

Human in vitro liver metabolism using HLM, HLCYT and Liquid Chromatography coupled to High-Resolution Mass Spectrometry

Created on: 04-10-2019 - Last modified on: 09-10-2019

SCOPE OF THE METHOD

Alternative method relates to	Environment, Human health
Alternative method is situated in	Basic Research
Type of alternative method	In vitro - Ex vivo
This method makes use of	Human derived cells / tissues / organs
Specify the type of cells/tissues/organs	Human Liver Microsomes and Human Liver Cytosol

DESCRIPTION

Method keywords

HLM

HLCYT

Liquid chromatography

mass spectrometry

Metabolism

liver

in vitro

Scientific area keywords

Toxicology
analytical chemistry
liver metabolism
Drug metabolism
Drug discovery

Method description

A compound of interest (e.g. new psychoactive substance, endocrine disrupting compound, ...) is incubated with human liver microsomes and liver cytosolic fractions to generate both Phase I and II metabolites. Samples are prepared for analysis using a simple method in order to avoid possible losses of biotransformation products. The extracts are analysed using liquid chromatography coupled to quadrupole time-of-flight mass spectrometry. Identification of the biotransformation products is performed using complementary screening workflows. These include a suspect screening based on *in silico* predictions and non-targeted screening using either vendor-specific or in-house developed open-source software protocols.

Lab equipment

- Warm water bath (37°C)
- Temperature-controlled nitrogen evaporator
- Centrifuge
- LC coupled to high-resolution mass spectrometry (for identification)

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

- Optimized assay with different timepoints, negative and positive controls and method blanks
- Tested for a variety of substrates (NPSs, EDCs, ...) resulting in multiple publications
- Custom data analysis possible, according to research question

- Besides analytical equipment (LC-HRMS) no need for expensive equipment

Challenges

- Possible over or underestimation of *in vivo* biotransformation
- Suspect screening dependant on strength of *in silico* predictions

Modifications

- No further optimizations are planned for the near future.

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

Associated documents

[2018 - Vervliet Mortelet et al - DTA - 5CI-THJ-018.pdf](#) [2019 - Vervliet - Toxicology - HLM DEMO.pdf](#)

PARTNERS AND COLLABORATIONS

Organisation

Name of the organisation University of Antwerp

Department Department of Pharmaceutical Sciences

Country Belgium

Coordinated by



Financed by

