2027 Summer Research Project

Section	Description
Project title	Novel Candidate Interactors of ORAI1: Implications for Store-Operated Ca^{2+} Entry
Hours & delivery	11 January 2027 to 19 February 2027, In person from 8am to 2pm Monday–Friday. School of Pharmacy and Pharmaceutical Sciences, Susan Tett Building, Dutton Park Campus, 20 Cornwall Street, Woolloongabba.
About the project (150–250 words)	Store-operated calcium entry (SOCE) is a central pathway in cellular Ca^{2+} signalling, supporting processes such as gene expression, proliferation, and cell survival, and its dysregulation is linked to multiple diseases, including cancer. SOCE is triggered when Ca^{2+} stores within the endoplasmic reticulum become depleted, prompting the sensor protein STIM1 to activate ORAI1 channels at the cell surface and allow Ca^{2+} to flow into the cell. While STIM1 is the canonical activator of ORAI1, increasing evidence suggests that additional proteins help fine-tune ORAI1 channel's activity. Using mass spectrometry proteomic approach, we have identified several candidate proteins that may influence ORAI1 channel activity. Students joining this project will help test these candidates directly using techniques such as calcium imaging and molecular cloning, to identify novel regulator of SOCE. Identification of novel SOCE regulators could reveal new mechanisms controlling calcium signalling in health and disease and may highlight potential targets for future therapeutic intervention.
What you'll do (100-150 words)	The student joining our team will gain hands-on experience across a range of core molecular and cellular biology techniques used in modern calcium signalling research. This may include: • **Cell culture**: maintaining and passaging mammalian cell lines under sterile conditions. • **Plasmid cloning**: designing and constructing expression vectors for candidate genes expression or silencing, which may include PCR, restriction digestion/ligation and bacterial transformation. • **Lentiviral transduction**: packaging lentiviral particles and using them to generate stable cell lines expressing or silencing candidate proteins. • **Calcium assays**: measuring changes in intracellular Ca^{2+} using fluorescence-based plate assays (FLIPR) and/or high-content imaging (ImageXpress), to assess how candidate proteins affect ORAI1-mediated calcium entry. You will be supported throughout your project by experienced lab members, with opportunities to analyse your own data and present your results at our weekly lab meeting.
What you'll learn (100–150 words)	Beyond specific laboratory techniques, the student will develop a broad skill set applicable to any future career in research or biomedical science. They will learn how to design experiments with appropriate controls, troubleshoot when things don't go to plan, and critically interpret data. Working with live imaging and/or plate-based assays will build their skills in quantitative data analysis, including using specialised software to process and graph calcium signalling data.

	Alongside technical skills, the student will develop scientific communication, presenting their data at weekly lab meetings and learning to discuss findings, field questions, and receive feedback from other lab members. Finally, the student will build good laboratory practice, including record-keeping, sterile technique, and safe handling of biological reagents.
Project outcomes (75–125 words)	By the end of the project, the student should have generated functional data on candidate proteins, helping to identify novel regulators of ORAI1-mediated calcium entry. This will directly contribute to a broader research effort mapping the regulatory network controlling SOCE and its role in disease. Validated candidates will form the basis for follow-up mechanistic studies within the lab. Findings may be used to contribute to a scientific publication.
Who should apply? (75–125 words)	This project suits motivated students with an interest in cell biology, molecular biology, or biomedical science. Only minimal prior lab experience is required. Basic pipetting skills are sufficient, as full training will be provided on other techniques. More important is enthusiasm for hands-on lab work, attention to detail, and willingness to work under supervision. Good communication and a collaborative attitude are valued. **Applicants must be available daily from 8am to 2pm for the duration of the summer research program.**
Team & supervision (75–125 words)	This student will be supervised by Dr Melanie Robitaille, Senior Research Fellow, within the Calcium Signalling in Therapeutic Team lead by Prof Greg Monteith. The student will work closely with Dr Robitaille throughout the project, alongside a postdoctoral researcher and PhD students. The project will be performed at the School of Pharmacy and Pharmaceutical Sciences, Dutton Park Campus, which is equipped with an advanced calcium imaging facility (FLIPR and ImageXpress).
Additional opportunities (optional)	There is potential for student contributions to be included in a larger scientific publication
Additional requirements (if applicable)	
Contact	Yes, students may contact the supervisor before applying. Direct enquiries to: m.robitaille@uq.edu.au