The 100th iCeMS

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A New Approach for 3D Tissue & Organ Fabrication Inspired From Orthopedic Surgery

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Venue: 2nd floor Seminar Room (#A207) Main Building
iCeMS Complex 1, Kyoto University

Fabrication of transplantable 3D tissues or organs in vitro is one of the major goals in regenerative medicine. Several scaffold-free systems have been developed to avoid potential side effects caused by scaffold mainly used to build three-dimensional tissue constructs. However, they seemed to be still unable to produce fine structures without contamination from exogenous biochemical materials. Inspired from bone fracture treatments in orthopedic surgery, we have established a simple method to fabricate 3D scaffold-free cell constructs. This method uses spheroids and temporal fixators which enable placement of various types of three-dimensional cells into desired xyz positions without need of hydrogels or biochemical reactive materials.

We also developed a robotic system for scaffold-free cell construction. The prototype can handle two different types of cells and fabricate 10 mm^3 scaffold-free cell constructs. We consider that the simplicity and scalability of this unique system will facilitate its clinical introduction. Near future, with combination of the robotic technology and the bio technology, we may be able to build living organs for autologous transplantation. And this multi-cell construct may be a useful research tool for drug development.

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