Plasma membrane mechanics during the formation of the first mammalian epithelium

General information

Call 2022
Reference 2022-10-MAITRE
Keyword(s) Morphogenesis; Cell and tissue; Mechanics; Preimplantation development.

Director(s) and team

Thesis director(s) Jean-Léon Maître
Research team Mechanics of mammalian development
Research department U934/UMR3215 – Genetics and Developmental Biology

Description of the PhD thesis project

During pre-implantation development, the mammalian embryo forms the blastocyst. The architecture of the blastocyst is essential to the specification of the first mammalian lineages and to the implantation of the embryo. Consisting of an epithelium enveloping a fluid-filled lumen and the inner cell mass, the blastocyst is sculpted by a succession of morphogenetic events. These deformations result from the changes in the forces and mechanical properties of the tissue composing the embryo. Combining microscopy, image analysis, biophysical tools and genetics, we study the mechanical and cellular changes leading to the formation of the blastocyst.

This PhD project will focus on the contribution of the plasma membrane to shaping the first mammalian epithelium.

International, interdisciplinary & intersectoral aspects of the project

Projects in the lab run at the interface between cell and developmental biology and biophysics. This project will be developed in collaboration with the Barcelona-based company Impetux and will benefit from interactions with biophysics labs located in France and abroad.
Recent publications


Expected profile of the candidate

Applicants should have a strong desire to explore cell biological phenomena in an in vivo context, and should show solid capacity for independent and creative thinking. Background in cell biology, developmental biology and/or biophysics is strongly recommended. The project highly relies on microscopy and live imaging techniques, for which the applicant should have either experience or a strong motivation to learn.