



MASTER 2 BMC PARCOURS GENOPATH ANNÉE 2021-2022

Titre du sujet de stage : Understanding adult stem cells using the adult *Drosophila* intestine

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Sujet de stage :

Adult stem cells replenish tissues through their activities of self-renewal and lineage differentiation. These essential functions of stem cells are ensured by transcriptional and epigenetic regulation. Fidelity of gene expression, in turn, relies on an accurate genomic content, which must be safeguarded from endogenous and exogenous mutagenic processes. We aim to better understand stem cell genome expression and stability by exploring the questions: How is gene expression controlled allowing stem cell fate decisions? What are the cellular mechanisms protecting stem cell genomes from mutation and what happens when they fail? We address these questions using the *Drosophila* intestinal stem cell model system, a simple model system with excellent genetic and genomic tools.

We have Master's projects open on these in 2 axes addressing important questions in stem cell biology. Decisions on the project will be made in conjunction with the student and lab's interests. A first potential project (Project 1) will investigate how chromatin state transitions influences differentiation in adult stem cell lineages, in response to stress, and how chromatin state misregulation negatively impacts stem cell activity. (Please see our recently published work in this area Gervais, et al, *Developmental Cell*, 2019).

A second potential project (Project 2) explores how somatic genomic damage by replication stress impacts stem cell regulation and investigate how tissue-specific contexts impact mutation acquisition. This project will explore mechanisms of non-autonomous tissue contribute to DNA damage and tumor growth and will contribute. This work will provide insight into mechanism of tumor initiation, growth and stem cell mutation during aging. (Please see our recently published work and preprint: Siudeja, Cell Stem Cell, 2015; Siudeja, Embo J, 2021; Riddiford, bioRxiv 2020.07.20.188979).

Technologies utilisées : Drosophila genetics, immunofluorescence + confocal imaging, statistical analysis, genomics

Mots clés : stem cells, chromatin, genome stability, replication stress

Publications d'intérêt :

Siudeja, Embo J, 2021;
Riddiford, bioRxiv 2020.07.20.188979
Gervais, et al, Developmental Cell, 2019
Siudeja, Cell Stem Cell, 2015;