

## Cincinnati Children's Stem Cell Initiatives March 2009

- Cincinnati Children's conducts medical research on several types of stem cells: hematopoietic stem cells (blood stem cells), adult stem cells and embryonic stem cells from animals and humans. Human embryonic stem cell research has involved cell lines approved for federal funding by the Bush administration in 2001.
- Research focuses on innovative treatments for birth defects and diseases like muscular dystrophy, diabetes and cancer, to name a few. The scope of stem cell research programs at Cincinnati Children's is expected to expand as a result of future federal or private grants awarded for specific projects.
- The Cincinnati Children's Research Foundation currently has budgeted \$10 million to expand human stem cell research over the next five to 10 years and is proposing a funding increase of up to \$30 million.
- Cincinnati Children's and the University of Cincinnati – which collaborate extensively on scientific research – have created a joint Embryonic Stem Cell Research Oversight Committee. The committee will help ensure research projects are conducted in a focused, effective and ethical manner.
- The medical center's Division of Hematology / Oncology uses hematopoietic stem cells to successfully treat certain blood disorders and cancers, such as leukemia. These cells have been studied at Cincinnati Children's for decades.
- Researchers at Cincinnati Children's also study adult stem cells found in certain organs and tissues. These cells, which grow into replacement cells for organ systems, have potential as treatments for some genetic disorders.
- The medical center plans to broaden the scope of studies exploring the significant therapeutic potential of human embryonic stem cells, which can become any cell type in the body. The end of federal funding restrictions on embryonic stem cell research will allow the medical center to study newer, therapeutic-grade cell lines.
- Since discovered 10 years ago, researchers around the world have learned how to turn embryonic stem cells into brain cells, heart cells, pancreatic cells, and blood. These have all been effective in animals to treat diseases like Parkinson's and diabetes. The first clinical trial in humans has been approved to for using embryonic stem cells to treat spinal cord injury. Cincinnati Children's wants to incorporate several of these emerging technologies into future therapies for people in the Cincinnati area and beyond.

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- Embryonic stem cells come from an egg that is fertilized in a Petri dish. After the fertilized egg divides about six times, this microscopic ball of cells can be coaxed into becoming an embryonic stem cell line that grows indefinitely in a Petri dish. The biological equivalent of a blank sheet of paper, they can form cells and tissues from any part of the human body, including brain and spinal cord neurons, cells for blood, bone skin, heart, and so on. For research purposes, eggs must be donated and fertilized in a laboratory setting, not in a person.
- Cincinnati Children's is expanding into the emerging area of research using genetic manipulation to reprogram adult stem cells back into an embryonic state. This would allow embryonic-like stem cells to be harnessed for patient-specific regenerative medicine without the ethical issues some have raised about natural-state human embryonic stem cells.
- Cincinnati Children's also conducts research with animal embryonic stem cells (such as mouse cells) to help gain insight into biological mechanisms that can be applied to studies of human disease.