DEVICE AND METHOD FOR DIRECT MEASUREMENT OF IN VIVO OXIDATION

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Technology description

Apparatus for analyzing metabolic pathwaysin vivo.
To aid in analyzing small animal metabolism, NHGRI inventors have developed a device and a method for measuringin vivooxidation rates of amino, organic, and fatty acids by detecting and quantifying carbon dioxide production rates. Specifically, a small animal (e.g., a mouse) can be given a dose of an organic acid, an amino acid, a fatty acid, or a simple carbohydrate labeled with C13 – a heavy but not radioactive atom. As the labeled compounds are metabolized, the produced carbon dioxide contains a fraction of the C13 tracer. Carbon dioxide is collected using a specially-designed respiratory chamber, which is used to take measurements over time. Thus, activity of diverse metabolic pathways can be evaluated and analyzed.
A top view of an embodiment of the chamber with two ports for gas detectors.

Application area

This technology can be used for the diagnosis and analysis of various animal models that mimic human metabolic disorders and in the development and testing of potential therapies (including enzyme replacement and gene therapies) for metabolic disorders. Some metabolic disorders that this technology could be used to evaluate include methylmalonic academia, phenylketonuria, maple syrup urine disease, fatty acid defects, glycolytic disorders, and organic acid metabolic disorders. Since this technique utilizes a non-radioactive tracer the method could potentially also be extended from analysis of animal oxidation to the measurement of oxidation in humans.

Institution

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