

## Gut microbiome showed positive response to vegetarian diet in two weeks

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The research team from ITMO University and collaborators analyzed the impact of short-term changes in diet on the condition of the gut microbiome. Assessing changes in the microbiome structure of 248 volunteers, the researchers concluded that a diet enriched with food fiber significantly changes the balance of gut bacterial species in two weeks. Obtained results will be used for a personal dietary recommendation system. This will be helpful for both healthy people and those who suffer from metabolic disorders and run the risk of atherosclerosis or diabetes. The study is published in *Nutrients*.

The connection between nutrition and health is becoming increasingly apparent. Recent discoveries about the <u>gut microbiome</u> show that its composition can affect the risk of multiple diseases, from diabetes to cancer. The microbiome composition is unique for each individual. However, in all cases, diet appears to be one of the key factors of the microbiome formation. This means that it's possible to avoid many diseases by adjusting personal eating habits. A properly chosen diet can increase the number of bacteria species that prevent disease. Yet, in order to achieve a positive effect, it is necessary to clearly understand how diet is connected with microbiome balance and take into account the individual characteristics of microbiome.

In an attempt to solve these problems, the researchers assessed the diets of 248 volunteers, devised personal nutrition recommendations for them and compared their microbiome condition before the experiment and after two weeks of dieting. The microbiome condition was evaluated



using a special test called "OhmyGut." It identifies hundreds of gut bacteria species and determines the proportion of their number through the analysis of microbiome genetic material, the metagenome. Also, the scientists statistically evaluated the influence of a number of factors, including dietary habits, antibiotics, sex and age on the microbiome.

The study showed that those who regularly consume a lot of fruits and vegetables initially had better microbiome balance. These products contain a lot of food fiber, thus stimulating the growth of inflammation-suppressing gut bacteria and improving microbiome diversity in general. Although WHO recommends that adults eat at least 30 grams of food fiber daily, the diet of most people does not contain enough fruits and vegetables to ensure this norm. This often violates the optimal ratio of gut bacteria species. According to the study, the introduction of more food fiber in the diet quickly improves the microbiome balance.

"Usually, these studies are conducted in clinical settings under strict control. We, on the contrary, did not keep track of how strictly volunteers followed their <u>diet</u>. The purpose of our work was to show that voluntary, even non-strict dieting rich in food fiber leads to positive changes just in two weeks," says Dmitry Alexeev, Microbiome Research Director at "Knomics," member of the Computer Technology Laboratory at ITMO University.

This study was the first Russian gut microbiome research project, successfully implemented on the basis of crowdfunding. Each study participant paid for the necessary tests, and in return, received individual data on their <u>microbiome</u> condition and personalized nutrition recommendations. According to the scientists, the interest in the study was high.

"In this study, we followed the concept of citizen science. It implies active involvement of ordinary people in the research. For us, it was a



useful and positive experience. In just four days, the number of participants rose three times higher than what we planned to collect over an entire month. We saw that it is possible to successfully carry out such a research in Russia, but it is crucial to provide thoughtful logistics and effective communication with participants. We need to explain what we do and give the results on time in a way that is easy to comprehend for ordinary people," says Alexander Tyakht, member of the Computer Technologies Laboratory of ITMO University and Technology Director at "Knomics."

Further project development is aimed at expanding the scope of the OhmyGut tests, for example, to develop nutrition recommendations for people recovering from cancer and other serious diseases. In addition, the researchers are planning to expand cooperation with the food and pharmaceutical companies to create useful products and effective probiotics.

**More information:** Natalia Klimenko et al. Microbiome Responses to an Uncontrolled Short-Term Diet Intervention in the Frame of the Citizen Science Project, *Nutrients* (2018). DOI: 10.3390/nu10050576

Provided by ITMO University

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