gibco

The power of stem cells

Before 1998

A significant amount of research occurred in the cell biology field prior to 1998, laying the groundwork for stem cell research. Primitive early cell lines, such as those from adult bone marrow stem cells, were used to study animal models. Research in mouse models and nonhuman primates was instrumental in leading to the discovery of human embryonic stem cells (hESCs).

Sir John Bertrand Gurdon

Recognized for his work in nuclear transplantation and cloning, Sir John Gurdon conducted research in 1958 at the University of Oxford that led to the successful cloning of a frog from intact nuclei in the somatic cells of a *Xenopus* tadpole. Gurdon refined his expertise in developmental biology at Cambridge University in the United Kingdom. In 2012, he and Dr. Shinya Yamanaka won the Nobel Prize for Physiology or Medicine by showing that developed, specific cell types can be reprogrammed and reset to become cells capable of differentiating into any number of cell types throughout the body.[2]

Dr. Shinya Yamanaka

With his codiscovery of induced pluripotent stem cells from human and mouse fibroblasts, Dr. Shinya Yamanaka significantly advanced the field of stem cell research. Dr. Yamanaka is a practicing physician and biologist at the Center for iPS Cell Research and Application at Kyoto University in Japan. Along with Sir John Gurdon, Dr. Yamanaka was awarded the 2012 Nobel Prize for Physiology or Medicine by showing that developed, specific cell types can be reprogrammed and reset to become cells capable of differentiating into any number of cell types throughout the body.[3]

1998–2006

The discovery of hESCs in 1998 by Dr. James Thomson offered new promise for understanding the development and physiology of human cells and for advancing drug discovery and regenerative medicine.

Dr. James Thomson

After successfully deriving human embryonic stem cells in 1998, Dr. James Thomson made significant advances in stem cell research and was one of the first to derive induced pluripotent stem cells in 2007. Dr. Thomson was trained in developmental biology at the University of Pennsylvania. Currently, Dr. Thomson is the Director of Regenerative Biology at the University of Wisconsin Morgridge Institute for Research. For his contributions to the field of stem cell research, Dr. Thomson has received numerous awards and accolades, including recognition from *Time* magazine as one of the world's 100 most influential people. In June 2013, Dr. Thomson was awarded the McEwen Award for Innovation.[1]

Today

The discovery of human induced pluripotent stem cells (iPSCs) in 2007 by Dr. Shinya Yamanaka and Dr. James Thomson unlocked the door for stem cell research. iPSCs are cells that have been reprogrammed from somatic cells, like fibroblasts or blood cells. They have the ability to turn into any cell type within the body. Because iPSCs can be derived from nonembryonic cell types, they alleviate many ethical, political, and legal barriers for stem cell research.

To find support for every step of your stem cell research, go to **thermofisher.com/powerofstemcells**

References:
1. mcdb.ucsb.edu/people/faculty/thomson
2. nobelprize.org/nobel_prizes/medicine/laureates/2012/gurdon-facts.html
3. nobelprize.org/nobel_prizes/medicine/laureates/2012/yamanaka-facts.html

Promise of the future

Stem cells are the promise of the future. Advances in the field of stem cell science provide the opportunity to shift the paradigm of medicine to better enable research into disease therapies and one day offer cures.

ThermoFisher SCIENTIFIC