

SAKAI LAB.

[Development of Cellular Tissues for Transplantation and Application to the Evaluation of the Effects of Substances on the Human Body]

Department of Materials and Environmental Science

<http://envchem.iis.u-tokyo.ac.jp/sakai/index.php>

Organs and Biosystems Engineering

Department of Chemical System Engineering

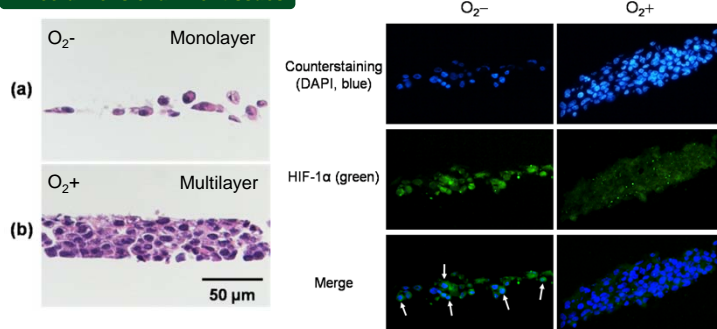
Department of Bio Engineering

Reconstruction and Utilization of the Tissue

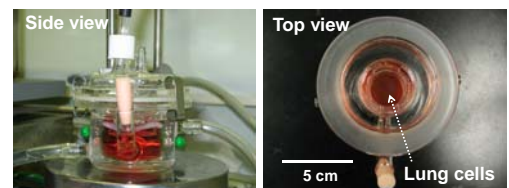
The general goal of our lab is the two- and three-dimensional organization of organ/tissue-derived cells, such as liver, pancreas, and lung cells, for regenerative medicine and cell-based assay for drug and chemical screening.

- ◆ Reconstruction of a three-dimensional cell sheet on the oxygen permeable membrane coated with a cell adhesion controllable polymer.
- ◆ Elucidation of self-organizing tissue patterns and development of its mathematical model.
- ◆ Differentiation control of ES/iPS cells in polymeric microcapsules and their application to mass culture system.
- ◆ Development of integrated tissue/organ-based modular systems.
- ◆ Development of microfluidic devices for studying cancer metastasis.
- ◆ Size control of two- and three-dimensional tissues by microfabrication techniques and application to drug and chemical screening.
- ◆ Development of in vitro screening methods for safety evaluation of nanomaterials (metal nanoparticles, carbon nanotube, and etc.).

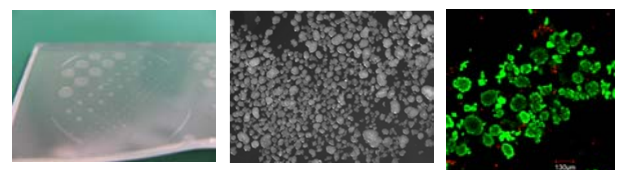
Three-dimensional liver tissues



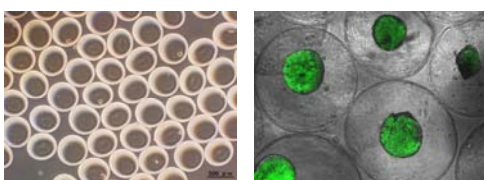
Gas exposure device with a lung tissue



Size control of three-dimensional microtissues



iPS cells in polymeric microcapsules



Integrated tissue-based modular system

