



Lab: CR2TI/UMR1064

Team: 1

Name and position of the supervisor: Dr Franck Halary, INSERM senior scientist

Email of the supervisor: franck.halary@univ-nantes.fr

Candidate (if internship filled):

Title of the internship: Mechanosensing KO impact study on a virally-infected, human renal tubule on chip model

Summary of the internship proposal:

Mechanical forces play a critical role in organ development and regulation of physiological functions [1]. Renal Proximal Tubule Epithelial Cells (RPTECs), the most abundant cell type in the human kidney, are known to experience a constant exposure to mechanical stimuli like Fluid Shear Stress (FSS) caused by the urine flow, thus modulating their functions [2, 3]. FSS sensing, part of the cellular mechanosensing machinery in RPTECs mostly relies on the primary cilium (PC), a non-motile structure that extends into the lumen. The intraflagellar transport proteins (IFT) are major PC components [4, 5]. While there is a growing understanding of how the physical properties of biological matter governs the different steps of a viral infection [6], nothing is known about how a physiological mechanical constrain like FSS could impact viral infections of the human kidney, like the BK polyomavirus, a human-specific pathogen. To address this question requires the implementation of a fully humanized, advanced in vitro model (AIVM) of the kidney tubule, a privileged reactivation site for the BKPyV in vivo, on a microfluidic chip which mimic kidney functions in a tightly controlled environment [8]. Such AIVM are currently being developed in our lab and has been recently reported to model the nephrotoxicity of well-established anti-cancer drugs or antibiotics [10]. During the M2 internship, after a thorough review of the literature and technical trainings, the candidate will operate several versions of the renal tubule AIVM to compare the impact of the IFT88-KO in RPTECs to the wild type cell line, on the BKPyV infection. Together with the supervisor(s), the candidate will be asked to design and conduct his/her experiments mainly using assays like RT-qPCR/qPCR, multiplexed IF, etc as well as cell culture in the two BSL2 labs in the CR2TI (internal training will be dispensed to the candidate at his/her arrival).

Profile(s) linked to the project:

☒ Experimental Biology (*Recherche expérimentale*)

☐ Clinical Research (*Recherche clinique*)

☐ Research in data analysis (*Recherche en analyse de données*)