Ph.D. projects in progress

1.

Mentor: Gábor Rákhely, Katalin Perei

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

Ph.D. student: Attila Bodor

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.

2.

Mentor: András Tóth, Gábor Rákhely

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

Ph.D. student: Nikolett Miklovics

Title of the research topic: Investigation of structural and catalytic properties of sulfide oxidase enzymes

Description of the research topic: The sulfide:quinone oxidoreductase (Sqr) enzymes are ancient membrane bound flavoproteins which play a basic role in the regulation of sulfide content via catalyzation of the oxidation of sulfide. Based on their activity these enzymes involve in numerous physiological and pathophysiological processes in a wild range of organisms. Six different types of the Sqr proteins are known which posses a common basic structure, however, there may be significant differences in their catalytic mechanism. The aim of this Ph.D. project is the identification and functional characterization of residues and structural elements of a model Sqr enzyme by the usage of molecular biological, biochemical, biophysical and structural methods. With these studies we would like to get an insight into the role of structural elements important for catalytic processes of the selected protein in order to gain a deeper understanding of the molecular mechanism of sulfide:quinone oxidoreductase enzymes.