

**Masters Thesis Project**

**Mechanistic insights into the effect of pilocarpine on posterior ocular tissues**

**Supervisors:** Drs Alyssa Lie, Lucy Goodman, and John Phillips

Presbyopia is an age-related condition in which the eye gradually loses its ability to focus on nearby objects. The symptoms of presbyopia begin in middle age when reading small print becomes difficult. This blurry vision is traditionally resolved by wearing reading glasses. A novel presbyopia treatment called Vuity has emerged as the first-ever eye drop approved to treat the symptoms of presbyopia. However, pilocarpine, the main active ingredient in Vuity eye drops, could have unknown detrimental effects on the retinal and choroidal tissues at the back of the eye. This project aims to understand the mechanisms by which acute pilocarpine treatment may alter choroidal thickness, chorioretinal blood flow, and retinal function.

**The project aims to:**

- To review the literature on topical ophthalmic medications on posterior ocular tissues
- To conduct an interventional before-after clinical trial to investigate how pilocarpine alters retinal and choroidal physiology
- To employ advanced imaging techniques to assess choroidal thickness (optical coherence tomography), chorioretinal blood flow (optical coherence tomography angiography), and retinal function (electroretinography)
- To explore retinal defocus, retinal luminance, and muscarinic activation as potential mechanisms of action of pilocarpine on posterior ocular tissues

**Who will it suit most:**

- Students eligible for a Masters in Health Science (MHSc) or Biomedical Science (MBiomedSc)
- Ready to start a full-time Masters Thesis by July 2025
- Interest in drug mechanisms and ocular physiology
- Good written and verbal communication skills
- Good practical skills with laboratory equipment or techniques
- Previous research experience involving human participants is helpful but not required

**If you are interested**

- Send an email to [a.lie@auckland.ac.nz](mailto:a.lie@auckland.ac.nz)
- In your email include
  - a) a short write up on why you are interested in working on this topic
  - b) curriculum vitae
  - c) unofficial copy of your transcript

This is a **funded position**, with **domestic fees and a tax-free stipend** (of \$14,463) covered for a 12-month enrolment. Applications are open until a suitable candidate is identified.