



Intraperitoneal glucose tolerance test (IPGTT) IMPC_IPG_001

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:0005559 - increased circulating glucose level, MP:0005560 - decreased circulating glucose level, MP:0005293 - impaired glucose tolerance, MP:0005292 - improved glucose tolerance, MP:0005291 abnormal glucose tolerance, MP:0000188 - abnormal circulating glucose level.

Experimental Design

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

Age of animal: 13 weeks.

Sexual dimorphism: yes.

Equipment

1. Glucose meter; GLUCOCARD G+meter GT-1820 as indicated in "Metadata".
The range of measureable values for this equipment is 10-600 ml/dL ^{*1}.
2. Scalpel scissors
3. Balance
4. Timer
5. Clean cages

Supplies

1. Glucose solution 20% (0.9 NaCl)
2. Gauge needle (26 G 1/2)
3. Syringe 1 ml

Procedure

1. Fast mice overnight for approximately 16-18 hours by transferring mice to clean cages with no food or faeces in hopper or bottom of cage. Ensure that they have access to drinking water at all times.
2. Prepare an experiment record sheet, syringe and sticks for glucose measurement and glucose solution.
3. Weight 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 (μ l) = 10 x body weight (g).
5. Score the tip of the tail using a fresh or sterilized scalpel scissors.
6. Discard first small drop of blood. A small drop of blood (<5 μ l) 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.

7. Inject the mouse intraperitoneally with the appropriate amount of glucose solution, as previously determined (point 3) and note the time-point of injection.
8. 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.
9. 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.
10. At the end of the experimental session, place the mouse in a clean cage with water and food available ad libitum.
11. Monitor the animals carefully to observe any abnormal behavior(s).

Notes

*1 Any glucose values that overshoot the measurement limit: 600 ml/dL, are shown as 601 ml/dL in the file.

The information about the date of the experiment, that is the date when the measurement is performed, is an important parameter which is to be submitted in the Experiment xml file (dateOfExperiment="2013-02-28").

Data QC

Perform a QC check of the glucose meter routinely as outlined in the manual.

Parameters

	Version	Type	Increment	Option	Derived	Unit	Data Type
Body Weight IMPC_IPG_001_001	1.3	simpleParameter				g	FLOAT
Blood glucose concentration IMPC_IPG_002_001	1.4	seriesParameter	0			mg/dl	FLOAT
			15				
			30				
			60				
			120				
Glucose area under the curve (AUC)		simpleParameter				Minutes · mg/dl	FLOAT

Metadata

	Version	Type	Increment	Option	Derived	Unit	Data Type
Equipment ID IMPC_IPG_003_001	1.0	procedureMetadata					TEXT
Equipment manufacturer IMPC_IPG_004_001	1.1	procedureMetadata		ARKRAY factory.Inc			TEXT
Equipment model IMPC_IPG_005_001	1.1	procedureMetadata		GLUCOCARD G+meter GT-1820			TEXT

	Version	Type	Increment	Option	Derived	Unit	Data Type
Mouse restrained IMPC_IPG_006_001	1.1	procedureMetadata		No			TEXT
Type of strip IMPC_IPG_007_001	1.0	procedureMetadata		Whole blood			TEXT
Experimenter ID IMPC_IPG_008_001	1.0	procedureMetadata					TEXT
Date equipment last calibrated IMPC_IPG_009_001	1.2	procedureMetadata					DATE