Understanding the relationship between mitochondrial damage, immune activation and diabetic kidney disease risk in children and adolescents with newly diagnosed type 1 diabetes.

Project Description

Project duration:	PhD Project (3.5 years) or possible Honours (1yr)
Description:	***Rationale:*** Individuals with diabetes and kidney disease make up the greatest proportion of persons requiring a kidney transplant or dialysis in Australia. Susceptibility to kidney disease in diabetes is not well understood, but previous studies have highlighted dysfunction of the power stations of the cells (mitochondria) as a potential mediator. In this project, we aim to better understand how dysfunction in mitochondria can contribute to kidney disease in diabetes. Our previous data has shown that changes in mitochondrial function happen early perhaps even as far back as at the diagnosis of diabetes. We know that a biomarker of mitochondrial function called mtDNA can tell us when this starts and how badly affected the power stations are and this aligns with early changes in kidney function. In this project, we will examine kidney and mitochondrial function in children and adolescents early in the development of diabetes. We will also look at where mtDNA comes from and if it can directly activate the immune system contributing to DKD. ***Hypotheses:*** Mitochondrial damage early in diabetes can impact immune cell function contributing to the development of diabetic kidney disease.
Expected outcomes and deliverables:	(i) Understanding of how clinical and translational teams function in a research environment. (ii) Measurement of kidney and mitochondrial function, structural damage and assays of glucose control. (iii) SEAHORSE assay and other mitochondrial assessments. (iv) Advanced microscopy (confocal and multispectral) and Multispectral flow cytometry techniques. (v) Bioinformatics and advanced statistical analyses. (vi) Co-authorships on publications as first author where research contribution warrants this. Oral presentations, Abstract submission to local, national and international scientific meetings and active opportunity for contribution to other projects being performed by our team as long as these do not interfere or compete with with the PhD candidature completion timeframe. The completion of any compulsory PhD course work and a

	thesis in line with the guidelines of UQ are unconditionally expected and used to assess this research degree.
Suitable for:	Looking for someone motivated, energetic and ready to work with a great team! Must want to make a real difference for people living with diabetes ☺ Must have either a medical or scientific undergraduate degree with a research higher degree (such as honours). Interested students who are looking for an Honours can contact the supervisors to discuss possible short duration projects in this area.
Primary Supervisor:	Prof Josephine Forbes/ Dr Amelia Fotheringham; Diabetes and Metabolism Research Group
Further info:	Please contact us for more information and prior to submitting an Honours or PhD application: josephine.forbes@mater.uq.edu.au; amelia.fotheringham@mater.uq.edu.au