

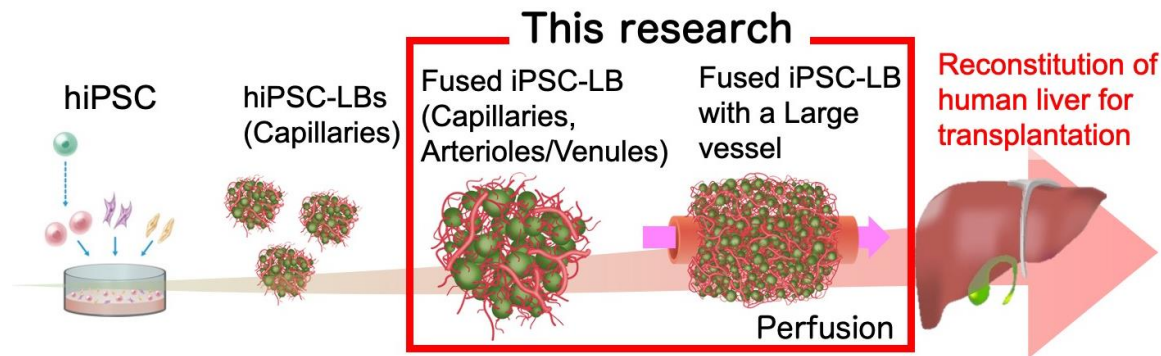


3D tissue reconstruction with hierarchical vascular networks

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Organoid culture technology, which allows us to create complex tissue structures by induction of self-organization through cell-cell interactions, has rapidly developed by using somatic stem cells and pluripotent stem cells. Organoids have been utilized for drug discovery, generation of disease models, and reconstruction of various organs over the last decade. Compared to tissue transplants, cell/organoid transplants take more time to connect to blood vessels and exert their function. Vascularized organoid technology shortens this process; however, a certain time lag exists until a connection is made with the blood stream. Another issue in regenerative medicine is the procurement of a large mass of tissue. To solve this problem, we have developed a cell culture method to generate 3D organoids with hierarchical vascular networks that seamlessly connect capillaries to large vessels. With such vascular networks, large organs can be generated by perfusion culture. In the future, this technology may be applied to pharmaceutical research and contribute to enhance transplant engraftment and improve tissue functions.



Generation of organ with hierarchical vessels applicable to the transplantation therapy.