



Master Biologie Moléculaire et Cellulaire 'BMC',
Université Paris Cité - UFR Sciences du Vivant

Parcours : **Biologie et Développement Cellulaires 'BDC'**

<https://master2bdc.ijm.fr/>

Fiche de Projet de Stage de M2, 2025-2026

Unité INSERM ou CNRS ou Université : Institut Curie - CNRS UMR 3215 / INSERM U934	Responsable du Stage : Co-supervision : Allison Bardin – Louis Gervais
Intitulé Equipe : Stem cells and tissue homeostasis	Contacts Adresse : Institut Curie 26 rue d'Ulm 75005 Paris
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Epigenetic Control of Adult Stem Cells: Insights from the *Drosophila* Intestine

Adult stem cells (ASCs) are vital for organ renewal and repair. While **epigenetics** is known to play a crucial role in stem cell control, its specific impact on ASCs during routine tissue maintenance or in response to environmental challenges remains unclear due to limited *in vivo* models.

Using the ***Drosophila* intestine** as a model for studying ASCs⁴, mirroring those found in mammalian barrier epitheliums, we aim to unravel how chromatin organization regulates gene expression in ASCs and contributes to **tissue homeostasis**.

Our previous studies characterized **chromatin organization** in the intestinal lineage *in vivo*¹ and demonstrated the respective roles of different chromatin modifying factors as regulators of adult intestinal stem cell proliferation and differentiation¹⁻³.

Building on these studies, we are now investigating: (1) Mechanisms by which **differentiation and proliferation** within adult stem cells is regulated by **transcriptional and chromatin organization changes**. (2) How **environmental changes can impact adult stem cell behavior and chromatin organization** over short and long time-scales. The project details will be further developed during discussions with the candidate. This project will utilize *Drosophila* genetic tools to investigate how disrupting chromatin regulators through mutant or RNA interference contexts impacts the intestinal lineage. We will also explore the short and long-term effects of environmental challenges (diet, microbiota) on chromatin organization and gene expression.

The student will gain experience with *Drosophila* genetics, advanced microscopy, image processing, and omics analysis using RNA-seq, CUT&Tag and ATAC-Seq approaches.

Lab and student profile: Our team is located within the Genetics and Developmental Biology Department at the Institut Curie, Paris. The student should be highly motivated and have a general interest in developmental biology and stem cells. The lab will provide mentoring for the student in writing and presenting their work. We are looking for a student who potentially would like to continue for a PhD.

Publications de l'équipe relatives au projet de stage (max 5)

1. Josserand M., Rubanova N., Gervais L*, Bardin A.J.* (2023). Chromatin state transitions in the *Drosophila* intestinal lineage reveal principles of cell type specification. *Dev. Cell*. Dec 18;58(24):3048-3063.e6. 10.1016/j.devcel.2023.11.005. * Co-corresponding authors.
2. Gervais L*..., Bardin A.J*. (2019). Stem Cell Proliferation Is Kept in Check by the Chromatin Regulators Kismet/CHD7/CHD8 and Trr/MLL3/4. *Dev. Cell* 49, 556-573.e6. * Co-corresponding authors.
3. Andriatsilavo M., Stefanutti M ..., Gervais L., Gillet-Markowska A., Al Zouabi L., Schweisguth F., Bardin A.J. (2018). Spen limits intestinal stem cell self-renewal. *PLoS Genet*. 2018 Nov 19;14(11):e1007773. doi: 10.1371/journal.pgen.1007773.
4. Gervais, L., and Bardin, A.J. (2017). Tissue homeostasis and aging: new insight from the fly intestine. *Curr. Opin. Cell Biol.* 48, 97–105.