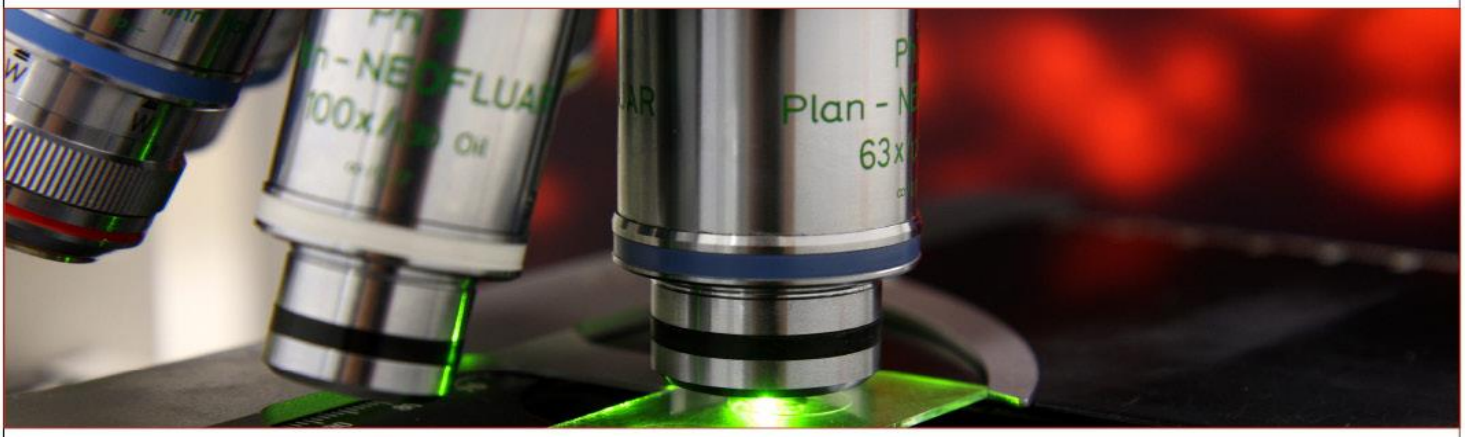
SÉMINAIRES ET CONFÉRENCES



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'' Why both maternal and paternal genomes matter: genomic imprinting in maternal-fetal health''

Unlike most vertebrates, mammalian uniparental embryos derived from two maternal or two paternal genomes fail to develop beyond the mid-gestation stage, even in carefully controlled lab settings. Why does mammalian development require exactly one maternally and one paternally inherited genome? I will discuss the development of an allele-aware pipeline I helped develop, which splits short read high throughput sequencing data into their maternal and paternal components. Using this tool, we traced the distinct and complementary epigenetic programs inherited from egg- and sperm-derived genomes during rat and mouse embryogenesis, and comprehensively mapped their genomic imprints. By comparing rat, mouse and human genomes, we identified lineage-specific imprints, enabling us to triangulate potential evolutionary events leading to imprinting, as well as conserved imprints, highlighting loci relevant to human overgrowth and growth restriction disorders. Mechanistically, I will show that DNA methylation is required for gene activation at specific loci during development using an *in vitro* model. We found that DNA methylation governs multiple molecular mechanisms that converge to activate *Zdbf2*, a growth-promoting imprinted gene. By employing site-directed epigenome editing approaches, we showed that DNA methylation *per se* mediates gene activation through antagonism of the Polycomb pathway and CTCF-mediated chromatin looping. Altogether, these evolutionary and mechanistic results provide insight into how growth-related imprinted genes are placed under tight transcriptional control.

Finally, I will offer a glimpse into the future by demonstrating how long read nanopore sequencing approaches, combined with deep mechanistic and evolutionary understanding, will revolutionize the diagnosis of human imprinting disorders and enabling clearer recurrence-risk counseling in maternal-fetal care.

Faculté de médecine
Département de biochimie et médecine moléculaire
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Le lundi 12 janvier, 13h00

Pavillon Joseph-Armand-Bombardier, Salle : 1035

Et

Zoom

Invité de Pascale Legault
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