

**Affiliation:** Masaryk University, Faculty of Medicine  
**Study program:** PhD program Biomedical Sciences  
**Specialization:** Biochemistry and Molecular Biology  
**Workplace:** FNUSA-ICRC  
**Form of study:** Full-time

**Supervisor:** Manlio Vinciguerra, [Manlio.vinciguerra@fnusa.cz](mailto:Manlio.vinciguerra@fnusa.cz); [455149@mail.muni.cz](mailto:455149@mail.muni.cz)

**Title:** Epigenetic mechanisms involved in the reprogramming of human somatic cells into induced pluripotent stem cells (iPSC)

**Brief annotation (max 200 words):**

Induced pluripotent stem cells (iPSCs) are a type of pluripotent stem cell that can be generated directly from a somatic cell. In 2012 two Nobel prizes (Yamanka and Gurdon) were awarded for the pioneering of iPSC technology. Pluripotent stem cells hold promise in the field of regenerative medicine, because they can propagate indefinitely, as well as give rise to every other cell type in the body. They represent a single source of cells that could be used to replace those lost to damage or disease.

DNA damage repair (DDR) is a safeguard for genome integrity maintenance. Increasing DDR efficiency could increase the yield of iPSC upon reprogramming from somatic cells. The epigenetic mechanisms overarching DDR during iPSC reprogramming are not completely understood. This competitive PhD project will focus on the evaluation of the splicing isoforms of histone variant macroH2A1, macroH2A1.1 and macroH2A1.2, as potential regulators of DDR, using a combination of in vitro/in vivo approaches, biochemistry, molecular biology, next generation sequencing, proteomics and imaging. The laboratory has a long-standing expertise in the study of macroH2A1 histone variants in metabolic diseases, cancer and stemness:

**Funding:** The PhD position is linked to the NPU grant (project no. LQ1605 from the National Program of Sustainability II (MEYS CR)).

**Requirements:**

Requirements to successfully obtain a PhD degree in the Biomedical Sciences PhD program:

- Have at least one first author publication in an international research journal with an impact factor above the median IF in the field or have two first author publications with the IF in Q3. Importantly, the affiliation to the Faculty of Medicine, Masaryk University must be listed.
- Gain a set of minimum credits (240 ECTS in 4-year study period), pass 4 faculty-wide courses + an English language course and 4 field-specific courses.
- Pass the doctoral state exam.
- Take an active part in teaching.
- Participate in the annual PhD conference.
- Present research outcomes at least once at an international conference (poster, presentation).
- Spend at least one month abroad on an internship.

**Masaryk University, Faculty of Medicine**

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Please quote the Reference Number in your reply.

**Additional information on the supervisor:** <https://www.fnusa-icrc.org/en/research/research-teams/pre-clinical-research/epigenetics-metabolism-and-aging/>

The laboratory has a long-standing expertise in the study of macroH2A1 histone variants in metabolic diseases, cancer and stemness:

Chiodi V et al, *FASEB J* 2021; Rivas Serna IM et al, *Int J Mol Sci* 2020; Buzova D et al, *Clin Epigenetics* 2020; Giallongo S et al, *Antiox Redox Signal* 2021; Lo Re O et al, *Theranostics* 2020; Bereshchenko O et al, *Clin Epigenetics* 2019; Lo Re O et al, *Epigenetics* 2018; Lo Re O et al, *Hepatology* 2018; Pazienza V et al, *Epigenetics&Chromatin* 2016; Jueliger S et al, *Epigenetics* 2016; Borghesan M et al, *Cancer Res* 2016