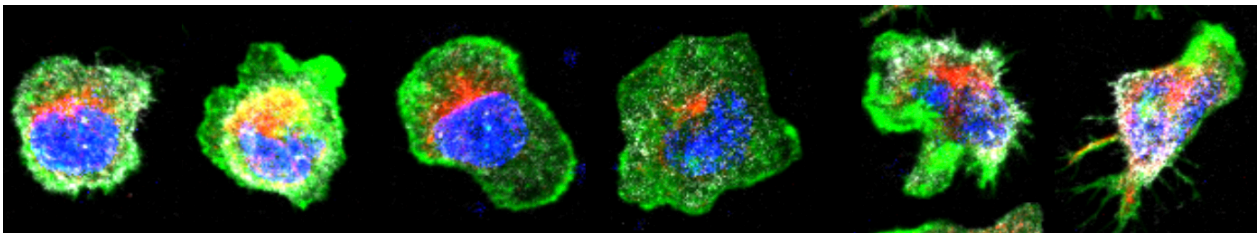
PhD fellowship in Toulouse, France

Architecture of actin cytoskeleton networks in T lymphocytes

Labs of **Loïc Dupré**, Infinity & **Renaud Poincloux**, IPBS

https://www.infinity.inserm.fr/en/research-teams/equipe-10-r-lesourne/
https://www.ipbs.fr/phagocyte-architecture-and-dynamics/



Starting date: April 2025

Project Description: Cytotoxic T lymphocytes are an essential component of the adaptive immune system and pivotal not only for killing intracellular pathogens, but also for eliminating malignant cells. The actin cytoskeleton sustains the formation of the immunological synapse, which regulates target cell adhesion and polarized delivery of cytotoxic molecules. The precise organization of the different actin filament networks at the immunological synapse of primary T lymphocytes remains poorly defined. The PhD project aims at exploring the T lymphocyte synapse-sustaining actin architecture from a molecular and a mechanical angle to decipher how cytotoxic T lymphocytes coordinate the adhesion and polarized delivery of cytotoxic molecules to their target cells. The acquired knowledge will then be applied to the study of T lymphocytes from immuno-compromised patients carrying mutations in actin and actin-binding proteins.

Experimental approaches: The hired candidate will generate and characterize primary lymphocyte cultures by flow cytometry. Immunological synapse architecture and actin cytoskeleton dynamics will be studied by a combination of microscopy approaches including high-content confocal imaging, TIRF microscopy, super-resolution microscopy and cryo-electron tomography approaches. Forces generated by the actin cytoskeleton at the Immunological synapse will be monitored using atomic force microscopy.

Environment: Completion of the thesis between Infinity (supervisor Loïc Dupré) and IPBS (co-supervisor Renaud Poincloux). Project in close collaboration with Marion Jasnin, Helmholtz Pioneer Campus, Munich, Germany and Alphée Michelot, the Mechanobiology Institute (MBI) at the National University of Singapore (NUS).

Funding: Funding of the project is from the French national research agency (ANR). A 3-year public law fixed-term doctoral contract will be issued by the French national institute for health and medical research (INSERM). The hired student will be registered at the Biology-Health-Biotechnology Doctorate School of the Toulouse University and benefit from the associated doctoral training support activities.

Qualifications: We are seeking a highly motivated student with a Master's degree in cell biology with experience in cell culture and microscopy approaches. Advance proficiency in English will be a plus given the international perimeter of the project.

How to apply: Please provide a CV (detailing your education, experience and acquired skills), 2 or 3 references, a cover letter describing the suitability of your profile and your scientific interests. To be sent to: loic.dupre@inserm.fr and renaud.poincloux@ipbs.fr - Deadline: February 28, 2025.