

Culture Device for Producing Liver Organoids with an Internal Vascular Network

We are looking to out-license the technology for its commercialization.

Efficiently induces vascular network formation within liver organoids

◆Background

Advanced liver models are increasingly needed as alternatives to conventional animal models. Although liver organoids can reproduce key liver cells, the formation of mature and perfusable vascular networks remains a major challenge, limiting their functionality and cell viability. Co-culture with vascular endothelial cells has been explored, but achieving sufficiently developed vascular structures and effective perfusion remains difficult.

◆Description

Researchers at Kyoto University have developed a culture method that recreates an in vivo-like mechanical environment, enabling efficient formation of vascular networks within organoids. Based on this method, the team developed a culture device (Fig. 1) and confirmed vascular network formation within liver organoids (Figs. 2 and 3). The vascular network supports oxygen and nutrient supply, waste removal, and drug transport, while promoting cellular maturation and function and enabling more physiologically relevant tissue structures.

➤ **No specialized technical skills required**

Liver organoids can be generated by seeding spheroids into the culture device (Fig. 1).

➤ **Production of liver organoids that closely resemble the in vivo environment**

Single-cell RNA sequencing (scRNA-seq) analysis confirmed the successful generation of physiologically relevant organoids.



Fig. 1. Culture device

Spheroids are seeded at the center of the device for liver organoid formation.

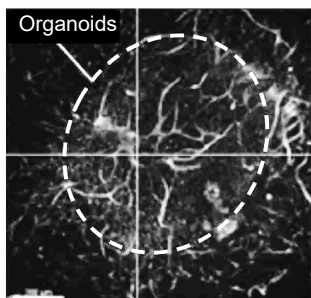


Fig. 2. Vascular network

A CD32b-positive vascular network extends into the liver organoid.

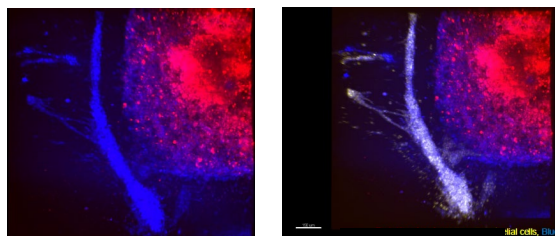


Fig. 3. Formation of Vascular Networks within Liver Organoids

Beads (blue) were used to visualize the spatial structure, dispersing into available space. In liver organoids generated using this culture device, vascular endothelial cells (yellow) formed vascular-like structures, with beads extending into the organoid. This suggests the formation of vascular networks. (Red: Hepatocytes)

◆Development Status

TRL: Level 3

- Demonstrated the production of liver organoids that closely mimic the in vivo environment.

◆Potential Applications

- Drug toxicity/efficacy evaluation
- Liver disease models (e.g. hepatitis virus studies)
- Model development for transplantation and MASH
- Specialized cell culture device

◆Offer

- Patent License

◆Contact

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