807 and is the first public medical school in the United States and continues today as an innovative leader in accelerating innovation and discovery in medicine. The School of Medicine is the founding school of the University of Maryland and is an integral part of the 11-campus University System of Maryland. Located on the University of Maryland's Baltimore campus, the School of Medicine works closely with the University of Maryland Medical Center and Medical System to provide a research-intensive, academic and clinically based education. With 43 academic departments, centers and institutes and a faculty of more than 3,000 physicians and research scientists plus more than \$400 million in extramural funding, the School is regarded as one of the leading biomedical research institutions in the U.S. with top-tier faculty and programs in cancer, brain science, surgery and transplantation, trauma and emergency medicine, vaccine development and human genomics, among other centers of excellence. The School is not only concerned with the health of the citizens of Maryland and the nation, but also has a global presence, with research and treatment facilities in more than 35 countries around the world.

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About the Institute for Genome Sciences

The Institute for Genome Sciences (IGS) is an international research center within the University of Maryland School of Medicine. Comprised of an interdisciplinary, multidepartment team of investigators, the Institute uses the powerful tools of genomics and bioinformatics to understand genome function in health and disease, to study molecular and cellular networks in a variety of model systems, and to generate data and bioinformatics resources of value to the international scientific community.

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About *mBio*

mBio is an open access online journal published by the American Society for Microbiology to make microbiology research broadly accessible. The focus of the journal is on rapid publication of cutting-edge research spanning the entire spectrum of microbiology and related fields.

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About the American Society for Microbiology

The American Society for Microbiology is the largest single life science society, composed of over 39,000 scientists and health professionals. ASM's mission is to advance the microbiological sciences as a



vehicle for understanding life processes and to apply and communicate this knowledge for the improvement of health and environmental and economic well-being worldwide.