

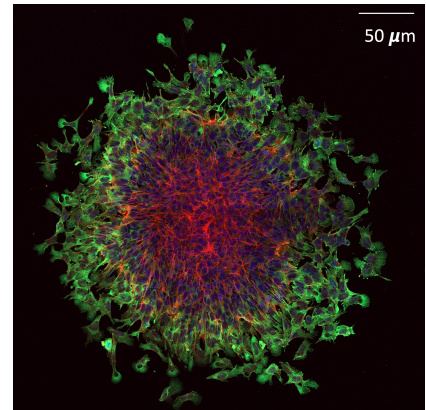


Internship proposal in physics of morphogenesis 2024

Role of the ECM signaling in *ex vivo* mesodermal morphogenesis

Laboratoire Physico-Chimie Curie
Institut Curie, Paris

We are looking for a motivated master's student to join our studies on tissue patterning and shape emergence during embryonic axis development. We are interested in understanding how mechanical cues, and possible feedbacks between mechanics and biochemical pathways, shape specific structures during the development of the anterior-posterior axis in a vertebrate embryo. More specifically, our research is focused on the process of somite generation during the axial morphogenesis, where in response to spatial gradients of morphogens, the posterior mesenchyme differentiates, condenses, and pinches off periodically in epithelial segments in shape of rosettes. The extracellular matrix (ECM), surrounding the PSM, plays a crucial role in tissue rearrangement through signals that can be mechanical (matrix stiffness) and/or chemical. The details of this process are not yet well understood.



Somite spreading in 2D. Focal adhesions (green), actine (red).

For this masters' internship, we will devise *ex vivo* experimental approaches to study **the role of ECM in tissue rearrangement** and **rosette formation** in controlled 2D and 3D configuration. The role of ECM proteins and stiffnesses, as well as cellular elements during this shape emergence process will be evaluated.

Keywords: tissue rearrangements, morphogenesis, biophysics, cell contractility, mechanobiology, tissue dynamics, signaling.

The candidate should have a background in biophysics, physics, bioengineering, biology, or in a closely related field, and a creative mindset and willingness to develop new skills at the interface of physics and biology. A good command of English is essential.

Techniques used: Phase contrast and confocal microscopy, video-microscopy, microdissection, and tissue culture, spreading assays, time-lapse image analysis, programming, immunolabeling.

Open to M1 or M2 students.

For more information, please contact Karine Guevorkian karine.guevorkian@curie.fr