Bdellovibrio bacteriovorus is a small (0.2-0.5 μm wide and 0.5-2.5 μm long) Gram-negative bacterium, which inhabits a wide range of environments, including fresh water, sewage, soil and even mammalian intestines. A characteristic feature of this bacterium is its predatory lifestyle – it proliferates within periplasm of other Gram-negative bacteria. *B. bacteriovorus* exhibits a biphasic lifestyle: in the free-living attack phase this highly motile bacterium encounters prey and enters to the cell periplasm; in the reproductive phase, *B. bacteriovorus* degrades the host's macromolecules using different types of hydrolytic enzymes and reuses reaction products to form its own cell structures. When the resources of the host cell are exhausted, the elongated filament synchronously septates to form usually three to six *B. bacteriovorus* progeny cells. These progeny cells become motile, and then are released into the environment through lysis of the remaining dead host cell.

The emergence of bacterial strains resistant to currently used antibiotics is a serious threat. Scientists are constantly looking for effective "weapons" to combat drug-resistant bacteria. Due to the *B. bacteriovorus* predatory life cycle leading to lysis of the host cell, this bacterium is perceived as a "live antibiotic", which can be an alternative to currently used antibacterial agents.

The aim of our project is to analyse one of the basic and key cell processes - the chromosome replication during *B. bacteriovorus* proliferation inside the periplasm of *Escherichia coli* as a model organism. We plan also to examine *B. bacteriovorus* cell cycle in different pathogens that pose the greatest threat to human health. We want to investigate whether the cell cycle of this predatory bacterium depends on the type of prey pathogen. The obtained results will significantly expand our knowledge on bacterial chromosome replication and bring us closer to the use of *B. bacteriovorus* as an alternative to existing antibiotics.