

Human bodies house a complex community of microbes (microbiome) that affects humans' health. As we know, microbes can either be "good" (probiotics) or "bad" (pathogens). However, not all elements of human microbiome have been recognized as good or bad for our health. Among those are bacteriophages (phages) that are viruses that infect only bacteria and are unable to infect eukaryotic cells. As such, they are commonly considered as a neutral component of microbiome. However, recent reports on phage interactions with the immune system show that phages may affect human health similarly to other components of the microbiome. Moreover, phages are able to kill bacteria in a very different way than antibiotics do. For this reason they can be employed for combating drug-resistant bacteria in so called phage therapy.

Since phages exist in our bodies as an important part of microbiome (**phageome**), or they can be administered to patients suffering from bacterial infections, we need to **understand how phages interact with human immune system and how they affect humans' health**. In this project we will find out which phages and which elements of phage particles are commonly affecting human immune system. We will compare between distant geographical regions (EU and US), and between people with three selected types of socially important diseases (cardiovascular, cancer, and allergies). As a result, we will find out **which phages promote health (probiotics) or which of them are harmful and should be avoided or removed from our bodies**. This project will also allow for recommending most useful phages that could be applied against bacterial infections in humans and in animals.