

**M³**

METABOLISM & MONITORING SYSTEM

KEY FEATURES:

- Collect precise and reproducible data easily with our superior laser sensors, which eliminate effects of humidity and temperature on measurements
- Conduct simultaneous experiments with multiple animals of different sizes with independent air flow control, up to 2 l/min total, per cage
- Minimal maintenance and easy calibration for a simple to use system
- Highly stable and precise monitoring of food and drink consumption and activity with our weight transducer technology
- Versatile and economical, a single system for both mice and rats
- Conserves valuable lab space with this extremely compact integrated system

APPLICATIONS:

- Obesity
- Diabetes
- Metabolic Disorders
- Nutrition Studies
- Chronobiology/Ciradian Rhythm Studies
- Drug Screening
- Phenotyping

The M³ is a modular and integrated system for the study of respiratory metabolism (O₂ consumption/CO₂ production), food and drink intake, activity and rearing measurements in specially adapted, autoclavable home cages.

Respiratory metabolism is evaluated via indirect calorimetry optimized for laboratory animals. The M³ features highly stable and accurate sensors – a laser diode for O₂ and infrared spectroscopy for CO₂ with 0.01% resolution.

The air flow and switching units allow fine regulation of the air flow inside the chambers and sends the chamber sample to the gas analyzer for O₂ and CO₂ analysis. Flow control to each cage is independent, up to 2 l/min total, in each cage. This allows simultaneous experiments with animals of different sizes from one flow controller and gas analyzer.

Food/drink intake and activity are evaluated using our high precision extensometric weight transducers. This technology allows the continuous assessment of the animal food and drink consumption as well as spontaneous activity with the highest stability and accuracy, 0.02g for food and 0.01g for liquid. Each cage can accommodate two external dispensers – 1 food/1 drink, 2 foods, 2 drinks – making the system extremely flexible for a variety of research needs. Our standard wire bar lid can be used for providing additional food and drink access. Transducers and amplifiers are housed in our specially designed platform placed below the home cage, minimizing the system footprint. Rearing assessment requires simply an additional Infrared (IR) frame connected to the system.

The modular design provides easy expandability for any of the configuration options. Select only those components of initial interest, but have the flexibility of adding others at a later date.

The M³ software is also modular, allowing the extraction and combined evaluation of data obtained by the M³ system. There are three modules – Calorimetry, Intake and Activity. Analog data for each module is collected directly and simultaneously from the base platform amplifiers and gas analyzer via the RS-232 to USB port. This data can be seen graphically over the course of the experiment and is saved in experimental files that can be opened, processed and re-processed using different time intervals post-experiment.

M³ SOFTWARE:

Calculations provided per software module – data given for each user-defined interval of time

- **Calorimetry Module**
 - Oxygen (O₂) consumption
 - Carbon dioxide (CO₂) production
 - Respiratory quotient (O₂/CO₂)
 - Energy Expenditure (Weir equation)
- **Intake Module**
 - Food and drink consumption
- **Activity Module**
 - Mean spontaneous activity
 - Number of rearing

COMPUTER REQUIREMENTS:

Windows™ XP/7 Professional operating system
Intel® Duo Core Processor or higher, 2 Gig of DDR
3 Ram, SATA Hard Disk, DVD Optical Drive.

ORDERING INFORMATION:

Order # Product

Base System

- M3-0451 Home Cage for Mouse and Rat
M3-0558 Fixed Food and Drink Dispensers with bottle – for use when not conducting intake monitoring studies
M3-0080 Metabolism Software Platform (up to 32 enclosures) – requires Experimental Modules for calorimetry, food and drink intake, and/or activity

Home Cage Lids

- M3-0452 Airtight lid for Rat
M3-0453 Airtight lid for Mouse
M3-0454 Flat wire bar lid
M3-0560 Standard wire bar lid with food/bottle access, Rats
M3-0561 Standard wire bar lid with food/bottle access, Mouse

Home Cage Floors

- M3-0564 Grid floor for Rat
M3-0565 Grid floor for Mouse
M3-0559 Plastic floor with holes, Rat
M3-0563 Plastic floor with holes, Mouse

Indirect Calorimetry Components

- M3-0195 O₂/CO₂ Analyzer
M3-0193 Air Supply and Switching Unit, up to 2 chambers
M3-0194 Air Supply and Switching Unit, up to 4 chambers
M3-0145 Metabolism Software Module - Calorimetry

Intake and Activity Platform Components

- M3-0455 Platform with Sensors and Amplifiers for Intake and Activity
M3-0456 Drink Module with Support Rods and Bottle, Mouse/Rat
M3-0457 Feeder Module with Support Rods, Mouse/Rat
M3-0462 Food and Drink Module Adapter – Mice Only
M3-0459 IR Frame for Rearing Detection
M3-0081 Metabolism Software Module – Food and Drink Intake
M3-0087 Metabolism Software Module – Activity and Rearing



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