

UQ Summer Research Project 2026- SBMS

Project title:	Switching basal mitophagy on and off
Hours of engagement & delivery mode	30 hours per week Onsite St Lucia: Otto Hirschfeld (Bld 81)
Description:	This project investigates how the mitophagy receptors BNIP3 and NIX function beyond their classical role in recruiting autophagosomes. Recent data from our lab suggest that these proteins also remodel mitochondrial structure and interact with other organelles such as the endoplasmic reticulum and peroxisomes. Using proximity labelling and imaging data, we have identified several potential BNIP3/NIX partners involved in mitochondrial dynamics and signalling, including MTCH2, VDAC2, PEX19, and the deubiquitinase USP33. During the project, the student will help validate these interactions and test their effects on mitophagy. This will involve molecular cloning, co-immunoprecipitation, confocal imaging, and analysis of mitophagy activity using the mtKeima reporter system. The student will also examine how the loss or mutation of these interactors alters mitochondrial morphology and energy balance.
Expected learning outcomes and deliverables:	What students will learn: Hands-on experience with mammalian cell culture and transfection techniques. Use of fluorescence microscopy and image-based mitophagy quantification. Understanding of mitochondrial quality control and organelle crosstalk. Data handling, image quantification, and presentation of experimental results. Exposure to cutting-edge research methods such as CRISPR editing and proximity labelling. Expected outcomes: By the end of the 6-week project, the student will produce a short written report and deliver a brief oral presentation summarising their findings. Their data may contribute to ongoing work characterising how BNIP3 and NIX coordinate mitochondrial remodelling and may form part of a future publication.
Suitable for:	These projects are suitable for those students with an interest in cell biology and mitochondrial disease.
Primary Supervisor:	Associate Professor Julia Pagan j.pagan@uq.edu.au Pagan Lab - Targeted protein degradation - School of Biomedical Sciences - University of Queensland
Further info:	The supervisor MUST be contacted by students prior to submission of an application