

# Generation of Hepatic Stellate Cells from Human Pluripotent Stem for in vitro liver fibrosis studies

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## SCOPE OF THE METHOD

<b>The Method relates to</b>	Human health
<b>The Method is situated in</b>	Basic Research, Translational - Applied Research
<b>Type of method</b>	In vitro - Ex vivo
<b>This method makes use of</b>	Human derived cells / tissues / organs
<b>Specify the type of cells/tissues/organs</b>	Non-tumor liver tissue, Non-tumor cirrhotic liver tissue

## DESCRIPTION

### Method keywords

Pluripotent stem cells

Hepatic stellate cells

organoids  
Liver spheroids  
In vitro liver model  
Non-parenchymal cells  
HepaRG

### **Scientific area keywords**

Liver fibrosis  
Disease modelling  
Toxicity assessment  
hepatocytes

### **Method description**

We established a protocol to efficiently generate hepatic stellate cells (HSCs) from human pluripotent stem cells (PSCs). Our procedure generated complex *in vitro* spheroid cultures that better mimic the complexity of the liver as well as liver function. In co-culture, iPSC-HSCs promote maintenance of hepatocyte metabolic functionality while being able to respond to hepatocyte-mediated toxicity, activating and promoting intra-spheroid fibrogenesis, one of the main drug-associated adverse liver outcomes. iPSC-HSCs display functional and phenotypic features of human primary cultured HSCs, indicating that they may be a highly suitable cell source of human HSCs for culture-based studies.

### **Lab equipment**

- Incubator,
- Cell culture hood,
- Flow cytometer,
- Laser Scanning Confocal microscope.

## **Method status**

Published in peer reviewed journal

## **PROS, CONS & FUTURE POTENTIAL**

### **Advantages**

- Protocol is highly robust,
- Yields 70%–80% iPSC-HSCs,
- Highly reproducible.

### **Challenges**

In 2D the responsive of iPSC-HSCs to external signals is rather limited. Thus far, the method has been used successfully in 3 different institutes using 3 different hESC/hIPSC cell lines, but more should be tested.

### **Modifications**

Higher throughput and better quality control for the different stages of hiPSC to HSC differentiations.

### **Future & Other applications**

Can be used for several applications, such as developmental studies, fibrosis modeling, drug screening, liver spheroid generation, and, eventually, regenerative medicine.

## **REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION**

## References

Coll, Mar et al. Generation of Hepatic Stellate Cells from Human Pluripotent Stem Cells Enables In Vitro Modeling of Liver Fibrosis. *Cell Stem Cell*, Volume 23, Issue 1, 101 - 113.e7

## Associated documents

## Links

[Liver cell biology research group](#)

## PARTNERS AND COLLABORATIONS

### Organisation

**Name of the organisation** Vrije Universiteit Brussel (VUB)

**Department** Basic (bio-) Medical Sciences

**Country** Belgium

**Geographical Area** Brussels Region

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