Centre de recherche
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Université de Montréal

Lipids and autophagy in age-related macular degeneration

Numéro de l'offre de stage : No. 19

Équipe de recherche

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Description du projet

Age-related macular degeneration (AMD) is the leading cause of blindness in adult over fifty. However, drivers of pathological angiogenesis that lead to blindness in wet AMD are not well understood. Autophagy was previously reported to play a potential role in AMD and regulation of lipid metabolism, especially under nutrient starvation. To explore the pathogenesis of AMD, we use mice deficient in Very Low-Density Lipoprotein Receptor (Vldlr), which have elevated serum fatty acid levels and develop retinal angiomatous proliferation (RAP), a subtype of AMD. We have now generated an AMD and autophagy reporter mice model (CAG-RFP-eGFP-LC3) to investigate the role of autophagy as pathological neovessels develop.

To assess the role of lipids and autophagy in AMD, the student will image and quantify the kinetics of autophagy in CAG-RFP-eGFP-LC3; Vldlr-/- mice relative to control. Retina from P5 to P17 will be collected, and neovascular lesion development (retinal flat mount), as well as autophagy flux (on retinal cryosections), will be imaged by confocal microscopy. At relevant time points, mRNA (qRT-PCR) and protein (Western Blot) markers of autophagy will be quantified. Finally, using pharmacological agonists or inhibitors of autophagy, we will quantify the autophagy flux and its impact on pathological vascular lesions in our AMD models.

The student will, therefore, contribute to pioneering work exploring the role of autophagy in macular degeneration, one of the leading eye disease worldwide. Findings may also help inform other neurodegenerative conditions, such as Parkinson and Alzheimer's diseases, where autophagy is believed to play an important role.

Mots clés

Lipids, autophagy, Age-related macular degeneration (AMD), angiogenesis, energy metabolism