MRI-UQ Winter Research Project Description

Project title:	**Glycogen in the diabetic kidney: the hero or the villain?**
Project duration:	6 weeks
Description:	**Background:** While it has been reported that an accumulation of kidney glycogen occurs in type 2 diabetes, the metabolic significance of this remains unclear. Given the dramatic deviation from the very low kidney-glycogen content seen in a normal kidney, uncovering the underlying cause of this accumulation and exploring its consequences may uncover novel clinical targets for the treatment of diabetic kidney disease. **Hypothesis:** The glycogen that accumulates in the type 2 diabetic kidney forms harmful polyglucosan bodies, correlating with kidney damage. Note: preliminary data indicates that this glycogen is resistant to degradation making this hypothesis even more likely! **Approach:** Glycogen from diabetic mouse tissue will be quantified, extracted and the structural parameters characterised. Analysing the structure of the glycogen will indicate if it is normally branched glycogen or if it is the hypothesized "polyglucosan" glycogen will longer chains. Key markers of kidney damage will also be analysed to see if there is a correlation between glycogen accumulation and kidney damage.
Expected outcomes and deliverables:	Applicant will gain experience in performing biochemical assays for glycogen and protein quantification. They will also learn how to extract and purify glycogen, as well as characterising the structure. Applicant will perform histological analyses to quantify kidney damage. Co-authorship on a publication is obtainable, given the experiments are successfully executed and of publishable quality. An oral presentation to our research team describing the experiments and results will be encouraged.
Suitable for:	A student who is keen to learn new skills in the laboratory and who will take a personal interest in the project. A student who has studied courses in biology or biochemistry, with some practical component to the courses would be most suited.
Primary Supervisor:	Dr Mitchell Sullivan and Professor Josephine Forbes.

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