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RESEARCH NEWS

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New Human Embryonic Stem-Cell Lines to be Made Available to Researchers

Howard Hughes Medical Institute researchers at Harvard University announced today that they have derived 17 new human embryonic stem-cell lines. The new cell lines will be made available to researchers, although at this time United States policies prohibit the use of federal funds to investigate these cells.

The cell lines were derived using private funds by researchers in the laboratory of Douglas A. Melton, a Howard Hughes Medical Institute (HHMI) investigator at Harvard University. The researchers described the stem-cell lines in an article published online on March 3, 2004, in the *New England Journal of Medicine* (*NEJM*). The article will also be in the March 25, 2004, print edition of *NEJM*.

Human embryonic stem cells have the potential to yield treatments for several devastating human diseases, as well as to enhance understanding of human development. “Studies of embryonic stem cells in several different organisms indicate that these cells have the capacity to give rise to nearly all of the cell types present in an adult organism,” Melton said. “The cell lines that we are making available are robust, they grow well and are easy to handle.”

"We hope that sharing these cells will quicken the pace of discovery."
- Douglas A. Melton

In 2001, Harvard University, HHMI and Boston IVF began a collaborative research effort that sought to realize the great therapeutic promise offered by human embryonic stem cells. Melton, Andrew P. McMahon, Chad A. Cowan, the article's lead author, and colleagues at Harvard worked with Douglas Powers and scientists from Boston IVF to produce the supply of human embryonic stem cells. Boston IVF supplied Melton and his colleagues with the excess, pre-implantation frozen embryos from which the stem-cell

lines were derived.

Funding for the research and construction of the research facilities in which the stem-cell lines were derived was provided by HHMI, Harvard and the Juvenile Diabetes Research Foundation. Melton has been an employee of HHMI for nearly 10 years.

Melton is hopeful that the availability of the new cell lines will speed research developments in the area of stem cell biology. “Consistent with the general practice among academic scientists, these cells are a reagent that will be shared,” said Melton. “We hope that sharing these cells will quicken the pace of discovery.”

Melton's laboratory will use the stem-cell lines to pursue their interest in type 1 diabetes. His research team has been studying the insulin-producing pancreatic beta cells that are missing in patients with type 1 diabetes, which commonly afflicts children. His group's long-term goal is to learn how to direct the differentiation of human embryonic stem cells, so that they can generate pancreatic beta cells that can be used as a therapy for type 1 diabetes.

The availability of the cell lines should provide a boost to stem cell researchers worldwide. According to the National Institutes of Health, there are about 15 human embryonic stem cell lines available for researchers in the United States who are doing federally funded research. The International Society for Stem Cell Research (ISSCR), an independent, non-profit organization formed to foster the exchange of information about stem cell research, says the number of available human embryonic stem cell lines is a matter of some debate. The ISSCR Web site states that only about 8-10 cell lines in total are currently widely accepted as true human embryonic stem cells.

The techniques used by Melton and his colleagues to derive the human embryonic stem cell lines were based, in part, on technology developed decades ago for mouse embryonic stem cells and more recent work by Ariff Bongso at National University Hospital in Singapore and James A. Thomson and his colleagues at the University of Wisconsin, Madison. Melton noted, however, that in the course of their experiments, they discovered an easier way to tease stem cells free from surrounding tissues by using enzymes. “One of the things our paper shows is that it's possible to select for cells that can be easily grown by using enzymes rather than by the tedious process of hand-dissecting them,” Melton said. “I would anticipate that in the future, researchers would use this method.”

Distribution of the cell lines will be handled through Melton's HHMI laboratory at Harvard. Melton said it is difficult to anticipate how much demand there will be for the cells, but he is confident that his group is ready to meet that demand. “We are planning to distribute [the cells], to the extent

possible, more or less the same way that we distribute any reagents we publish, be it a DNA clone or any other cell line."

Researchers requesting the cells will do so according to directions that can be found on a Web site run by Melton's group, which can be viewed at http://www.mcb.harvard.edu/melton/hues. After the request is received by staff in Melton's lab, it will be forwarded to the Office for Technology and Trademark Licensing at Harvard University. Researchers requesting stem cells will receive a material transfer agreement from Harvard, which they must complete and return to Harvard before the cell lines are shipped. At this time, researchers will not be charged any fees for the stem cells beyond the actual shipping costs to their institution.