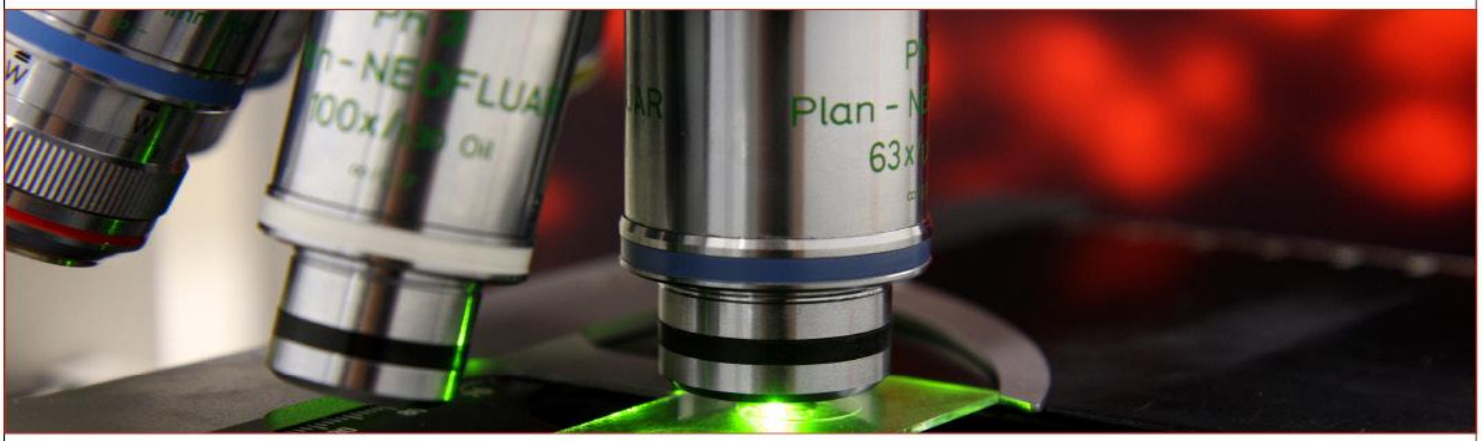
SÉMINAIRES ET CONFÉRENCES



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'' Towards reconstituting primate post-gastrulation development *in vitro*''

Recent efforts to reconstruct complex developmental processes *in vitro* from stem cells open up exciting new opportunities for studying the biological principles, which govern the emergence of form and function during embryonic development in humans and other primates. Early embryonic developmental events including somitogenesis, during which the metameric body plan of vertebrates is laid out, have been extensively studied using model organisms such as mouse or chick but remain largely elusive and poorly understood when it comes to human and other primates. Using induced pluripotent stem cell (iPSC)-derived presomitic mesoderm (PSM), we previously succeeded to quantify oscillatory activity of the segmentation clock, a molecular oscillator believed to control segmentation process (Matsuda, Yamanaka et al., *Nature* 2020; Matsuda et al., *Science* 2020). Interestingly, these *in vitro* models of the segmentation clock did not show any sign of segmentation or somitogenesis despite the presence of oscillatory activity of clock genes such as *HES7*. Extending on these earlier findings we then asked whether we could recapitulate not only the clock but also the actual process of segmentation and epithelial somite formation *in vitro*. Utilizing again pluripotent stem cells as starting material we succeeded to establish a 3D *in vitro* model of human somitogenesis, which exhibited periodic formation of properly patterned epithelial somites in synchrony with the segmentation clock (Yamanaka, Hamidi et al., *Nature* 2023). Our selforganizing 'axioloids' reconstituted various morphological and molecular features of the emerging human embryonic axis and could be also used to study the pathogenesis of human congenital diseases of the spine. Currently, we are further improving our axioloid model to reconstitute additional aspects of post-gastrulation development and expanding it also to other primate species including chimpanzee, orangutan, gorilla, macaque and marmoset. Our overall aim is to utilize these and other *in vitro* model systems to increase our still limited understanding of development, disease and evolution in human and other primates.

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Le vendredi 3 octobre, 11h30

Pavillon Joseph-Armand Bombardier salle : 1035

et

Zoom

invité de Paul François
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