

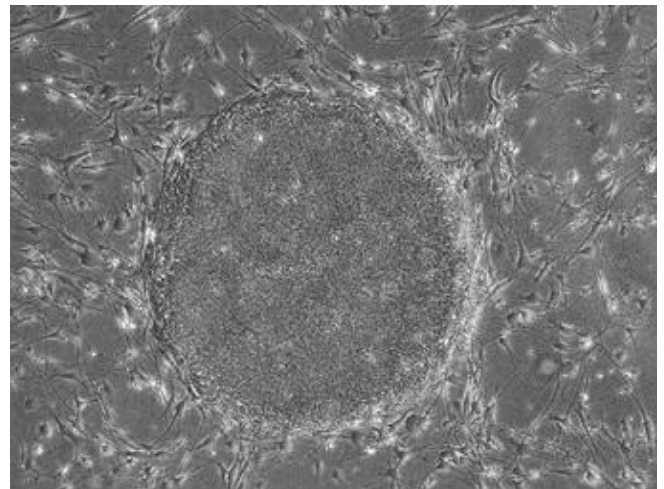
## James Ellis, PhD

- Research Institute, Developmental & Stem Cell Biology, Senior Scientist
- University of Toronto, Molecular Genetics, Professor

Our major focus is to make induced pluripotent stem (iPS) cells from patients. We have made stem cells from four Cystic fibrosis (CF) individuals. After the stem cells are made, we provide the stem cells to the lab of Janet Rossant, and her lab differentiates them into the lung epithelia. The lung cells then go to Christine Bear's lab for drug tests.



iPS cells were discovered by Shinya Yamanaka in 2006 and 2007, and Yamanaka won the Nobel Prize in 2012 for his discovery. Yamanaka did this by transferring four genes that normally control embryonic stem cell growth into skin cells of patients. These four genes tell the skin cells to grow and behave like embryonic stem cells. We use this technique on the skin cells of CF patients. We isolate the iPS cells and show that they are pluripotent (meaning that they can differentiate into any cell type in the body) by differentiating them into nerve cells, cardiac cells, and other cells. Once we know that these cells are pluripotent, we give them to Janet Rossant's lab to make the lung cells for drug testing.



*iPS Cell Colony.*

For a recent publication involving my lab, a drug that is currently in clinical trials was tested on lung cells derived from the CF patient stem cells. This is a way to move towards personalized medicine. We can test different drugs on the lung cells derived from stem cells and determine which would be most effective for a particular patient, or which may have toxicities and side effects and should not be used. The first step is to screen known drugs. These cells can also be used to screen chemical libraries to identify new compounds that could be useful as novel therapeutics for CF disease.

My father was a marine biologist, and he used to gather samples from a research vessel and take them back to the lab. So I have been involved to some degree in science ever since I was small. My father's work as a marine biologist was very descriptive, as it involved classifying species that lived in

different places. This motivated me to pursue science that is more mechanistic, which is why I went on to study molecular biology, gene therapy, and more recently, stem cell models of disease. Once we began working on stem cells, Amy Wong's work in my lab as well as SickKids' long expertise in cystic fibrosis presented a real opportunity to apply the stem cells to CF here at SickKids.

**Trainees:**

**Amy Wong (post-doctoral fellow)** reprogrammed the stem cells and worked with Janet Rossant to differentiate them into lung cells, and then worked with Christine Bear to test the C18 compound.

[SickKids Hospital > James Ellis Profile](#)

[SickKids Hospital > Research > Researchers in profile > Interview with James Ellis](#)

[SickKids Hospital > Research > Ellis Lab](#)