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Three Bernese researchers receive Pfizer Prize

Three immunologists from the University of Bern and Inselspital, University Hospital Bern, have been awarded a Pfizer Research Prize for their work. The researchers have shown how our gut microbes influence the formation of antibodies.

The Pfizer Research Prize is one of the most important research prizes for medicine in Switzerland. It is awarded annually to outstanding young scientists who have made distinguished and pioneering contributions to laboratory or clinical research at Swiss research institutes or hospitals. The Pfizer Research Prize is awarded at the request of independent scientific committees in five fields, and the prizes are each worth 15,000 Swiss francs.

Prof. Dr. Stephanie Ganal-Vonarburg, Dr. Hai Li and Dr. Julien Limenitakis, from the Department for BioMedical Research (DBMR) of the University of Bern and Department for Visceral Surgery and Medicine, Gastroenterology at the Inselspital, are awarded for their joint work. In collaboration with Prof. Andrew Macpherson, they have discovered that gut microbes can shape our antibodies.

Prof. Claudio Bassetti, M.D., Dean of the Medical Faculty of the University of Bern: "I am very pleased about this success. The Pfizer Research Prizes are an important recognition – also for the strong commitment of our faculty to the promotion of young researchers."

Intestinal microbes stimulate white blood cells to produce antibodies

In recent years, new insights have been gained into the influence that benign microbes have on our immune system. These microbes colonize the intestinal mucosa, among other places. However, it was largely unclear which influence these beneficial and harmless microorganisms have to B cells. B cells are white blood cells and a crucial component of our immune system. They recognize foreign structures in the body and produce specific antibodies.

Hai Li, Julien Limenitakis and Stephanie Ganal-Vonarburg wanted to know how, when and where the intestinal microbes on mucous membranes influence B cells in the body. In doing so, the three faced the challenge that both gut bacteria and B cells each form highly complex and highly individual systems. The researchers colonized germ-free mice with various innocuous bacterial strains and then sequenced the DNA of the B cells and their antibodies. Results showed that the bacteria have a clear influence on these immune cells and literally shape their composition.

Depending on which bacteria were used and to what extent, the repertoire of B cells in the mice changed, as did their antibody response.

"Our work underscores how important a healthy bacterial flora is for the host organism. Depending on the B-cell population that builds up in an early phase of life through contact with commensal microorganisms, the immune system will react differently to inflammation or pathogens later on," says Stephanie Ganal-Vonarburg.

The three Bernese researchers' results show in detail how benign bacteria shape "their" repertoire of B-cells in the analyzed mice. Since the relevant part of bacterial colonization occurs early in life, it is possible that the development of the B-cell repertoire during this critical period also influences the subsequent immune responses during infections and vaccinations.

About Stephanie Ganal-Vonarburg

Stephanie Ganal-Vonarburg was born in Offenburg (Germany). From 2003 to 2009 she studied molecular medicine at the University of Freiburg, Germany, and at the University of British Columbia in Vancouver, Canada. She subsequently completed her doctorate in molecular medicine and immunology in Professor Andreas Diefenbach's laboratory at the University of Freiburg and received her doctorate (Dr. rer. nat.) in 2013. Ganal-Vonarburg came to Switzerland as a postdoctoral fellow in 2013 with the help of a Marie Curie scholarship from the European Union and an EMBO scholarship. From 2013-2019 she worked in Professor Andrew Macpherson's laboratory at the Department for BioMedical Research at the University of Bern, investigating the role of maternal microbiota in the development of the child's immune system and the impact of commensal colonization on B cell responses. The results of these studies were published in the journals *Science* and *Nature* in 2016 and 2020, respectively. In 2019, she was awarded with a Peter Hans Hofschneider Endowed Professorship and since 2020, she is assistant professor at the DBMR of the University of Bern and Department for Visceral Surgery and Medicine (UVCM) of the Inselspital and heads her independent research group.

About Julien Limenitakis

Julien Limenitakis was born in Clermont-Ferrand (France). From 2001 to 2007 he studied Molecular Biology at the Université Blaise-Pascal in Clermont-Ferrand, France and at the University of Geneva, Switzerland. He received his doctorate in molecular biology and parasitology in 2011 from the laboratory of Professor Dominique Soldati-Favre at the University of Geneva. After a post-doctorate in systems biology at the Biozentrum in Basel, Limenitakis was awarded a SNSF SystemsX.ch transition fellowship in 2014, joining the group of Professor Andrew Macpherson at the Department of BioMedical Research at the University of Bern. From 2014 to 2016, he worked on establishing and developing computational biology analyses to better understand the stability of, and interactions within, the gut microbiota. Since 2017, Limenitakis has continued his collaboration with the group of Andrew Macpherson as an Inselspital research scientist, working on projects relying on computational tools to decipher the antibody repertoires generated in response to microbial colonization in the gut. The results of this study were published in the journal *Nature* in 2020.

Please find more information and contact details on the following page.

About Hai Li

Hai Li was born in Shandong province of China. From 2001 to 2005 he had his Bachelor of Science in Biotechnology at Shandong Normal University, China. He was recommended to a master-doctor combined program in Shanghai Institutes for Biological Sciences, China in Professor Xiaolong Liu's lab to study thymic T cell development and received his PhD in 2011. He then came to Switzerland to continue his research interest on microbiology and immunology as a postdoctoral researcher in Prof. Andrew Macpherson's laboratory at the Department for BioMedical Research at the University of Bern. During 2011-2021, he had completed three projects and was involved in several other research works in the field of host-microbial mutualism, with a focus on microbiota influence on host B cell immunity, and had published the results in *Nature*, *Nature Communications* and *Immunity* as first author. He has been awarded with the Chinese National Science Fund for Excellent Young Scholars in 2021, and will take a professorship at the Department of Biomedicine of University of Science and Technology of China late this year to start his own research.

Links to the publication:

<https://www.nature.com/articles/s41586-020-2564-6>

[Media release of the University Bern about the awarded work \(5th August 2020\)](#)

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