

VISION SCIENCE HONOURS PROJECTS

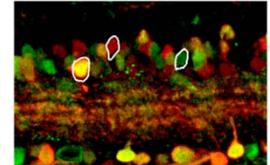
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LABORATORY PROJECTS

WHAT IS THE ROLE OF RETINAL REMODELLING IN RETINITIS PIGMENTOSA?

In RP, photoreceptor cells die leading to visual impairment and blindness. However, before cell death, other changes occur in the retina: cells sprout new processes and retract old ones, cells migrate to different retinal layers and the neurochemical signalling between cells is altered. These processes, called retinal remodelling, occurs in early disease and therefore offer a new timepoint to treat retinal disease.

This project investigates retinal remodelling in animal models which mimic Retinitis Pigmentosa in humans. This project will investigate retinal remodelling using immunohistochemistry and microscopy.



IS VINPOCETINE A TREATMENT FOR RETINAL ISCHAEMIA?

Retinal ischaemia is the primary pathological process underlying several major retinal diseases including diabetic retinopathy, acute angle closure glaucoma and vascular occlusion syndrome. It causes irreversible cell death and has very few viable therapeutic strategies.

We recently demonstrated that vinpocetine, a natural herbal supplement, may be a potential treatment for ischemia. Vinpocetine increases glucose availability and regulates glutamatergic signalling in the retina following ischemia. This project investigates the mechanisms of action of vinpocetine in ischaemia and its potential as a preventive treatment for ischaemia using immunohistochemistry and metabolic assays.

CLINICAL PROJECTS

WHAT IS THE ROLE OF THE PERIPHERAL RETINA IN CENTRAL RETINA DISEASES?

Retinal diseases which involve the central retina such as age-related macular degeneration and glaucoma have devastating effects on patient's vision. However, there is evidence that many of these diseases extend beyond the macula and affect the peripheral retina as well. This project investigates the role of the peripheral retina in central retina diseases and the clinical significance of these changes. This project will involve analysing clinical images of the retina taken with advanced imaging modalities such as Optomap of patients seen at the Centre for Eye Health. From this we will characterise peripheral findings in central retina diseases and the effect of incidental findings.

HOW DO DRUSEN AFFECT THE RETINA THROUGHOUT AMD

Age related macular degeneration (AMD) is a leading cause of blindness worldwide. Detection and diagnosis of AMD relies on imaging of early structural abnormalities known as drusen. Our group recently found that drusen alters the thickness of the retina directly above and in surrounding drusen-free areas. We have also found different drusen types have effects on different retinal layers.

This project expands on these findings, determining how these drusen related changes link to disease pathogenesis. This project uses clinical images from AMD patients to measure changes relating to drusen using automated segmentation software and image analysis tools.

