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## Nanofibrillar cellulose as 3D cell culture matrix for HepG2 and HepaRG liver cells and human stem cells

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We have shown, that the plant derived nanofibrillar cellulose hydrogel (NFC) is extremely good support and matrix for different types of 2D and 3D cell cultures by 1) rheological properties that allow formation of a 3D scaffold in-situ after facile injection, 2) cellular biocompatibility without added growth factors, 3) cellular polarization, and differentiation of human hepatic cell lines HepaRG and HepG2, 4) with human embryonic stem cells (hESCs) and induced pluripotent stem cells (hiPSCs) to maintain the pluripotency of hPSCs for up to 26 days, 7) human PSCs cultured in the NFC to form 3D spheroids, 8) a cellulose enzyme to degrade NFC and to recover 3D hPSC spheroids (Fig.1) and 8) to maintain the pluripotency of 3D SC spheroids in NFC by *in vitro* embryoid body formation and further *in vivo* teratoma formation.

The developed NFC hydrogel system recapitulates the natural niche of hPSCs and will be useful in cell-based drug research, cell therapy and tissue engineering.

### Biography

Marjo Yliperttula is Professor of Biopharmaceutics at the Faculty of Pharmacy of the Helsinki University in Finland. She received PhD in Biophysics, University of Helsinki, in the field of bio-optoelectronics at 1993, was as a post doc at "Centre d'Etudes de Atomique Moleculaire, Saclay, France" at Saclay, France at 1993-4. During 1995 - 2005 she worked at the Drug Discovery and Development at Orion Pharma, and joined back to university at 2005 and started as professor in 2007. The main areas of her research are nanoparticles drug delivery, nanomedicine, biophysics and -materials, and also the development of the different types of cell culture systems as tools for drug discovery and development. She has filed about 80 pre-review articles, has three drug discoveries related patents, one patent and five pending in the field of biomaterials and cell culture systems.

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