

UQ Summer Research Project 2026- SBMS

Project title:	Defining how epigenetic modifiers shape embryonic cortical development
Hours of engagement & delivery mode	36 hours per week Onsite St Lucia: Otto Hirschfeld (81) Level 6
Description:	<p>The controlled proliferation, then differentiation, of stem cells is crucial for the generation of organs of the correct size, and when things go awry, the consequences can be devastating. An example of this is seen in the developing brain, where the delayed differentiation of neural stem cells (NSCs) gives rise to brain enlargement (megalocephaly), a disorder characterised by intellectual disability. Megalocephaly is also commonly associated with autism spectrum disorder (ASD); indeed, ~15% of patients with ASD exhibit enlarged brains. Critically, megalocephalic ASD patients have significantly more severe behavioural, sensory and social deficits than other patients with ASD; bigger is definitely not better. This highlights the need to better understand the abnormal biological pathways leading to brain overgrowth. We know that the extended proliferation of NSCs can drive brain overgrowth. What we do not know are the mechanisms underlying this process, knowledge that is critical if we are to develop clinically tractable ways to treat megalocephalic patients. We have a creative and innovative take on the problem - we postulate that the epigenetic regulation of chromatin via trimethylation of lysine residue 36 on histone H3 (H3K36me3 - associated with open chromatin and transcriptional activity) regulates timely NSC differentiation, and that perturbations to this modification lead to disorders characterised by ASD with megalocephaly. Here, we will study the role of one of the factors that controls H3K36 methylation, SETD2, in brain development.</p>
Expected learning outcomes and deliverables:	Scholars will gain skills in data collection and analysis, histology, microscopy and produce a report at the end of their project.
Suitable for:	Suitable for students considering Honours and eventually a PhD.
Primary Supervisor:	Prof Michael Piper m.piper@uq.edu.au Piper Group - Neural stem cells in development and disease - School of Biomedical Sciences - University of Queensland
Further info:	The supervisor MUST be contacted by students prior to submission of an application