



National Human Genome Research Institute (NHGRI)

Patented Technology Available for Licensing

Device and Method for Direct Measurement of In Vivo Oxidation

NHGRI invention number:
E-099-2009/0

Patent Status

U.S. Patent 8,293,187
Issued October 23, 2012
U.S. Patent 8,721,988
Issued May 13, 2014

Lead Inventor

Charles Venditti, M.D.,
Ph.D. Genetics and Molecular
Biology Branch, Head of Organic Acid
Research Section, NHGRI, NIH

NHGRI Contact

Claire Driscoll
Director, NHGRI Technology Transfer
Office
cdriscoll@mail.nih.gov

Summary

NHGRI inventors have developed a device and a method for measuring *in vivo* small animals' (e.g., mice) oxidation rates of amino, organic, and fatty acids via the detection and measurement of carbon dioxide production rates. Specifically, a small animal 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.

Potential Commercial Applications

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.

Related Article

Chandler, R. and Venditti, C., *Long-term Rescue of a Lethal Murine Model of Methylmalonic Acidemia Using Adeno Associated Viral Gene Therapy*, 18 MOL. THER. 11 (2009). <http://www.nature.com/mt/journal/v18/n1/pdf/mt2009247a.pdf>

Key Words

Metabolic Disorders, Medical Device, Oxidation Rates, Carbon Dioxide

