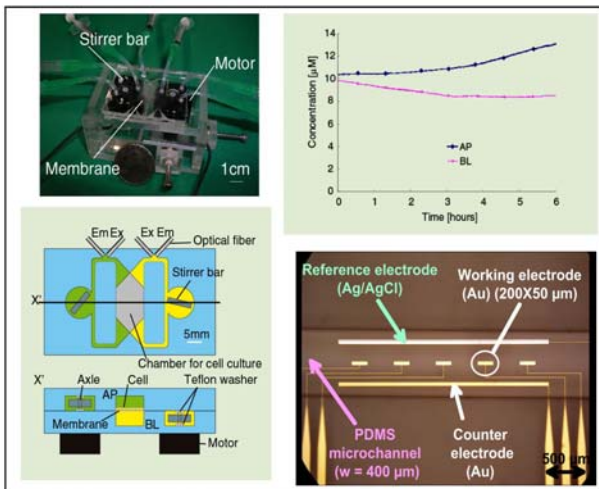


Development of Cell-engineering Devices

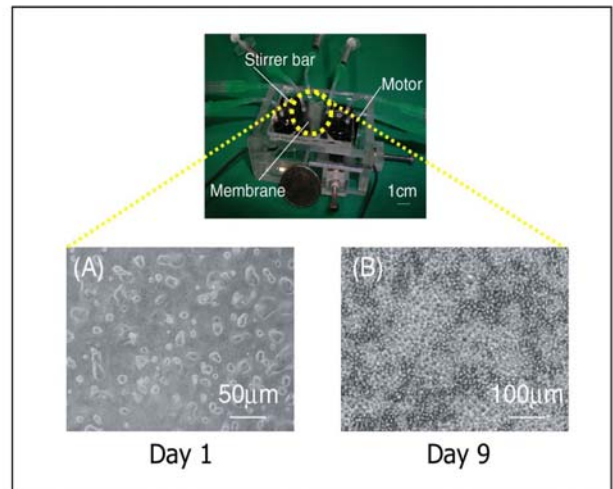
Overview : By combining the microscale channel structure and nanoliter scale fluid handling techniques, "Cell-engineering Devices" for advanced cell and tissue culture is developed. The culture conditions in the device are precisely controlled and monitored by integrated pumping and sensing functions. The mid-term goal was to realize new device structure through the development of basic components to be integrated into the device, such as pumping mechanism and sensing elements. Integration of stirrer bar-based pumping mechanisms and optical fibers for fluorescent detection has successfully been completed. And the performance of the device was evaluated by conducting experiments to measure polarized transport function of Caco-2 cells. Electrochemical sensors for oxygen and glucose measurement are to be integrated once new arrangement to avoid their mutual cross-talks will be found and fixed.

Development of Cell-engineering Devices

Principal Investigator : Teruo Fujii
 Collaborator : Yasuyuki Sakai



- Design and fabrication of multi-functional cell culture platform
- Integrated pumping mechanism for long-term operation
- Fluorescent measurement through embedded optical fibers
- Evaluation of integrated electrochemical sensors



- Parallelization of the system
- Further evaluation
- Sensors for Other Factors/Ions
- Sensor Array Integration
- Measurement on-the-fly (culture)
- Establish a method for monitoring microenvironment