Biophysical Society

Biophysical Society 62nd Meeting, Feb. 17-11, 2018, San Francisco

Gut Reactions to Improve Probiotics
The bacterial makeup of gut flora in mice is resilient in some ways but fragile in others

EMBARGOED for release until 8:00 a.m. Eastern Time on Monday, Feb. 19, 2018

For More Information:
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WASHINGTON, D.C., February 19, 2018 -- When bacteria enter the body, they have a great deal to overcome to colonize the colon. First, they must survive harsh environments with very few salts without bursting (unlike human blood cells within water). Then, they navigate through saliva enzymes and stomach acid, bypass our immune systems within the small intestine, switch from being exposed to oxygen to having none at all, and hang on so that they're not flushed away by the gut's constant outward flow.

During the 62nd Biophysical Society Annual Meeting held February 17-21, in San Francisco, California., Carolina Tropini, a postdoctoral research fellow in the Department of Microbiology and Immunology at Stanford University, will present her work exploring how bacteria living in the gut respond to common changes within their habitat.

How are microbes living in and on our bodies intimately linked to our health? "They make compounds we're unable to produce, and the molecules they produce are readily absorbed into our blood system—no differently than a drug we'd take by mouth,"
said Tropini.

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"Changes in the bacteria that live in our gut are linked to diseases ranging from colon cancers to neurological disorders. So, my goal is to study how communities of bacteria respond to and change the physical environment of the host in health and disease."

First, Tropini administers a common over-the-counter drug to mice to change their gut environment. Then, she measures which bacterial species survive the change using DNA sequencing techniques. "The idea is that we can tell which bacterium [the DNA] comes from by sequencing only a small region of a very conserved gene, which differs slightly between species," Tropini explained.

Tropini measures: how the gut environment has changed and recreates a simplified version of it in the lab; the number of bacteria within the new habitat; and the physiological response of the bacteria—whether they grow faster or slower, or produce different proteins.

What were the results? "In the short term, bacteria are impressively able to counteract changes…but in a heavily competitive environment any disadvantage [or change in environment] can play a major role in changing the bacterial makeup of gut flora," Tropini said. "Bacterial species that make up a large fraction—even up to half—of the gut community may go extinct when the environment is altered even slightly, because they aren't competitive against all of the other species in this new environment."

What does this say about health implications? While the implications of these changes aren't entirely clear, "bacterial extinctions are hard to compensate for and may leave us with a community of gut microbes with less functionality," Tropini said. "By understanding how bacterial communities respond to common changes within their physical environment, we can design probiotics and therapies to directly target weaker parts of the community to make them more resilient."

1630-Pos, Board B539 "Mechanical Perturbations to the Gut Microbiota" is authored by Carolina Tropini, Justin Sonnenburg, KC Huang and Katharine Ng. It will be displayed at 1:45 p.m. on Monday, Feb. 19, 2018 in the South Hall ABC of the Moscone Center, South

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MORE MEETING INFORMATION

ABOUT THE MEETING

Each year, the Biophysical Society Annual Meeting brings together more than 6,000 researchers working in the multidisciplinary fields representing biophysics. With more than 3,600 poster presentations, over 200 exhibits, and more than 20 symposia, the BPS Annual Meeting is the largest meeting of biophysicists in the world. Despite its size, the meeting retains its small-meeting flavor through its subgroup symposia, platform sessions, social activities and committee programs. The 62nd Annual Meeting will be held at the Moscone Center (South) in San Francisco, California.

PRESS REGISTRATION

The Biophysical Society invites professional journalists, freelance science writers and public information officers to attend its Annual Meeting free of charge. For press registration, contact Ellen Weiss at EWeiss@biophysics.org or the Media Line at the American Institute of Physics at media@aip.org or 301-209-3090.

NEWS RELEASES

Embargoed press releases describing in detail some of the breakthroughs to be discussed at the meeting are available on EurekAlert!, Newswise and Alpha Galileo or by contacting the Media Line at the American Institute of Physics at media@aip.org or 301-209-3090.

QUICK LINKS

Main Meeting Page: https://www.biophysics.org/2018meeting/Home/tabid/7117/Default.aspx

Symposia:
https://www.biophysics.org/2018meeting/Program/ScientificSessions/Symposia/tabid/7192/Default.aspx

Desktop Planner:
http://www.biophysics.org/2018meeting/GeneralInfo/MobileApp/tabid/7473/Default.aspx

ABOUT THE SOCIETY

The Biophysical Society, founded in 1958, is a professional, scientific Society established to encourage development and dissemination of knowledge in biophysics. The Society promotes growth in this expanding field through its annual meeting, monthly journal, and committee and outreach activities. Its 9,000 members are located throughout the U.S. and the world, where they teach and conduct research in colleges, universities, laboratories, government agencies, and industry. For more information on the Society, or the 2018 Annual Meeting, visit http://www.biophysics.org.

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