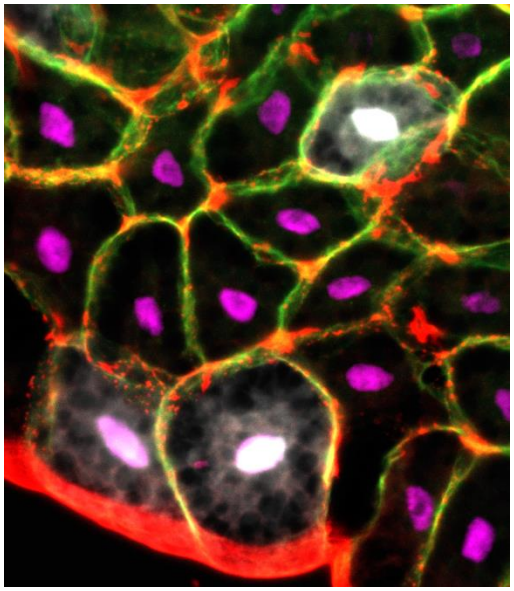
Postdoctoral position available: metabolism-epigenetics interplay in *Drosophila*

Patrick Jouandin lab, young ATIP-AVENIR investigator, Montpellier Cancer Research Institute. Exciting projects, state-of-the-art technologies, friendly and dynamic scientific environment, translational research. ATIP-AVENIR funded position, 12 months + 12 month.



Research background & project:

Metabolism is intricately linked with epigenetics. On the one hand, the epigenetic machinery controls chromatin's architecture that governs the expression program of metabolic enzymes. On the other hand, specific metabolic products can act as epigenetic modifiers that can reprogram transcription. This interplay is involved in development, cancer and the immune response, and unravelling this regulatory network will have immediate impact on understanding human health. However, the mechanisms at play and their roles *in vivo* are largely unclear. One challenge has been a lack of genetic models amenable to the systematic characterization of the complex crosstalk between epigenetic and metabolic pathways. Another is that because alteration of the epigenome triggers global transcriptional changes, it is particularly difficult to link a set of specific target genes to a measurable phenotype *in vivo*. To address this, we have established a genetic model in *Drosophila* that allows for medium-throughput screening in vivo to systematically interrogate the metabolism-epigenetics interaction during development and inflammation. Our screening results already identified numerous metabolic enzymes and epigenetic factors implicated in these processes, awaiting functional characterization. The postdoctoral candidate will develop projects along any of these three research aims: i) characterize the chromatin landscape bound by epigenetic factors and identify direct metabolic targets, ii) characterize how epigenetic factors regulate flux through specific metabolic pathways, and iii) identify metabolites secreted from the adipose tissue that regulate development and the inflammatory response. Overall, we aim to decipher, in vivo, a complex regulatory network of conserved genes and metabolites that are pathophysiologically relevant in humans.

Profile:

We will recruit a highly motivated PhD with a collaborative spirit. The candidate is expected to have a strong experience with basic molecular biology and biochemistry methods. In addition, we seek any expertize with gene editing technologies, metabolomics, fluxomics, bioinformatics/ NGS data analysis, proteomics, chromatin biology/ epigenetic, imaging, or a combination thereof. Experience with *Drosophila* genetics is appreciated but not necessary.

Applications: Please send a cover letter, a CV and at least one recommendation letter to patrick.jouandin@inserm.fr.

Key publications:

1. Gu X*, Jouandin P*, Lalgudi PV, Binari R, Valenstein ML, Reid MA, et al. Sestrin mediates detection of and adaptation to low-leucine diets in Drosophila. Nature. 2022 Aug;608(7921):209–16.
2. Jouandin P, Marelja Z, Shih YH, Parkhitko AA, Dambowsky M, Asara JM, et al. Lysosomal cystine mobilization shapes the response of TORC1 and tissue growth to fasting. Science. 2022 Feb 18;375(6582):eabc4203.
3. Parkhitko AA, Jouandin P, Mohr SE, Perrimon N. Methionine metabolism and methyltransferases in the regulation of aging and lifespan extension across species. Aging Cell. 2019 Dec;18(6):e13034.
4. Ghiglione C*, Jouandin P*, Cérézo D, Noselli S. The Drosophila insulin pathway controls Profilin expression and dynamic actin-rich protrusions during collective cell migration. Development. 2018 Jul 30;145(14):dev161117.
5. Jouandin P, Ghiglione C, Noselli S. Starvation induces FoxO-dependent mitotic-to-endocycle switch pausing during Drosophila oogenesis. Development. 2014 Aug;141(15):3013–21.

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