ABSTRACT

Summary:

Glucose tolerance test with insulin secretion measures systemic clearance of glucose and systemic appearance of insulin following an intraperitoneal bolus injection of 20% dextrose. This experiment measures insulin sensitivity and insulin secretion (pancreatic ß-cell function) in awake mice assuming that there are no alterations in systemic insulin clearance. Insulin sensitivity and pancreatic ß-cell function are altered in obese mice.

MATERIALS

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20% Dextrose injection USP
Hospira(Pfizer) Catalog #NDC0409-7935-19

Insulin Ultrasensitive ELIZA
Alpco Catalog #80-INSMSU-E01

Note:

Hospira, RRID:SCR_003985
Insulin Ultrasensitive ELIZA, Cite this, (Alpco Diagnostics Cat# 80-INSMSU-E01, RRID:AB_2792981)
1 Mice may be fasted overnight (~15 hours) or for 5 hours prior to the start of experiment.

2 Collect plasma sample (20 µl) before the start of experiment (basal-0 min) to measure basal glucose and insulin levels.

3 Administer intraperitoneal injection of 20% dextrose (1 or 2 g/kg body weight) using an insulin syringe.

4 Collect plasma samples (20 µl) at 10, 20, 30, 60, 90, and 120 min following injection to measure circulating glucose and insulin concentrations.

5 For data analysis, plasma glucose levels vs. time after injection are plotted, and area-under-curve may be calculated to estimate insulin sensitivity. Also, plasma insulin levels vs. time after injection are plotted, and area-under-curve may be calculated to estimate insulin secretion (pancreatic β-cell function).