# Title: Prevention of exercise-induced hypoglycemia with the artificial pancreas


## Researchers:

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## Research area: Type 1 diabetes


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## Summary:

In healthy individuals, blood sugar levels are tightly controlled by insulin. Secretion of insulin, a vital hormone to reduce blood sugar, is lost in type 1 diabetes (T1D). Thus, people living with T1D (PWT1D) need life-long intensive insulin therapy through multiple injections or an insulin pump. Hypoglycemia (low blood sugar) is a frequent complication of insulin therapy and affects quality of life, mental health, and everyday activities. Tools for managing T1D and preventing hypoglycemia improve every year. PWT1D can now combine insulin pumps and continuous glucose monitors to make an artificial pancreas, which automates insulin delivery (AID). While these systems improve day to day blood sugar levels, hypoglycemia during physical activity (PA) is still common. There are no studies looking at what pre-PA target blood sugar level works best for different activities and different times of day. AID systems have not been rigorously tested for PA and propose a unique pre-set "exercise" glucose target that does not work for most PWT1D and types of PA. With the help of patient partners, we developed a research program to study Automated Insulin Delivery and hypoglycEmia (AIDE).

With this project we will:

- Compare three different pre-PA target blood sugar levels to determine which will provide the best blood sugar levels during and after aerobic exercise (e.g. jogging).
- Examine if the menstrual cycle phases or if time of the day (morning fasting vs afternoon) influences required targets.
- Determine if targets should be changed for different types of PA (lifting weights, combined weights and aerobic exercise).
- Assess the feasibility of artificial intelligence in predicting PA-induced hypoglycemia.

As fear of hypoglycemia prevents many PWT1D from being more active, this project has the potential to reduce barriers to PA and improve quality of life for PWT1D. Results of this project will be easily integrated into current AID systems.