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

Commonly used acronym: *hSKP-based ALF model*

Created on: 20-03-2019 - Last modified on: 26-05-2022

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Organisation

Name of the organisation Vrije Universiteit Brussel (VUB)

Department Pharmaceutical and Pharmacological Sciences

Specific Research Group or Service In Vitro Toxicology and Dermato-Cosmetology

Country Belgium

SCOPE OF THE METHOD

The Method relates to	Human health
The Method is situated in	Basic Research, Education and training
Type of method	In vitro - Ex vivo
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 a 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 every lab.

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)

Links

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