

McGill University - Imperial College London Student Exchange

Training opportunity within the Lachapelle Laboratory at McGill University

Project Title: Postnatal consequences of bright light exposure on retinal structure and function.

Hypothesis/Question to be Addressed: The purpose of this project is to determine at what time (during retinal maturation) the retinal asymmetry (and especially the retinal hole observed in the supero-temporal retina) shown to characterize the rodent model of light induced retinopathy (LIR) starts developing.

Specific Aims: Newborn rats exposed to a bright luminous environment from eye opening (P14) to the end of the first month of life (P28) will develop a retinopathy known as Light-Induced Retinopathy or LIR. This retinopathy is characterized with the following features: 1- Hemiretinal asymmetry where the superior retina is significantly more affected than the inferior one, 2- The presence of a retinal hole (ie absence to near absence of photoreceptor) at approximately 1000 μm temporal of the optic nerve head. To date, the LIR features were always documented at the end of the 14 day light exposure regimen.

Rat pups + mother will be raised in a bright luminous environment (10,000 lux) between P14 (eye opening) and P28. Retinal structure (histology, immunohistochemistry, etc.) and retinal function (flash and multifocal electroretinograms) will be obtained at P16, P18, P20, P22, P24, P26 and P28 and compared to data gathered from control rat pups raised in normal luminous environment.

Specific aims are therefore: 1-Record flash (fERG) and multifocal (mfERG) ERGs at selected time points in normal and light exposed rats. 2- Harvest retinal tissues at selected experimental time points in order to perform histological sections as well as immunohistochemistry staining to evidence upregulation of previously identified nerve growth factors. 3- Determine the first sign of LIR manifestation.

Role of Student: Students is expected to function as a graduate student. He/she will be responsible for every steps of the project, from literature review to data analysis. Following appropriate certification by the animal care committee, the student will also be responsible for conducting the experimental part of the project. The student is also expected to actively participate at weekly journal clubs at which he/she will present when his/her time comes. At the end of the stage, the student will present a seminar (to lab members) outlining the results obtained. If warranted, the student might be invited to write up an abstract (as first author if justified) of his/her findings to be submitted to one of the meetings attended by other lab members.

Contact:

Prof. Pierre Lachapelle, PhD
Département d'ophtalmologie (D-164)
Université McGill-Hôpital de Montréal pour enfants
Email: pierre.lachapelle@mcgill.ca