STudent REseArch Mobility Programme (STREAM)
Project proposal

Host University:
Université Paris-Sud

Field (drop-down list):
Natural sciences, mathematics and statistics

Specified field, subject:
Cell Biology

Research project title:
Regulation of the initiation of ciliary growth

Possible starting month(s):

Sep	Oct	Nov	Dec	Jan	Fev	Mar	Apr	May	Jun	Jul	Aug
☐	☐	☐	☐	☐	☐	☒	☒	☒	☒	☒	☐

Possible duration in months:

1	2	3	4	5	6	7	8	9	10	11	12
☐	☒	☒	☒	☒	☐	☐	☐	☐	☐	☐	☐

Alternatively, exact starting and end date: from date to date

Suitable for students in: ☐ Bachelor level ☒ Master level

Prerequisites:
Basic knowledge on cell biology/immunochemistry.

Restrictions:

Description (maximum 2,000 characters):
The main focus of our team is to understand the mechanisms sustaining cilia biogenesis. Cilia are extremely well conserved organelles among eukaryotes, from unicellular organisms to humans. They are involved in essential functions such as fluid circulation, sensory perception and cell signaling. In humans, almost all cell types can generate a primary cilia in G0, which acts as a cell antenna. Furthermore, specialized cell types possess motile cilia or modified cilia dedicated in sensory perception. According to the abundancy of cells bearing cilia in our body, ciliary defects lead to human pathologies with pleitropic effects (mental retardation, infertility, obesity, cystic kidney, skeletal defects…) that are commonly named ciliopathies.

In vertebrates, the mother centriole of the centrosome, migrates and docks to the plasma membrane to form the basal body from which the cilium is generated. Cilia have a specific protein composition which implies that ciliary components have to be sorted. This sorting is carried out by the transition zone, localized between the basal body and the ciliary axomene. Interestingly, almost all transition zone components identified so far are involved in human ciliopathies.

Our lab studies biogenesis in *Paramecium*, a unicellular organism bearing thousands of basal bodies. Remarkably, although all basal bodies are docked to the plasma membrane some of them remain unciliated. Alternation of ciliated and non-ciliated basal bodies makes Paramecium a powerful system to identify proteins involved in the regulation of ciliary growth. We have shown that the transition zone has to become fully mature, molecularly and structurally, in order to allow cilium growth. We want to understand what are the molecular mechanisms involved in this maturation, and started to analyse some candidates. Interestingly, our preliminary results show that depletion of transition zone components affect cilia stability (cilia are more stable or more fragile according to the protein depleted). The student will be in charge of the fine characterization of these phenotypes.

Faculty and/or Department:
University Paris-Saclay, Integrative cell biology institute (I2BC)
Team: biogenesis and functions of centrioles and cilia structures

Contact person, including position:
Séverine Fogel, Head of International Relations

Contact email:
severine.fogel@u-psud.fr

Deadline for nomination to reach host university:
2 months before the starting date

Notification of admission given by the end of:
Within 3 weeks

Additional information: