

MEDICAL BIOLOGY – FOUR YEAR, FULL-TIME DOCTORAL STUDIES
at the Center for Translational medicine, International Clinical Research Center
(FNUSA-ICRC)

Research area: Epigenetics, Cancer Biology

Dissertation topic: **Epigenetic mechanisms linking DNA damage and cancer**

Summary: We invite applications for a post-doctoral researchers from applicants with an enthusiastic interest in epigenetic and cancer. The successful candidate will work under the supervision of Dr. Vinciguerra to identify and characterize novel epigenetic mechanisms (i.e. histone variants, DNA methylation) involved in the insurgence of liver cancer (hepatocellular carcinoma), one of the deadliest malignancies worldwide. Our previous finding demonstrat that the lack of a specific histone called macroH2A1 transform liver cancer cells into aggressive cancer stem cells, and aggravates the disease. MacroH2A1 is necessary for PARP1-mediated DNA repair in many cell types, and it synergizes with DNA methylation. The project will unravel the epigenetic mechanisms linking DNA damage and hepatocellular carcinoma, especially the roles of macroH2A proteins.

Aims to be reached in the dissertation:

- Determine the role of macroH2A1 in DNA repair upon drug- or radiation-induced DNA damage in primary and immortalized cell lines
- Characterize the role of macroH2A1 and associated molecules in liver cancer stem cells chemoresistance
- Getting familiar with advanced microscopy to visualize epigenetic and chromatin-associated events

Number of accepted applicants: 1

Funding: Beyond the standard MU scholarship the PhD students will receive a salary linked to supervisor's institutional project, within the International Clinical Research Center (FNUSA-ICRC).

Prerequisites and requirements for applicants and students

- Complete Master's degree in molecular biology, biochemistry or similar field
- Experience with a range of molecular and cell biology techniques relevant to the research project
- Well-organised, motivated, hardworking and passionate about science
- Fluent in English
- Required to teach medical students (100 - 250 hours in total during the standard 4-year studies)
- A compulsory research stay abroad (min. 1 month) at a foreign research institution / participation in an international research project

Other obligations and recommendations: <http://www.med.muni.cz/index.php?id=795>

Supervisor's name: **Dr. Manlio Vinciguerra, PhD**

Contact: tel: +420 511 158 277

e-mail: vinciguerra@med.muni.cz; manlio.vinciguerra@fnusa.cz

<https://www.muni.cz/en/people/455149-manlio-vinciguerra>

<https://www.fnusa-icrc.org/cz/vyzkum/integrované-centrum-celulární-terapie-a-regenerativní-medicíny.html>

<https://manliovinciguerra.blogspot.com/>

Relevant recent publications:

1. Lo Re O et al. **Epigenetics**. 2018 Aug 30. doi: 10.1080/15592294.2018.1514239. [Epub ahead of print]
2. Lo Re O, Vinciguerra M. **Genes** (Basel). 2017 Dec 5;8(12). pii: E367. doi: 10.3390/genes8120367.
3. Lo Re O et al. **Hepatology**. 2017 Sep 15. doi: 10.1002/hep.29519. [Epub ahead of print]
4. Paziienza V et al. **Epigenetics Chromatin**. 2016 Oct 25;9:45. eCollection 2016.
5. Jueliger S et al. **Epigenetics**. 2016 Aug 11:1-12. [Epub ahead of print] PMID: 27646854;
6. Borghesan M et al. **Cancer Res**. 2016 Feb 1;76(3):594-606. doi: 10.1158/0008-5472.CAN-15-1336..
7. Podrini C et al. **FASEB J**. 2015 May;29(5):1676-87. doi: 10.1096/fj.14-262717.
8. Sheedfar F et al. **Int J Obes** (Lond). 2015 Feb;39(2):331-8. doi: 10.1038/ijo.2014.91.
9. Paziienza V et al. **Aging** (Albany NY). 2014 Jan;6(1):35-47.
10. Rappa F et al. **PLoS One**. 2013;8(1):e54458. doi: 10.1371/journal.pone.0054458.

Success in grant competitions

MAGNET, European Regional Development Fund

AZV CR, Czech health research council

International cooperation: Prof. Valter Longo, University of Southern California, LA, USA; Dr. Marcus Buschbeck, Jose Carreras Leukemia Research Center, Barcelona, Spain; Dr. Tommaso Mazza, Mendel Institute, Rome, Italy; Prof. Massimo Pinzani, University College London (UCL), London, UK.

MU cooperation: Prof. Lumir Krejci; Dr. Stjepan Uldrijan

Past PhD graduates and their further positions: Post-doc at San Raffaele hospital in Milan, Italy; Post-doc at King's College, London, UK; project manager at Pfizer; Study Director at QPS Netherlands.