\*Title: **Intraperitoneal glucose tolerance test (IPGTT)**

\*Centre: IMPC

\*Date\_modified: 12-03-2012

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\*Version: 1

{Sections:}

## \*1. Purpose:

The glucose tolerance test measures the clearance of an intraperitoneally injected glucose load from the body. It is used to detect disturbances in glucose metabolism that can be linked to human conditions such as diabetes or metabolic syndrome. Animals are fasted for approximately 16 hours, fasted blood glucose levels are determined before a solution of glucose is administered by intra-peritoneal (IP) injection. Subsequently, the blood glucose level is measured at different time points during the following 2 hours.

Ontological description: MP:000188 - abnormal circulating glucose level.

## \*2. Experimental Design

Minimum number of mutant animals: 7 mice for each sex.

Age of animal: 13 weeks.

Sexual dimorphism: yes.

## \*3. Equipment

1. Mouse restraining device (optional)
2. Glucose meter
3. Scalpel blade
4. Balance
5. Timer
6. Clean cages

## \*4. Procedure

1. Fast mice overnight for 16 hours by transferring mice to clean cages with no food in hopper or bottom of cage. Ensure that they have access to drinking water at all times.

1. Following the fasting period, place each mouse into a separate and clean cage labeled with their identification and water available *ad libitum*.
2. Prepare an experiment record sheet, syringe and sticks for glucose measurement and glucose solution.
3. Remove a mouse from its home cage and place on the weighing balance. Record the weight of the mouse.
4. Calculate and record the volume of 20% glucose solution required (2g of glucose/kg body mass) for IP injection as follows: volume of IP glucose injection (μl) = 10 x body weight (g).
5. *Optional application of topical anesthetic cream*:
6. Wearing gloves apply a small amount of topical anesthetic cream to the tail of the mouse, spreading over the tail evenly
7. Gently massage it in for ~10 seconds to enhance the effect of the anesthetic cream ensuring that the proposed incision site is fully covered
8. Wipe off any excess cream with a piece of tissue
9. Optional: Restrain the mouse in the restraining device with the tail exposed.
10. Score the tip of the tail using a fresh or sterilized scalpel blade
11. Discard first small drop of blood. A small drop of blood (<5μl) is placed on the test strip of the blood glucose meter. This is the baseline glucose level (t = 0) and is recorded in the experiment record sheet.
12. Remove the mouse from the restraining device.
13. Inject the mouse intraperitoneally with the appropriate amount of glucose solution, as previously determined (point 3) and note the time-point of injection on the record sheet.
14. The blood glucose levels are measured at 15, 30, 60 and 120 minutes (t = 15, t = 30, t = 60 and t = 120) after glucose injection, by placing a small drop of blood on a new test strip and recording the measurements. Start the bleeding again by removing the clot from the first incision, massage the tail if blood flow is inadequate. Results are recorded in the record sheet.
15. Ensure that further blood loss from the incision is minimal by briefly applying pressure to the incision after each measurement. At the end of the experiment add food to the cage and make sure that a plentiful supply of water is available to the animals.
16. At the end of the experimental session, place the mouse in a clean cage with water and food available *ad libitum*.
17. Monitor the animals carefully to observe any abnormal behavior(s).

## \*5. Notes

### Data QC

1. Calibrate the glucose meter routinely as outlined in the manual.

## \*6 . Measured Parameters - list

{Placed in Parameters spreadsheet}

## \*7. MetaData Parameters - list

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| **Metadata** | **Example** | **Required for data upload** | **Required for data analysis** |
| Equipment ID |  | YES | NO |
| Equipment manufacturer | Roche Diagnostics Ltd. | YES | YES |
| Equipment model | Accu-Chek Aviva | YES | YES |
| Mouse restrained | Yes/No | YES | NO |