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Head of Department: Doc. MVDr. Aleš Hampl, C.Sc.
Topic: **Bioinformatic analysis of human pluripotent stem cell-based model to study the Alzheimer's disease pathogenesis in vitro**

Short description:

“Bioinformatic analysis of human pluripotent stem cell-based model to study the Alzheimer's disease pathogenesis in vitro”

Alzheimer's disease is the most common cause of dementia in elderly population worldwide. The current body of research supports the concept that protein aggregation initiates the onset of Alzheimer's disease. However, in spite of the large number of available literature and studies, a mechanism of pathogenesis initiation and potential treatment for Alzheimer's disease remains elusive. Our laboratory has recently implemented a method for derivation of cerebral organoids (so called “minibrains”) from human embryonic stem cells. Using this model, as well as other relevant differentiation strategies, we aim to test hypothetical mechanisms of Alzheimer's disease pathogenesis using patient's derived pluripotent stem cells. In collaboration with other partners from Masaryk University, we will use single cell sequencing technique (10x Genomics) to study the development of Alzheimer's disease pathology. Subsequent bioinformatic studies will reveal novel molecular markers and/or cell types that are altered during AD development and progression and these will be all performed by the PhD student. We believe that proposed strategy will bring a new perspective the field of Alzheimer's disease research.

Requirements of our PhD program:

- Minimum one first-author and one co-author publication in a journal with impact factor
- Willing to take active part in teaching (max. 4hours/week)
- Good level of spoken and written English. Student will be part of a multi-national research team therefore English is required. An interview in English is an essential part of the admission process

Every PhD student has to spend at least one month abroad on a research internship or take active part in an international project with research outcomes that will be published in an international journal or presented at the international conference. Alternatively, another form of international collaboration can be discussed. This depends on the outcomes of the research project.

Additional information

Visit our website to find more information about the supervisor, publication activity, current international collaborations and grants, and successful graduates:

<https://www2.med.muni.cz/histology/dasa-dolezalova-bohaciakova/>