Master de Sciences et Technologies
Mention Biologie Intégrative et Physiologie
Parcours : Neurosciences
Responsable : Professeur Régis Lambert

Internship Proposal
Academic Year 2019-2020

1. Host team :

Research Unit (e.g. Department or Institute) : Institut de la Vision, Sorbonne Université – Inserm UMR_S968 – CNRS UMR_7210, Team S13
Research Unit Director : Prof. José-Alain Sahel
Research Team Director : Dr. Emeline Nandrot
Team name : Physiology of the retinal pigment epithelium and associated pathologies

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2. Internship project title:

In vitro and *in vivo* Identification and characterization of new plasma membrane receptors for the circadian regulation of retinal phagocytosis

3. Internship Description :

The retinal pigment epithelium (RPE) constitutes a cell monolayer fulfilling several functions all crucial for vision. Notably, RPE cells phagocyte in a circadian pattern photoreceptor outer segments (POS) that are renewed continuously. Absence or deregulation of retinal phagocytosis lead to either early (retinitis pigmentosa) or late (age-related macular degeneration) vision loss, respectively. These pathological developments highlight the importance of understanding both function and pathogenesis of retinal phagocytosis in order to envision therapeutic strategies.
Our projects aim at characterizing the regulation of known and new membrane receptors governing the daily cyclic elimination of POS. These mechanisms are close to those used by macrophages to discard apoptotic cells. However, they differ due to the permanent contact between RPE and POS thus emphasizing the strict molecular control of the process in the retina. We identified families of new candidate proteins for rod photoreceptor phagocytosis, and are setting up new approaches to characterize the phagocytic machinery of cone photoreceptors in charge of color and detailed vision.
The main techniques used for this project are cell biology (cell line and primary cultures, *in vitro* phagocytosis), molecular biology (RT-qPCR, transfection), biochemistry (western blots, immunoprecipitation, immunocytochemistry and confocal microscopy), retinal tissue histology and the analysis of *in vivo* models (circadian phagocytosis, visual phenotyping).