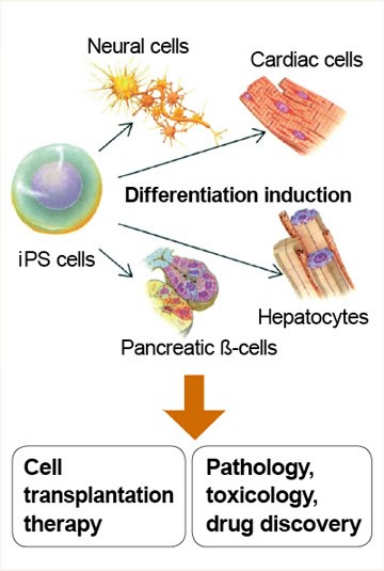
The Potential of iPS Cells

The generation of induced pluripotent stem (iPS) cells is a highly significant advance in stem cell research, which has the potential to open up new avenues of medical research and treatment. The use of iPS cells enables researchers and medical practitioners to avoid the controversial use of human embryos, and unlike embryonic stem (ES) cells, iPS cells can circumvent the risk of rejection by the immune system because they can be derived entirely from the patient's own body.

iPS cells were created by introducing a small number of genes into ordinary human somatic (differentiated) cells. The cells which were produced exhibited properties remarkably similar to those of embryonic stem cells, such as the capacity for theoretically indefinite growth in culture and the ability to differentiate into any type of cell in the body. In the future, iPS cells may be used to help study diseases, discover new drugs and treat medical conditions through cell therapies.

At present, the cell therapies used in regenerative medicine require patients to take immunosuppressants to prevent rejection, but the advent of iPS cells may enable patients to receive therapies using their own cells, and eliminate the risk of incompatibility. It may be possible to steer iPS cells derived from the cells of a patient with an intractable disease to differentiate into the desired cell type, such as neurons or cardiac muscle cells. Such differentiated cells could potentially be used to study the development and course of diseases in ways never before possible. By creating large populations of cells of a specific type, it may also become possible to test new drugs in ways that are not feasible in human subjects. This could make a tremendous contribution to drug development in the future.

iPS cell research is still in its infancy, and a number of steps, such as the development of standardized cell lines, the establishment of proven safe methods for cell generation, animal tests of preclinical safety and efficacy, and the development of government policies and regulations for the clinical use of iPS cells will be needed prior to their use in humans. CiRA is leading the efforts to make the applied use of iPS cells a reality.



Professor Shinya Yamanaka has been recognized for his outstanding work in iPS cell research, and received the 2009 Canada Gairdner International Award in addition to many other honors.

The research building for CiRA was completed in February 2010. Its facilities include open laboratories and a cell processing center named the Facility for iPS Cell Therapy (FiT), which is dedicated to the generation of clinical-grade cells.

Center for iPS Cell Research and Application (CiRA)