Non-targeted metabolomics by high resolution mass spectrometry in HPRT knockout mice

Sarah K. Tschirner, Heike Bähre, Alexander Kaever, Erich H. Schneider, Roland Seifert, Volkhard Kaever

PII: S0024-3205(16)30312-5
DOI: doi: 10.1016/j.lfs.2016.05.031
Reference: LFS 14912

To appear in: *Life Sciences*

Received date: 26 November 2015
Revised date: 7 April 2016
Accepted date: 20 May 2016

Please cite this article as: Tschirner Sarah K., Bähre Heike, Kaever Alexander, Schneider Erich H., Seifert Roland, Kaever Volkhard, Non-targeted metabolomics by high resolution mass spectrometry in HPRT knockout mice, *Life Sciences* (2016), doi: 10.1016/j.lfs.2016.05.031

Non-targeted metabolomics by high resolution mass spectrometry in HPRT knockout mice

Sarah K. Tschirner[1], Heike Bähre[1, 2], Alexander Kaever[3], Erich H. Schneider[1], Roland Seifert[1], Volkhard Kaever[1, 2, *]

[1]Institute of Pharmacology, Hannover Medical School, Carl-Neuberg-Str. 1, D-30625 Hannover, Germany

[2]Research Core Unit Metabolomics, Hannover Medical School, Carl-Neuberg-Str. 1, D-30625 Hannover, Germany

[3]Department of Bioinformatics, Institute of Microbiology and Genetics, Georg-August-University Göttingen, Goldschmidtstr. 1, D-37077 Göttingen, Germany

Abstract

Aims:

Lesch-Nyhan disease (LND) is characterized by hyperuricemia as well as neurological and neuropsychiatric symptoms including repetitive self-injurious behavior. Symptoms are caused by a deficiency of the enzyme hypoxanthine-guanine phosphoribosyltransferase (HPRT) as a result of a mutation on the X chromosome. To elucidate the pathophysiology of LND, we performed a metabolite screening for brain and serum extracts from HPRT knockout mice as an animal model for LND.

Main methods:

Analyses were performed by high performance liquid chromatography (HPLC)-coupled quadrupole time-of-flight mass spectrometry (QTOF-MS).

Key findings:

In brain extracts, we found six metabolites with significantly different contents in wild-type and HPRT-deficient mice. Two compounds we could identify as 5-aminoimidazole-4-carboxamide ribotide (AICAR) and 1-methylimidazole-4-acetic acid (1-MI4AA). Whereas AICAR was accumulated in brains of HPRT knockout mice, 1-MI4AA was decreased in these mice.