U.S. Doctors Initiate First Official Human Embryonic Stem Cell Trial

by Andrew Dargie

The FDA recently approved the petition of Geron Corp, a Silicon Valley biotech company, to begin clinical trials of embryonic stem cells to treat human spinal cord injuries. Geron, world renowned for its development of therapeutic treatments using human embryonic cells, began its stem cell research in 1999 and has spent $170 million dollars developing this highly controversial treatment.

The clinical trial is based upon research that found paralyzed rats regained some motor function upon injection of stem cells into their spinal cords. Researchers are hopeful the same results can be observed in humans.

Geron’s plan is to utilize stem cells that are encouraged to differentiate into nerve cells which can then be injected directly into the spinal cord. The first clinical trial began with a patient at Shepherd Center, a spine and brain injury rehabilitation hospital in Atlanta. Other clinical trail sites across the USA are expected, and in each case the stem cell therapy will be offered to suitable patients within fourteen days of the initial injury.

These first trails are being watched carefully by researchers around the world who are primarily interested in the safety of this new technology. Ian Wilmut, director of the Medical Research Council Centre for Regenerative Medicine at the University of Edinburgh, stated that “the objective of trials at this stage is to confirm first of all that no harm is done to patients, rather than to look for benefits. Once that has been confirmed then the focus moves on to development and assessment of the new treatment.”

A plethora of other stem cell trails will undoubtedly be released if Geron’s trials prove safe and tolerable for patients. UK researchers are already planning to run clinical trials using stem cell therapy to treat age-related macular degeneration - a leading cause of blindness.

While there is no proof yet that stem cell treatment will be beneficial, it is a major step forward in the world of regenerative medicine.


Scientists are making large gains in the development of stem cell treatments and technologies. With these exciting advances, it is easy to overlook the problems with the research. One in particular is the use of embryonic stem cells. Currently the largest sources of stem cells are human embryos. On the timeline of development, an embryo is formed within a week of conception while a fetus takes another 7 weeks to develop, and of course, the baby is ready to be born after a total of 9 months. Nobody would advocate the destruction of a baby in the womb, but what ultimately is the difference between a baby and the embryo that will grow into the baby? An embryo represents the potential for a human life and if stem cell treatments become viable, embryos will become a crop to be mass produced, harvested, and used to heal those who can afford the treatment.

This does not mean that all stem cell research must stop. It simply means that other methods of obtaining stem cells should be developed before stem cell treatments reach a high level of demand. There are a number of experimental methods to take an adult cell and turn it back into a stem cell. In an effort to save human embryos and stop them from becoming a mass produced product, these methods should be brought to a point to where they are easier to obtain than embryonic stem cells. Therefore, laws prohibiting the use of embryonic stem cells should be encouraged to force researchers to create another source of stem cells. We must protect the value of a human life by protecting the attitude towards the embryo which will become a human life.

Enroll in Med 83Q: Ethical, Legal, and Social Dimensions of Stem Cell Research

Why are embryonic stem cells so powerful? Why do they provoke such controversy? How, as a society, do we balance our responsibilities to the unborn and the sick?

Students will first learn the theoretical and practical aspects of stem cell biology and their importance in human development.

With that information in hand, we’ll spend part of the class working at the laboratory bench in Stanford’s new stem cell research facility.

There, we’ll learn how to culture mouse embryonic stem cells, perform experiments to change them into other types of cells, and discuss why scientists are so excited about their potential for human health.

Photo Credit: sdnn.com
GRAND OPENING:

Nation’s Largest Stem Cell Research Building

by Michelle Jin

As the nation’s largest stem cell research building, the Lorry I. Lokey Stem Cell Research Building (SIM1) adds another entry to Stanford’s breakthrough record. Completed in fall 2010 with the goal to serve as the center for Stanford Stem Cell Biology and Regenerative Medicine Institute. The building provides a common roof for researchers in different areas to share ideas and combine their specialties for new discoveries. From cancer, to neuroscience, to biotechnology, and to immunology, the areas of interest that the building hosts is endless.

Conveniently located near the Stanford hospitals and School of Medicine campus, the goal is, according to the building’s official website to make new discoveries in stem cell research, and applying findings to more efficient therapy and treatments.

This $225 million facility is funded by the California Institute for Regenerative Medicine, Lorry I. Lokey, the University, and other private resources. Amidst controversy surrounding stem cell research, scientists can sigh in relief that research at Stanford is not subject to lawsuits that could end public funding. President Hennessy hopes that among “a dark time for stem cell research,” the center can “turn that ship around” and provide opportunities for new breakthroughs.

The building occupies 200,000 and is supplied with state-of-the art animal facilities, tissue banks, and equipments. It also has energy-efficient systems to reduce energy intake and minimize pollution. The building attracted accomplished scientists around the world and is open for researchers of all backgrounds and experiences. Since its opening, the building served over 500 faculties, post-doctorates, students, staff, and other researchers.

Sources: “Lorry I. Lokey Stem Cell Research Building,” from Stanford School of Medicine, http://lokey.stanford.edu

FUN FACT:

Lorry Lokey also donated the funds that made the new Stanford Daily building and the Lokey Chemical Biology Laboratories possible
Researchers Create Stem Cells Using RNA

TECHNIQUE INDUCES PLURIPOTENCY WITHOUT PROBLEMS OF VIRUS-BASED METHODS

by Robin Jia

Researchers at Harvard have recently discovered a new way to induce pluripotency—the ability to differentiate into many different cell types—in normal adult cells without altering the genetic composition of the cells themselves.

Instead, Harvard Medical School Professor Derrick Rossi has grown induced-pluripotent stem cells (iPSCs) by introducing specific RNA strands into the cells. This messenger RNA codes for four crucial proteins—first identified by UCSF Professor Shinya Yamanaka—that cause the regular adult cells to become pluripotent stem cells.

Yamanaka pioneered the production of induced-pluripotent stem cells in 2006, but he relied on viruses that inserted specific genes into the target cells’ DNA. Unfortunately, this technique could only transform between one in every thousand and one in every ten thousand cells. Moreover, since Yamanaka’s technique involved mutating the cells’ DNA, the resulting stem cells could potentially become cancerous.

Rossi’s new technique seems to avoid both these problems. His RNA strands are reportedly 100 times more efficient at transforming cells than traditional viruses. Furthermore, since Rossi is not altering any DNA, there is no risk of cancer-causing mutations.

While Rossi says that further testing is needed to gauge the usefulness of these RNA-induced pluripotent stem cells, many scientists in the field are already excited about his discovery. Yamanaka himself told Technology Review, “The standard method to generate iPSCs for clinical applications has yet to be established. I think this method has the potential for it.”

Scientists have grown walnut-sized human livers and hope to eventually grow livers for transplants

Photo Credit: The Telegraph
What we Do:

• Arrange lunches to get to know prominent faculty and hear about their work
• Teach a student-initiated course to help Stanford students learn from interdisciplinary stem cell experts
• Teach at local high schools to inform students about the ethical dilemmas, scientific basis, and therapeutic potential of stem cells
• Plan a Stanford-run undergraduate stem cell conference with other national chapters
• Produce this publication!

UPCOMING EVENT

What: Faculty lunch with Renee Reijo Pera

When: Monday, February 28th at 12:15 PM

Where: Hillel Board Room

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