

# New Human Stem Cell Center Expected to Speed Research and Keep It Safe

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In a novel effort to simplify and speed up safe human stem cell research, Johns Hopkins has set up a “one-stop shop” to preserve, create, supply and test high-quality cell lines for its own researchers now and the greater scientific community later.

The privately funded Stem Cell Resource Center, housed for now within the School of Medicine’s Institute for Cell Engineering on the East Baltimore campus, offers streamlined and centralized handling of cell lines and requests to use them and is expected to cut wait times and paperwork substantially, according to Chi V. Dang, M.D., Ph.D., the School’s vice dean for research and head of the Institute, known as ICE.

In tandem with the opening of the new center, Hopkins appointed an eight-person Embryonic Stem Cell Research Oversight - ESCRO - committee modeled on guidelines set forth in 2005 by the National Academies. Similar to institutional review boards that oversee the safety of human subjects in research, the ESCRO committee’s charge is to ensure that all human stem cell experiments conducted at the university are safe.

“It’s frankly astonishing that no other place has done the much-needed, head-to-head comparison of the existing stem cell lines to fully describe them and make sure they’re safe to use,” says Dang. “This isn’t the ‘sexy’ part of stem cell work, but it’s critical because this research aims at developing stem cell treatment for use in people, and ESCRO is going to make sure to every extent possible that such use at Hopkins is safe.”

The Center and ESCRO will call on Hopkins experts to screen all cell lines for alterations or mutations that might compromise their quality or signal danger. For example, scientists from Hopkins' McKusick-Nathans Institute of Genetic Medicine and Center for Epigenetics of the Institute of Basic Biomedical Sciences will examine DNA sequences and chromosomes in each cell line for alterations that look like cancer or other inherited diseases.

Last year, a team led by researchers at the McKusick-Nathans Institute of Genetic Medicine at Hopkins reported that human embryonic stem cell lines accumulate changes in their genetic material over time. Cells grown in the lab longer were worse off, containing the wrong number of chromosomes, changes in the marks that control genes, or changes in the DNA sequence. While the precise effects of these changes aren't known, some resemble those seen in cancer cells. Whether the changes affect the stem cells' abilities to become other cell types also is unknown.

Within the Center, experts in the study of genes and their functions (genomics) will develop molecular toolkits for turning on or off genes that coax stem cells to develop into specific cell types, and experts in microscope imaging will create and test better ways to mark the cells so that they can be observed and followed as they grow and develop.

“We're convinced that such services will bring a stunning level of confidence and security to stem cell research at Hopkins, so much so that scientists will be able to work more quickly,” Dang says. With plans to apply for funds from Maryland's new stem cell initiative, Dang adds, the Center hopes to open its services to non-Hopkins scientists in the state and more widely next year.

Beyond researcher convenience and safety, centralization of services within the Center should mean economies of scale that will lead to better use of dollars and time, Dang notes. “These are core operations that can't

always be done by a single lab, and now that lab doesn't have to reinvent every wheel to do important work," he says.

The Center's scientists also will establish new cell lines and study how they change over time and when or under what conditions they lose genomic integrity, Dang says.

"We know of many researchers who would like to venture into stem cell science but don't in great measure because of the immense bureaucratic burden of paperwork required to gain access to individual cell lines by contract or material transfer agreements," he says. "The Center will do all that for the entire university, so that as far as any individual investigator can tell, it will be free access."

With start-up support from a small portion of a \$100 million anonymous gift to The Johns Hopkins University earlier this year, the Center first will store a collection of adult and embryonic stem cell lines, some approved for studies that have federal funding and some not. The Center also will keep tabs on the funding used to support research on all the cells it provides to ensure compliance with federal laws.

Human embryonic stem cells are obtained from extra embryos created during in vitro fertilization. Because the cells can become any type of cell in the body, they may one day treat or cure diseases such as Parkinson's disease or type I diabetes. According to policy established by President Bush, only human embryonic stem cell lines created before 9 p.m. ET, Aug. 9, 2001, can be used in federally funded research. The cell lines that currently meet that eligibility requirement are not suitable for use in any future human trials because they were initially grown on mouse cells and therefore might harbor mouse-specific viruses.

As the new Center ramps up its services, the new ESCRO committee will set university-wide standards on experiments performed at Hopkins

under the leadership of Jeremy Sugarman, M.D., professor in Hopkins' Berman Bioethics Institute, and Carol Greider, Ph.D., the Daniel Nathans Professor and director of molecular biology and genetics in the Hopkins Institute of Basic Biomedical Sciences and recent winner of the Lasker Award for her work on chromosomes.

On the Web:

[www.hopkinsmedicine.org/ice/index.html](http://www.hopkinsmedicine.org/ice/index.html)

Source: Johns Hopkins Medical Institutions

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