Open Ph.D. projects

1.

Announcer: Gábor Rákhely

Doctoral School: University of Szeged, Faculty of Science and Informatics, Doctoral School of Biology

Title of the research topic: Biotechnological application of bacteriophages

Description of the research topic: Bacterophages are able to infect bacteria. Some of them including certain filamentous phages do not kill the host bacterium, but there are phages specifically killing the target bacterium. The temperate phages have lysogenic and lytic life cycles. The lytic bacteriophages are excellent candidates, as antimicrobial agents in plant protection, food industry or hygiene, since they can specifically eliminate pathogen bacteria without environmental impact.

In the project, phages capable of infecting/killing plant/animal/human pathogen microbes are isolated, characterized by standard and genomic methods: Phage coctails are prepared for agricultural, food industrial or medical applications. The possible formation of phage resistancy is also studied and adapted phages are produced by co-evolutionary expreriments.

2.

Announcer: András Tóth, Gábor Rákhely

Doctoral School: University of Szeged, Faculty of Science and Informatics, Doctoral School of Biology

Title of the research topic: Structure-function relationships of sulfide-quinone oxidoreductases

Description of the research topic: The sulfide-quinone oxidoreductases are ancient membrane-bound flavoproteins playing important role in contolling intracellular sulfide concentrations. Thus, these enzymes take part in numerous (patho)physiological processes in a wide range of living organisms. The Sqr proteins are classified into six different families which have more or less similar structural characteristics but may differ in their catalytic mechanisms. The aim of the PhD work is to identify the structural groups of fundemental roles in a model Sqr and to disclose their function in the catalytic processes applying molecular biological, biochemical, biophysical and structure determination approaches. The study will provide a deeper insight into the molecular events of the catalysis and the role of the structural elements involved in the function of the enzyme.

3.

Announcer: Gábor Rákhely, Katalin Perei

Doctoral School: University of Szeged, Faculty of Science and Informatics, Doctoral School of Biology

Title of the research topic:

Environmental potential of viable but not culturable bacteria

Description of the research topic: Alike other organisms, microorganisms are able interact with their environment, initiation various stress responses and mechanisms for their survival when the living conditions get suboptimal. Certain bacteria are able to tide over the extreme conditions by a low activity state, in which they retain their viability, but loose their culturability in standard laboratory media. The mood named as viable but non-culturable (VBNC) could be observed in many bacterial species. The process might be reversed i.e. the cells can be converted into culturable form from the VBNC state. The topic of the PhD is to apply such biostimulants to promote the biodegradation of pollutants, oils, xenobiotics emitted into the environment. The processes are monitored by analytical, microbiological a metagenomics tools.