



Energy balance – food intake, energy expenditure, physical activity

Version: 1
 Edited by: Jason Kim

(note that the following list should be linked to the appropriate location.)

- [Summary](#)
- [Reagents and Materials](#)
- [Protocol](#)
- [Reagent Preparation](#)
- [Reagent 1](#)
- [Reagent 2](#)
- [Reagent 3](#)

Summary: *(This area will include a brief description of what the protocol is used for and why someone would need to use it.)*

The TSE PhenoMaster/LabMaster Metabolic Cage system is used to measure indirect calorimetry, food/water intake, energy expenditure, and physical activity in individually housed awake mice. The experiment noninvasively measures VO₂ consumption and VCO₂ production rates in individual mice using metabolic chambers and calculates the respiratory exchange ratio (respiratory quotient) to reflect energy expenditure. Metabolic cage measurement is conducted continuously for 72 hours (3 days) to account for acclimation of mice housed in home cages during the study. With our high-speed Siemens O₂/CO₂ sensing unit, indirect calorimetry measurements may be performed at a 20-min interval for a full 12-cage study.

Reagents and Materials: *(This should be a comprehensive list of stock solutions and material. The reagent list for the stock solutions is included in the reagent preparation area that is included at the end of this SOP.)*

Reagent/Material	Vendor	Stock Number
TSE Phenomaster Metabolic Cages	TSE	
LabMaster Software	TSE	
Mouse diets	Conditional	
Drinking water	In-house	
Corn-cob bedding	In-house	

Protocol:

1. Metabolic cage food and water baskets are calibrated.
2. Drink and food baskets are filled with water and appropriate diet.
3. Corncob bedding is added to the cages.

4. Mice are individually housed in metabolic cages and checked daily for access to food and water.
5. Software is set to collect data at selected interval for 3 consecutive days (72 hour measurement period).
6. Post-run data are exported and analyzed using Microsoft Excel program.
7. Mice should be assessed for body composition (whole body lean mass) prior to metabolic cage measurement in order to incorporate whole body lean mass data for energy expenditure calculation.
8. Metabolic cages require monitoring on a daily basis to ensure food and water are accessible to the mice.