**Mouse Glucose Tolerance Test**

**Equipment:** One Touch Ultra Glucometer (manufactured by LifeScan Canada Ltd., Burnaby, B.C.) (http://www.lifescan.com/lsprods/ultra.html)

**Supplies:**
- One Touch Test Strips for the glucometer (Lifescan Canada Ltd., Burnaby, B.C.)
- uncapped 50 ml Falcon tube with air holes (to restrain mouse)
- D-glucose, anhydrous (Sigma-Aldrich Canada Ltd., Oakville, Ontario)
- distilled water
- sterile 15ml Falcon tube
- 0.2 \( \mu \)m filter
- scalpel or razor blade
- glass slide
- 1 cc syringe
- 27 gauge needle
- timer or clock
- weigh scale

**General Information:**
Mice are screened for diabetes by performing a glucose tolerance test.
Glucose (sugar) is measured in fresh, whole blood using a glucometer that is commercially available in drug stores. The range of the One Touch Ultra Glucometer is 0 – 33.3 mmol/L.

**Procedure:**
- The mouse is fasted for 15 hours (overnight) prior to the glucose tolerance test. The animal has free access to drinking water during the fasting period.
- A 20 % glucose stock solution is prepared by dissolving 2 g of D-glucose, anhydrous in 10 ml of sterile, distilled water. The solution is sterilized by passing it through a 0.2 \( \mu \)m filter into a sterile 15 ml Falcon tube.
- Prior to performing a glucose tolerance test, body weight and a baseline glucose level must be recorded for each mouse. The conscious mouse is restrained in an uncapped 50 ml Falcon tube that has had air holes drilled in the closed end. The mouse’s tail is left hanging out the open end of the tube. The end of the mouse’s tail is placed on a glass slide and a 0.5 - 1 mm length is cut off the tip of the tail using a sharp razor blade. A small drop (< 5 \( \mu \)l) of blood is placed on the glucometer test strip. After a 5 second developing time, the baseline blood glucose value is recorded (in mmol/L). The mouse is then removed from the restraining tube.
- Following the baseline glucose measurement, the mouse is challenged with a 2 mg glucose/gram body weight glucose load. The mouse is restrained by holding the excess skin at the base of the neck between the technician’s thumb and forefinger. The mouse’s tail is held under the technician’s pinky finger to secure the animal’s hind end. The glucose solution (2mg glucose/gram body weight) is injected i.p. using a 1 c.c. syringe and a 27 gauge needle. The time of the injection is noted and additional blood samples are obtained at 15, 30, 60, and 120 minutes to measure post-challenge glucose levels. It may be necessary to remove a scab that has formed at the initial tail cut site in order to collect the subsequent blood samples.

**Reported Results:**
For each mouse tested, body weight, and blood glucose levels pre- and post-challenge are reported.

**Acknowledgements:**
The CMHD requests that the users of our screening service acknowledge the technical assistance of our facility in any presentations or publications that report results generated by our services. A suitable acknowledgement for publications is as follows: "The authors would like to acknowledge the Samuel Lunenfeld Research Institute's CMHD Mouse Physiology Facility for their technical screening services (www.cmhd.ca)."

Additionally, please send reprints or information on such publications or presentations when they are submitted or available. Such acknowledgements will help promote the use of our service and assist us in obtaining continued financial support to help defray service fees.