Project Title: MicroRNA Profiles of Metformin Exposure during Pregnancy	**Code: SMS11**

Host School / Institute: Sydney Medical School/ NHMRC Clinical Trials Centre | **Address:** Level 1, Medical Foundation Building, 92-94 Parramatta Rd, Camperdown NSW

Certificates & Clearances required: No

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Project Type: Data Analysis

Project Category: Genetics; Endocrinology/Metabolism

Skills / Attributes of a successful student: Training in genetics and statistics is welcome. We are looking for an enthusiastic person who is willing to learn and explore multiple methods of data analyses and also potentially ready to take up an honors project to continue on a similar project.

Project Keywords: Gestational diabetes; Metformin; MicroRNAs; Data analysis; Endothelial cells

Project Description: Gestational diabetes mellitus (GDM) leads to increased risk of complications during pregnancy, as well as a 50% chance of developing Type 2 Diabetes (T2D) in later life. Metformin is used as one of the treatments for GDM and as metformin crosses the placental barrier, long-term effects on the fetus of in utero metformin exposure are possible. We therefore aim to understand the potential effects of metformin exposure on microRNA expression profiles using in vitro and longitudinal clinical samples from Metformin in Gestation - The Offspring Follow Up (MiG-TOFU) study.

As part of this ongoing study, we assessed cellular and released microRNAs from in vitro cultures of human endothelial cells and cadaveric pancreatic islets that were exposed to metformin or vehicle control. We have also profiled microRNAs from serum of longitudinal study samples of mothers and their offsprings enrolled in MiG and MiG-TOFU study. Longitudinal samples from MiG study were from two treatment groups; one treated with metformin and other with insulin.

In this project, we aim to analyse the microRNA PCR data using in-house data analysis workflows. Differentially expressed microRNAs will be identified in this project along with further analyses to identify associations between microRNA expression and clinical characteristics. Interested student will be trained in using R-scripts for tSNE, volcano plots, regression analyses and other machine learning analyses. With all microRNA profiling data already available, we believe the data analyses generated in these eight weeks of summer research will significantly advance this project to publication-ready drafts.