Adult skin stem cell-derived in vitro model for investigating acute liver failure

Commonly used acronym: *hSKP-based ALF model*
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SCOPE OF THE METHOD

Alternative method relates to	Human health
Alternative method is situated in	Basic Research, Education and training
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 skin-derived precursors

DESCRIPTION

Method keywords

acute liver failure

in vitro

Stem cells

paracetamol

Scientific area keywords

in vitro cytotoxicity

hepatic toxicity

hepatic in vitro model

hepatocyte-like cells

Method description

This method uses human skin-derived precursors (hSKP) differentiated towards hepatic cells (hSKP-HPC) as an hepatic in vitro model. Exposure of these cells for 24 hours to sub-cytotoxic concentrations of acetaminophen, which is a reference hepatotoxicant, induced specific cellular responses in a comparable way to primary human hepatocytes in culture. APAP-induced gene expression modulation (the read-out of this method) pointed towards an activation “liver damage”, “liver proliferation” and “liver necrosis” and “liver steatosis” were found to be significantly enriched in both in vitro models. This in vitro model, may be used as a surrogate of primary human hepatocytes for the screening of compounds that might potentially induce acute liver failure.

Lab equipment

Biosafety cabinet
Affymetrix microarray platform
Affymetrix Human Genome U133 plus 2.0 arrays
RT-qPCR
Cell culture equipment

Method status

Published in peer reviewed journal

PROS, CONS & FUTURE POTENTIAL

Advantages

Alternative for primary human hepatocytes
Fast method

Challenges

Microarray analysis are still expensive and not available in everylab

Modifications

QPCR analysis instead of microarrays: selection of specific gene list, that if modulated together would provide the same results

Future & Other applications

Other applications, besides drug-induced liver injury should be possible, i.e. for screening of other compounds than drugs

REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

References

Rodrigues et al., Stem Cells Dev. 23, 44–55 (2014)

Associated documents

Links

Download article from the journals website

PARTNERS AND COLLABORATIONS

Organisation

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Coordinated by

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