

**TITLE OF RESEARCH TOPIC: Characterization of protein nanopores****Summary:**

Nanopore sensing is gaining momentum as extremely fast, direct and inexpensive technology that can be used for detection of various analytes in a high-throughput manner. It has become an indispensable technology finding potential in many applications in life sciences, personalized medicine, biotechnology and ecological monitoring. Pore forming proteins and many pore forming toxins are capable of formation of transmembrane pores in lipid membranes. They are interesting protein molecules in terms of molecular mechanism of action and structural features. In recent years they attracted a significant attention due to their use in sensing applications. The research topic will aim for finding new types of pore forming proteins and toxins that could have beneficial properties for various sensing applications.

**Research techniques used:**

Mining of databases and bioinformatics approaches will be used to search for novel interesting types of pore forming proteins and toxins. The experimental research techniques that will be used will be biochemical (engineering, preparation and biochemical characterization of proteins), biophysical (measurements of activity of nanopores by using planar lipid bilayers and other approaches) and structural (for example cryo electron microscopy to analyze structures of pores).

**The reason why the topic is innovative:**

Use of protein nanopores in sensing is becoming an important analytical approach for detection of various molecules. Novel types of pores are crucially needed to expand the potential of this technology for various applications. The development and engineering of novel nanopores will significantly advance the field of macromolecular sensing.

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