

**Master 2 internship project
Year 2026-2027**

Laboratory/Institute: BGE/IRIG/CEA Grenoble
Team: MetaNucleoMics

Director: Marie-Odile Fauvarque
Head of the team: Delphine Pflieger

Name and status of the scientist in charge of the project: Delphine Pflieger

HDR: yes ☒ no ☐

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Program of the Master's degree in Biology:

- ☐ Microbiology, Infectious Diseases and Immunology ☒ Biochemistry & Structure
☒ Physiology, Epigenetics, Differentiation, Cancer ☒ Neurosciences and Neurobiology

Title of the project:

Studying epigenetic dysregulations in the brain of new-born mice after a pre-eclamptic pregnancy

Objectives (up to 3 lines):

We wish to analyze by proteomics and Western Blot the possible rewiring of histone post-translational modifications in the brain of new-born mice having developed in a hypoxic and oxidative placenta.

Abstract (up to 10 lines):

Preeclampsia, a hypertensive disorder that occurs after 20 weeks of gestation and affects 3 to 8 percent of pregnancies, is a major cause of maternal and fetal morbidity and mortality. Beyond the immediate risks, in utero exposure to preeclampsia (PE) is associated with long-term impairments in brain development and neurological function in children. During its development, the fetus is immersed in a hypoxic and inflammatory environment, which likely perturbs cellular functioning, in particular by modifying histones and thus affecting transcription programs. We will extract histones from the brain of new-born mice which developed in the context of a normal or pre-eclamptic pregnancy, to analyze their patterns of modifications (acetylation, methylation, and lactylation which was described to be induced by hypoxia) on the core histones, using Western Blot and analysis by liquid chromatography-tandem mass spectrometry. We expect to highlight some histone modifications that are deregulated by preeclampsia.

Methods (up to 3 lines):

Histone extraction from mouse brain, biochemical processing (*in vitro* modification of free lysines and enzymatic digestion), interpretation of mass spectrometry data, Western Blots.

Up to 3 relevant publications of the team:

1. Manessier J., Hijazi H., Brugière S., Courçon M., Masselon C., de la Iglesia A., Cocquet J., **Pflieger D.** Both L-lactyl and D-lactyl enantiomers modify histones in mouse testis. *Mol. Cell Proteomics* 2026, 25, 7, 101601
2. El Kennani, S.; Crespo, M.; Govin, J.; **Pflieger, D.** Proteomic Analysis of Histone Variants and Their PTMs: Strategies and Pitfalls. *Proteomes* 2018, 6, 29.

Requested domains of expertise (up to 5 keywords):

Biochemistry / Proteomics; Epigenetics.

