

The influence of processes occurring within human gut on the immune system and general health is the subject of growing interest. Microbiome of the large intestine appears to significantly affect the conditions within the gut. Gastrointestinal disorders belong to the most commonly diagnosed diseases worldwide. Millions of patients suffer from intestinal bacterial infections each year.

Transcytosis is one of the phenomena occurring in the gut. It allows the nutrients broken down as a result of digestive processes occurring earlier along the gastrointestinal tract to enter the bloodstream and be further utilized by the organism. It has been shown that the components of the microbiome – both bacteria and viruses, including bacterial viruses: bacteriophages, which constitute the major fraction of human virome – may also be subjected to transcytosis. The aim of this project is to determine which microbiome components can be translocated from the intestinal lumen to the circulation. These data will be correlated with the diagnosed intestinal disorders. It will allow us to understand the factors that may affect the passage of microbiome components through the gut-blood barrier.

Studies of bacteriophage biology are important in the aspect of searching for alternative tools to control antibiotic-resistant pathogens. Phages are used as experimental therapy to treat bacterial infections for which standard therapeutic options were ineffective. Understanding phage “behavior” within human body, especially in the gut where they affect the composition of microbiota, is essential in the context of safety studies of such therapy. In the future our research may contribute to the development of phage therapy as a more commonly used treatment option in patients suffering from chronic bacterial infections as well as broaden the possibility of targeted therapies based on bacteriophages.