Six new U-M stem cell lines now publicly available to help researchers find treatments for disease

The Associated Press

Six new human embryonic stem cell lines derived at the University of Michigan have just been placed on the U.S. National Institutes of Health's registry, making the cells available for federally-funded research.

U-M now has a total of eight cell lines on the registry, including five that carry genetic mutations for serious diseases such as the severe bleeding disorder hemophilia B, the fatal brain disorder Huntington's disease and the heart condition called hypertrophic cardiomyopathy, which causes sudden death in athletes and others.

Researchers at U-M and around the country can now begin using the stem cell lines to study the origins of these diseases and potential treatments. Two of the cell lines are believed to be the first in the world bearing that particular disease gene.

The three U-M stem cell lines now in the registry that do not carry disease genes are also useful for general studies and as comparisons for stem cells with disease genes. In all, there are 163 stem cell lines in the federal registry, most of them without major disease genes.

Each of the lines was derived from a cluster of about 30 cells removed from a donated five-day-old embryo roughly the size of the period at the end of this sentence. The embryos carrying disease genes were created for reproductive purposes, tested and found to be affected with a genetic disorder, deemed not suitable for implantation and would have otherwise been discarded if not donated by the couples who donated them.

Some came from couples having fertility treatment at U-M's Center for Reproductive Medicine, others from as far away as Portland, OR. Some were never frozen, which may mean that the stem cells will have unique characteristics and utilities.

The full list of U-M-derived stem cell lines accepted to the NIH registry includes: UM9-1PGD - Hemophilia B UM17-1 PGD - Huntington's disease UM38-2 PGD - Hypertrophic Cardiomyopathy (MYBPC3) UM15-4 PGD - Hydroxysteroid Dehydrogenase 4 Deficiency, a rare hormone disorder UM11-1PGD - Charcot-Marie-Tooth disease Type 1A UM4-6 - no disease gene UM14-1 - no disease gene UM14-2 - no disease gene "Our last three years of work have really begun to pay off, paving the way for scientists worldwide to make novel discoveries that will benefit human health in the near future," says Gary Smith, Ph.D., who derived the lines and also is co-director of the U-M Consortium for Stem Cell Therapies, part of the A. Alfred Taubman Medical Research Institute.

"Each cell line accepted to the registry demonstrates our attention to details of proper oversight, consenting, and following of NIH guidelines," says Sue O'Shea, Ph.D., professor of Cell and Developmental Biology at the U-M Medical School, and co-director of the Consortium for Stem Cell Therapies.

U-M is one of only three academic institutions to have disease-specific stem cell lines listed in the national registry, says Smith, who is a professor in the Department of Obstetrics and Gynecology at the University of Michigan Medical School. The first line, a genetically normal one, was accepted to the registry in February.

Each line is the culmination of years of preparation and cooperation between U-M and Genesis Genetics, a Michigan-based genetic diagnostic company. This work was made possible by Michigan voters' November 2008 approval of a state constitutional amendment permitting scientists to derive embryonic stem cell lines using surplus embryos from fertility clinics or embryos with genetic abnormalities and not suitable for implantation.

The amendment also made possible an unusual collaboration that has blossomed between the University of Michigan and molecular research scientists at Genesis Genetics, a company that has grown in only eight years to become the leading global provider of pre-implantation genetic diagnosis (PGD) testing. PGD is a testing method used to identify embryos carrying the genetic mutations responsible for serious inherited diseases.

Genesis Genetics performs nearly 7,500 PGD tests annually. Under the arrangement between the company and U-M, patients with embryos that test positive for a genetic disease now have the option of donating those embryos to U-M if they have decided not to use them for reproductive purposes and the embryos would otherwise be discarded.

The agreement was worked out between U-M's Smith and Mark Hughes, M.D., Ph.D., founder and president of Genesis Genetics and a pioneer in the field of pre-implantation genetic diagnosis. "These are very precious cells, and it would be unconscionable not to take advantage of such an opportunity for medical science and the cure of disease," Hughes says.

The hemophilia B line also resulted from a collaboration with the Oregon Health Science University, and is believed to be the first of its kind in the world. Through the partnership with the Reproductive Endocrinology and Infertility division, headed by Philip Patton, M.D., and the work of David Battaglia, Ph.D., the single embryo was frozen at OHSU and shipped to Michigan.

Contributors to the A. Alfred Taubman Medical Research Institute's Consortium for Stem Cell Therapies include the Taubman Institute; the Office of the Executive Vice President for Medical Affairs; the Office of the Medical School Dean; the Comprehensive Cancer Center; the Department of Pediatrics and Communicable Diseases; the Office of the Vice President for Research; the School of Dentistry; the Department of Pathology; the Department of Cell and Developmental Biology; the

College of Engineering; the Life Sciences Institute; the Department of Neurology; and U-M's Michigan Institute for Clinical and Health Research.

To see the stem cell lines currently listed in the NIH registry, visit http://grants.nih.gov/stem_cells/registry/current.htm [1] .

For more information about the A. Alfred Taubman Medical Research Institute at the University of Michigan Medical School, visit www.taubmaninstitute.org [2] .

For more information about stem cell research at U-M, visit http://www.umich.edu/stemcell [3] .

Couples who might be interested in donating embryos for U-M research, and their physicians, may learn more at http://www.stemcellresearch.umich.edu/donation/index.html [4] .

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Links:
[1] http://grants.nih.gov/stem_cells/registry/current.htm
[2] http://www.taubmaninstitute.org
[3] http://www.umich.edu/stemcell
[4] http://www.stemcellresearch.umich.edu/donation/index.html
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