Title: Can we improve the metabolic health of the next generation by restoring circadian rhythms?

Researchers:

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Research area: Gestational diabetes

Award: End Diabetes 100 Award, 2021-2024

Summary:

Brief Background: Childhood Type 2 diabetes (T2D) is rapidly increasing across Canada. Disproportionately affected are First Nations youth, who make up ~90% of cases. Among these children, exposure to diabetes during pregnancy is a potent risk factor for T2D. Specifically, exposure to gestational diabetes mellitus (GDM), which is the temporary increase in blood sugar that begins in pregnancy, increases the risk of T2D in the exposed offspring 4- fold. GDM rates among First Nations mothers are 3-fold higher than the general population in Canada, likely contributing to the higher rates of childhood-onset T2D in First Nations youth.

Objective of Research Proposal: To break this intergenerational cycle of T2D, our overall goal is to determine how exposure of a fetus to GDM during pregnancy programs the offspring to be more susceptible to T2D and examine if 'time-restricted feeding', where food intake is limited to a shorter period of the day, can prevent metabolic dysfunction and diabetes risk in offspring exposed to GDM.

Brief Description of Research Project: Here, we will use an established rodent (mouse) model of GDM to examine how GDM exposure influences the establishment of circadian rhythms and insulin secretion in the offspring. Circadian rhythms are internal biological rhythms that align our internal biology with the external environment. Disruption of circadian rhythms results in metabolic diseases. Further we plan to examine if time-restricted feeding can override the circadian dysfunction seen in GDM-exposed offspring and reduce T2D incidence in the next generation.

Relevance to Diabetes: We anticipate that these findings will provide valuable information about how GDM exposure increases susceptibility to T2D in children and how it might be stopped, which will help us build collaborative clinicial- and community-based research projects with Indigenous Scholars to test the use of such an intervention in GDM-exposed children in First Nations communities.