

Bacteriophages - viruses infecting bacteria, are the most abundant biological entities in the world (estimated 10^{32}) play an important, although not fully known, function in natural communities. Numerous ecological processes associated with bacteriophages are still unexplored at the molecular level, or relations mechanism of host-phage systems.

It turns out that most viruses (infecting animals, plants and bacteria) during their replication cycle, somehow interfere with host cell function and often lead to changes in the metabolism and signalling pathways of the infected cells. As a result, infected cells are transformed into "small factories" which only produce progeny virus particles. On the other, cells constantly create sophisticated defence mechanisms, protecting them from the destructive influence of viruses. In other words, cells and viruses carry on endless "evolutionary arms race".

The proposal is probably the first attempt to analyse the defence strategy at: proteomic and transcriptomic levels, in Gram-positive bacilli. The project aim at providing a comprehensive explanation, if the bacterial response to bacteriophage infection is specific to a particular bacterium, or the mechanism is more related to the type of bacteriophage, that infects the cell. We also attempt to understand the way in which two unrelated phages take over the metabolism of *Bacillus pumilus* in order to accomplished their replication cycle.

Results of our work enhance the knowledge about mechanisms of cell response during bacteriophage infection, which in long-term perspective could guarantee development of biology and molecular biology of bacterial cell, as well as establish of new tools of molecular biology.