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

Internship Proposal
Academic Year 2018-2019

1. Host team :

Research Unit (e.g. Department or Institute) : Institut de la Vision
Research Unit Director : José-Alain SAHEL
Research Team Director : Alain Chedotal
Team name : Role of axon guidance molecules

Address : 12 rue Moreau, 75012, Paris

Supervisor of the Research Intern for this project : Alexandra Rebsam
Telephone : 01 45 87 61 27
E-mail : alexandra.rebsam@inserm.fr

2. Internship project title: *Developmental origin of the retinal defects in albinism*

3. Internship Description :

Brain function relies on the precise organization of neuronal connections. The construction of this neural network depends on precisely controlled developmental events ranging from proliferation, neurogenesis, neuronal differentiation and migration to axon guidance and targeting, synaptogenesis. Alterations of any of these steps will have structural and functional consequences. We use the visual system to precisely study the mechanisms that regulate some of these developmental events and this project focuses on a genetic disease, albinism, showing clear functional consequences arising from a developmental alteration. In albinism, a defect in melanin production leads to hypopigmentation, a hallmark of this disease, but also to important visual deficits due to abnormal development of the retina. Indeed, a delayed neurogenesis in albino retina leads to a reduced number of ipsilateral retinal ganglion cells, most likely at the basis of the altered binocular vision in people with albinism. The fate of all retinal subtypes depends on the time of neurogenesis, but it remains unknown whether other retinal cell types are affected in albinism, and what are the exact mechanisms explaining the delayed neurogenesis. This project aims at understanding the origin of the retinal defects in albino mouse retina. First, the student will characterize whether other cell types generated by retinal progenitor cells (RPC) are affected in albino retina and what are the consequences on retinal connectivity. In parallel, the student will start to explore whether the altered generation of neuronal subtypes in albino retina arises from defects in the division (symmetric/asymmetric) and/or cell fate choice of retinal progenitor cells using new multicolored genetic tools for clonal analysis. This project will provide fundamental advances on the mechanisms of retinal neurogenesis and cell fate determination and their dysfunction in albinism.