The basic research on stem cells have been reported one after another in Japan recently. Based on these superb outcomes it seems that generating organs in vitro has been booming. Nevertheless, generating complete organs in vitro is not foreseeable. The author has been pushing forward "Transplantable organ fabrication" with the following three strategies:

1. To generate human organs in the body of heterozoic animals such as pig, animal factory or In vivo Bioreactor.
2. The method of fabricating human organ bud in vitro and transplanting it to patients, Organ Bud Transplantation.
3. The multilayer method to fill cells Ex vivo. Perfusion culture system is essential to develop by use of biomedical technology.

In this lecture, I would like to review recent organ perfusion system for organ transplantation and share our recent knowledge for organ fabrication using biomedical engineering technology.