The University Of Queensland AUSTRALIA | IMB
Institute for Molecular Bioscience

NEUROPEPTIDE RESEARCH
PHD OPPORTUNITIES AT WORLD-CLASS RESEARCH INSTITUTE

Supervisory Team
A/Prof. Markus Muttenthaler – www.neuropeptidelab.com; https://imb.uq.edu.au/neuropeptide-lab
A/Prof. Irina Vetter – https://imb.uq.edu.au/pain-pathways

Neuropeptides are key mediators in many biological functions and understanding their interaction with target proteins is fundamental to unravel the underlying mechanism of diseases. Over the years, an increasing number of bioactive peptides from animals, plants, and bacteria have been characterised, with the overwhelming realisation that these molecules often show better therapeutic performance than their human counterparts, particularly in terms of *in vivo* stability.

Our main research efforts situated in this area of Chemical Biology focus on the exploration and translation of these vast and untapped natural libraries towards the development of useful research tools and therapeutics. Solid phase peptide synthesis, the main tool to access these compounds, is a powerful technology for the assembly and chemical modification of these highly chiral and structurally complex peptides. We then use these ligands to develop advanced molecular probes and therapeutic leads to address important questions of unmet medical need.

We are seeking talented and highly motivated PhD candidates for multidisciplinary projects around

(i) the oxytocin signalling system in breast or prostate cancer,
(ii) venom peptide drug discovery, and
(iii) neuropeptide probe development.

Please see the project descriptions below for further details.

If interested, please send your CV, academic record / grade transcripts and a short cover letter to m.muttenthaler@uq.edu.au with 'PhD Application' in the subject line. Shortlisting occurs every two months. Applications will be accepted until all positions have been filled.

Requirements

Strong chemistry or pharmacology background
First Class Honours Degree or Master Degree in related field
Good hands-on laboratory skills
Strong ambition and work ethics

Project-dependent techniques that will be acquired throughout PhD

Solid phase peptide synthesis; organic and medicinal chemistry; mass spectrometry, peptide and protein purification techniques; nuclear magnetic resonance spectroscopy, circular dichroism; recombinant protein expression, cell culture and pharmacological assays; various bioassays, proteomics and transcriptomics, peptide drug development; bioinformatics;

Project 1 – The Oxytocin Signalling System in Breast and Prostate Cancer

The oxytocin signalling system regulates many fundamental physiological processes such as reproduction, water balance, cardiovascular responses and complex social behaviour. It is also an understudied, yet high-profile target in breast and prostate cancer. This project focuses on developing molecular probes and therapeutic leads to study this signalling system's role in cancer development and regression. This project comprises medicinal chemistry, molecular pharmacology and structure-activity relationship studies with the goal to develop diagnostic and therapeutic leads for cancer management.

Project 2 – From Venoms to Drugs

Venoms comprise a highly complex cocktail of bioactive peptides evolved to paralyse prey and defend against predators. Homology of prey/predator receptors to human receptors render these venom peptides also active on human receptors and they have become a rich source for neurological tools and therapeutics. This project comprises venom peptide drug discovery, chemical synthesis, and structure-activity relationship studies of these venom peptides with the goal to develop therapeutic leads and novel probes for neuroscientists.

Project 3 – Neuropeptide Probe Development

Neuropeptides are key mediators in many biological functions and understanding their interaction with their target receptors is fundamental to understand their physiological relevance and underlying role in diseases. This project combines bioinformatics, medicinal chemistry and molecular pharmacology to design and synthesise advanced molecular probes that will facilitate the study of these intriguing neuropeptide signalling systems, with applications in long-term memory formation, pain, diabetes and cancer.

Institute for Molecular Bioscience

The University of Queensland's Institute for Molecular Bioscience, located on the main University campus, is Australia's leading biosciences research institute. Established in 2000, the Institute is home to over 420 staff and is located in thriving Brisbane, a city consistently ranked as one of the world's most vibrant and liveable cities.

The Institute, ranked in the Top 20 globally for life sciences research, pursues a multidisciplinary approach to solving some of the world's most serious challenges in the fields of health, disease and sustainable solutions for our cities, fuels and foods. The Institute is housed in a single building and is organised into technological platforms (Divisions) and research themes (Centres). The Divisions support state-of-the art facilities including the Centre for Microscopy and Microanalysis, which houses new cryo-electron microscopes; the NMR facility containing 500, 600 and 900 MHz machines; the Mass Spectrometry Facility accommodating a wide array of instrumentation; suites for work with a variety of model organisms; a plethora of next generation DNA sequencing technologies and the southern hemispheres leading program in complex genetic traits. The Research Centres accommodate 36 groups using a combination of genomics, chemistry and cell biology to take life science discoveries from the genome to drug design and application in the areas of antimicrobial resistance, inflammation, pain, cardiovascular disease and rare and developmental diseases.

Details of the research interests of the Institute may be accessed at: imb.uq.edu.au

The candidate

Both Australian and international applicants are welcome to apply. Candidates should have a First Class Honours Degree or Master Degree (or equivalent) in the fields of chemistry, biochemistry, pharmacology or a related discipline. Strong academic performance, good oral and written communication skills, and published output will be additional assessment criteria. Selected candidates will be provided with assistance to apply for a PhD scholarship. Award of a scholarship will be conditional for entry to the PhD program at UQ.

Applicants must be eligible to enrol in a PhD with the University of Queensland. For a complete list of the University of Queensland's minimum entry requirements please refer to: https://graduate-school.uq.edu.au/uq-research-degrees. Please note the English language proficiency requirements https://graduate-school.uq.edu.au/english-language-proficiency-requirements.