

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

Commonly used acronym: hSKP-based ALF model

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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)

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