# Establishment of sandwich cultures of primary human hepatocytes

*Created on: 14-03-2019 - Last modified on: 14-08-2025*

### 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

**Geographical Area** Brussels Region

## SCOPE OF THE METHOD

| | |
|---|---|
| **The Method relates to** | Human health |
| **The Method is situated in** | Basic Research |
| **Type of method** | In vitro - Ex vivo |
| **Specify the type of cells/tissues/organs** | Primary human hepatocytes |

## DESCRIPTION

### Method keywords

Sandwich cultures of hepatocytes

### Scientific area keywords

Drug-induced cholestasis

### Method description

This method describes a well-known optimised human *in vitro* model of drug-induced cholestasis. Cryopreserved primary human hepatocytes are cultured between two layers of extracellular matrix scaffold, which will delay dedifferentiation and allows to restore cell-extracellular matrix interactions. The sandwich culture method can be applied to both single cell culture dishes and multi-well plates, thus providing an opportune model for high-throughput screening.

### Method status

Still in development

## PROS, CONS & FUTURE POTENTIAL

### Advantages

Suitable for long-term exposure;

Restored cell polarity;

Presence of cell-ECM interactions;

Formation of functional bile canalicular network;

Maintain functional expression levels of transport proteins and xenobiotic metabolization enzymes;

Applicable for quantifying and detecting cholestatic liabilities.

### Challenges

Mass transfer barrier;

Difficult to culture in 96-well plates;

Require daily medium renewal due to accumulating toxic metabolites;

Hypoxic environment.

### Modifications

The model is already modified by introducing a renewal of the collagen layer every 3-4 days. As a result, the model shows and extended cultivation regime up to 14 days (Parmentier et al. 2013).

### Future & Other applications

The model could be used to assess the overall hepatotoxic potential of drugs, cosmetics, biocides or food additives.

## REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

### References

Gijbels E., Vilas-Boas V., Deferm N. et al. (2019) Mechanisms and in vitro models of drug-induced cholestasis. Archives of Toxicology (submitted)

Gijbels E., Vanhaecke T., Vinken M. (2019) Establishment of sandwich cultures of primary human hepatocytes. Methods in Molecular Biology - Protocols in Experimental Cholestasis Research (accepted)

Other references you can find in attached document

### Associated documents

Manuscript.docx

### Links

IVTD - VUB

Prof. Mathieu Vinken - Team

*Coordinated by*

*Financed by*