Offer of topics for Ph.D. study projects in Third Faculty of Medicine, Charles University in Prague

Project:	**Analysis of the neurosteroid effects at the NMDA receptor**
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Project Narrative: *(max. 500 characters including spaces):*	N-methyl-D-aspartate (NMDA) receptors are a subtype of ionotropic glutamate receptors that mediate fast synaptic transmission in central nervous system and play a key role in learning and memory. On the other hand their over activation leads to cell death, that cause serious neurological and psychiatric diseases. The aim of the NMDA receptor research is among others to find chemical compounds that would protect the cells against prolonged over activation of NMDA receptors together with preservation of receptor normal function. We have shown that derivatives of naturally occurring neurosteroid pregnanolone sulfate are promising group of NMDA antagonist due to their favorable mechanism of action. The project will be solved mainly using: patch-clamp, fast perfusion system, pharmacological analysis, optical methods (optogenetics – stimulation and recording electric activity among neurons). Considerable role in the project will have prediction methods based on the kinetic modeling of protein structure and molecular dynamics depending on the specific conditions and presence of ligands. The aim of the master/doctoral thesis is to contribute to the detailed understanding of molecular mechanisms that neurosteroids affects the processes in the central nervous system during normal and experimental conditions of biological models of selected neurological and psychiatric diseases (e.g. neurodegeneration and schizophrenia).
Requirements for student applicants: *(specify your requirements such as degrees or period after degree was granted)*	