

Ex-vivo Liver Model Displaying 3D Hepatic Lobule Structure

We are seeking licensing partners interested in the collaborative development and commercialization of this technology.

This model replicates the 3D structure of hepatic lobules, incorporating not only hepatocytes and capillaries, but also pseudo-arteries and pseudo-veins.

◆ Background

As the prevalence of liver diseases continues to rise globally, the development of therapeutic drugs has become increasingly important. However, existing animal models face issues such as interspecies differences and ethical concerns, creating a demand for alternative liver model technologies. The human liver is composed of approximately 500,000 hepatic lobules which serve as its structural units. As a result of this highly sophisticated architecture, it is extremely difficult to create three-dimensional liver models that closely resemble the human liver. Moreover, two-dimensional culture systems are associated with rapid functional decline of the cultured cells. Therefore, conventional alternatives to animal models have thus far been unable to simultaneously replicate the hepatic lobule architecture, maintain liver function, and support long-term culture.

◆ Advantages

Kyoto University researchers have successfully developed a model that reproduces the structure of hepatic lobules, including key features such as the portal vein, central vein, and even sinusoid-like architecture. The model also accurately reflects the size of hepatic lobules as found in vivo. By enabling enhanced precision in the spatiotemporal analysis of disease progression and drug efficacy in the liver, this model is expected to serve as a promising alternative to conventional animal studies.

➤ Demonstration of hepatic lobule structure and function

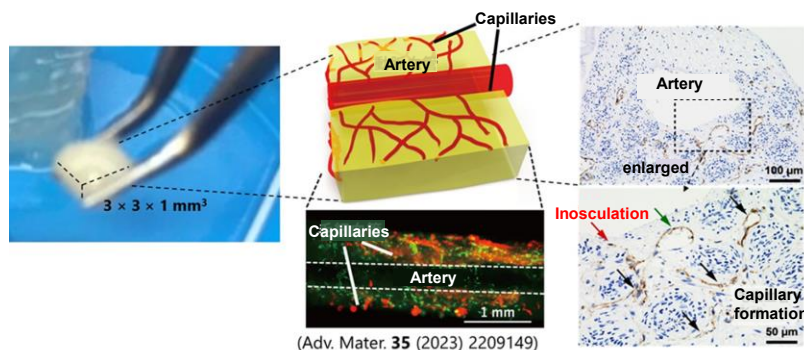


Figure 1. The liver lobule model of the present invention (left), its structure (middle), and immunohistochemical staining image (right)

➤ Ability to replicate liver tissue fibrosis induced by carbon tetrachloride

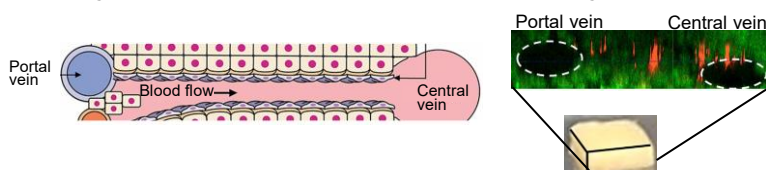


Figure 2. Reproduction of the portal vein and central vein in the hepatic lobule model

◆ Desired Collaborations

- **Biopharma companies • CROs • Research Institutions**
 - Drug screening, efficacy evaluation, toxicity assessment, etc.
- **Contract Research Partnerships**
- **Collaborative Fundamental Research**
 - Liver lobule zonation, perfusion systems, etc.

◆ Applicable Uses

- Drug development and toxicity assessment
- Liver injury drug screening
- Liver research

◆ Developmental Stage

This hepatic lobule model has been constructed and successfully demonstrated its ability to replicate tissue fibrosis induced by carbon tetrachloride.

◆ Presentation Status

Presented at TLO-KYOTO
Innovation Matching Seminar
➤ [YouTube Link \(Japanese\)](#)

◆ Licensing Offerings

- Patent license*
 - Collaborative research
- *Patent application filed by Kyoto University, currently pending

◆ Contact

TLO-KYOTO Co., Ltd.

Mail: event@tlo-kyoto.co.jp
Phone: +81-75-753-9150

Level 3, International Science
Innovation Bldg., Kyoto Univ.,
Yoshida-honmachi, Sakyo-ku,
Kyoto 606-8501, Japan

