

9. GutX – The bacterial consortia

Bacteria are indispensable for our digestion, and yet more and more people are developing immune responses to these microbes. The result is chronic infection of the gut. The GutX project is investigating the interaction between humans and their resident bacteria more closely.



The myriad microorganisms in the large intestine, an estimated 1,000 different bacterial species making up a total population of hundreds of billions, help us to break down our food and thus provide the body with essential nutrients and vitamins. They promote the development and maintenance of the intestinal mucous membranes, as well as being involved in the body's defenses against viruses, fungi or pathogenic bacteria. Today, however, an increasing number of people are suffering from phases of acute and chronic intestinal

inflammation. This is caused by immune cells in the intestine's mucous membranes that react aggressively to the body's own microorganisms.

By now, around one in a thousand suffers from chronic inflammatory bowel disease (IBD). "An increasing number of young people are becoming affected," says Andrew Macpherson, professor at the University of Bern and principal investigator of the GutX project.

The MRD Project wants to get to the bottom of this and investigate exactly what

is happening in the bowels of affected patients. Until now, research in this area has mainly focused on the question of which of the thousands of possible microorganisms reside in the intestines of patients with chronic IBD. But this approach neglects to address the complex interactions that occur between the microorganisms and their host. "Our study therefore poses the question: How exactly are these bacteria interacting with one another, and to what extent does the host organism play a part in these processes?" says Macpherson.

The researchers are investigating how the metabolism of these intestinal microbes – that is, the entirety of their biochemical reactions – influences the mucous membranes and the patients' immune systems. To this end, the scientists are employing methods that simultaneously measure many of the different biochemical substances within the intestine. They then look at how these substances are passed from the bacteria to the host, and develop models that simulate these processes in a healthy and diseased organism.

The researchers have access to samples and data from the Swiss IBD Cohort Study, which encompasses over 3,000 patients. For the modeling part, they use mice, which have only 12 different kinds of intestinal bacteria. The researchers want to use this mouse model to analyze and test different bacterial consortia. The ultimate goal of the study is to vindicate microbiota manipulation as a therapy to treat IBD.

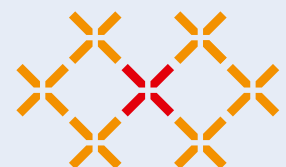
GutX at a glance

Principal investigator: Prof. Dr. med. Andrew Macpherson, Gastroenterology and Mucosal Immunology, Inselspital, University of Bern

Research groups:

- Prof. Uwe Sauer, Department of Biology, ETH Zurich
- Prof. Jörg Stelling, Department of Biosystems Science and Engineering, ETH Zurich
- Prof. Christian von Mering, Institute of Molecular Life Sciences, University of Zurich

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