Aim 2: Examine the effect of early time-restricted feeding in the perinatal period on maternal health. Dams exposed to time-restricted feeding during gestation will be compared to age-matched ad libitum fed controls. Food intake, body composition, energy expenditure, gestation length, and mechanisms of insulin sensitivity will be evaluated.

Background:

Methods:

Animals:

C57Black6/J mice were previously used in the insulin resistance of pregnancy experiment were used in this experiment. At 134 days of age, age matched females were randomized to either ad libitum (AL) or early time-restricted eating (eTRF). Dams randomized to AL feeding had 24-hour access to chow (5% fat, 24% protein, 3.7% sucrose, 32% starch). Dams randomized to eTRF feeding were allowed ad libitum access to chow during 6 hours of the dark cycle (8pm-2am). At 2 am, all dams were moved to clean cages (Cite Panda here). Animals were held in a 12:12 light dark cycle, temperature and humidity-controlled facility. Food intake was monitored daily, with 6 hour and 24-hour intake calculated.

Mating:

Dams were singly housed for the course of the experiment. After a one-week acclimation period, males were added to the cages in monogamous pairs. Males were allowed to remain in cages until copulatory plug appeared, which was noted as day 0.5 of pregnancy.

Body Composition:

Once a week, Dams weight was measured weekly using an electronic scale (). Body composition including fat mass, lean mass, and free water was assessed indirectly via magnetic resonance imaging (EchoMRI).

Insulin Sensitivity:

*Insulin tolerance test:*

Insulin sensitivity was assessed by insulin tolerance test 16 days after mating began. Gestational age during ITT was determined using plug data, body weight gain, and date of delivery. As a result, most dams were in the 1st or 3rd week of gestation during this time. After 6-hour fast, blood glucose was taken using a glucometer and tail clip. Females were given insulin injections (0.75 units/kg body weight; Humulin U100 in cold sterile, filtered Phosphate buffered saline (PBS)) and blood glucose was tested using a glucometer at 15-minute intervals for 2 hours. If animals began to exhibit moribund behaviors, 300 units of 10% glucose in cold sterile filtered PBS was administered and subsequent BG measurements were omitted from the ITT.

*Hyperinsulinemic-euglycemic clamp:*

Dams during after mating and confirmation of pregnancy by weight gain of \_\_ g signaling 7 days of pregnancy, animals will be placed singly hoursed into a CLAMPS unit. Dams will be cannulated and exogenous insulin will be administered, inducing a state of hyperinsulinemia (CITE) and thereby suppressing hepatic glucose production. Glucose is infused to maintain blood sugar, with the amount infused correlating to the ability of that animal to utilize insulin to dispose of glucose. Greater glucose infusion rates represent more insulin sensitive animals. This method also allows for understanding of tissue-specific glucose disposal. 2-deoxy-glucose is given as a bolus75 minutes after initiation of the clamp. Fample and tissues are taken for analysis of glucose content

Radiolabeled [3H] glucose HGP= whole body glucose turnover – GIR.

This was already done in musial, as well as hepatic vs adipose vs skeletal muscle insulin signaling and then also fetal vs placental vs maternal tissue use og radiolabeled glucose.

Energy Expenditure:

Digestive Physiology:

Expected Results and Potential Pitfalls:

* Lack of response in dams to

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2.1 Insulin sensitivity and glycemia

* eTRF vs AL more IS, lower glycemia
* Why? -> Cort/GDF15
* Test ->

2.2 GWG/Body Comp

* PL no D,

2.3/2.4 Energy Expenditure/Feeding

2.5 Digestive efficiency

Why/How