

LifeCell – Daily News Update

August 13 , 2009

Key Industry News:

Publication	edition.cnn.com
Headline	Stem cells may offer promise for damaged hearts
Gist of the article	<p>In a field largely still in its infancy, scientists are making headway toward using stem cells to treat heart ailments.</p> <p>The FDA regulates which adult stem cell techniques are allowed to go into clinical trials.</p> <p>The FDA regulates which adult stem cell techniques are allowed to go into clinical trials.</p> <p>The major focus of stem cell research in cardiology is promoting regeneration of the heart or preventing scar formation, said Jeffrey Karp, who runs a stem cell biology lab at Harvard University.</p> <p>One study reporting successful results in humans involves harvesting patients' own stem cells, purifying them, and injecting them directly into the heart muscle. The stem cells have a surface marker called CD34, which means they are capable of growing new blood vessels.</p> <p>The study, sponsored by Baxter Inc., is the largest adult stem cell study for heart disease in the U.S., said Dr. Douglas Losordo, cardiologist at Northwestern Memorial Hospital in Chicago, Illinois, who is leading the trial. The researchers will present their one-year findings from Phase II of the trial in September, Losordo said.</p> <p>"It's important to point out that this is a use of a patient's own body's repair capabilities," Losordo said.</p> <p>If everything goes well, it's conceivable this treatment could be widely available in a little over four years, he said. The target patient population, consisting of end-stage cardiac patients who have tried all other available therapies, is about 300,000 to 900,000 people, he said.</p> <p>So far, researchers have not found side effects from this method, Losordo said. However, because it is an invasive surgical procedure in which stem cells are delivered through a catheter, there is a risk of perforation of about 1 percent, he said. There is also a small risk of blood clotting from the drug, GCSF, which mobilizes stem cells.</p>

Injecting stem cells into the heart muscle carries the risk of arrhythmia, said Techung Lee, associate professor of biochemistry at the State University New York at Buffalo. But Losordo said this risk is theoretical in his trial, and is believed to be very low with CD34 cells in general.

Lee and colleagues are working on a less-invasive technique. In a study in mice, they injected stem cells from bone marrow into skeletal muscles of limbs. They found that the stem cells produced growth factors that traveled to the heart, in addition to stimulating the muscle itself to make growth factors that also improved cardiac function.

The challenge for translating this method to humans would be that, while each mouse needed only a few million stem cells, each human patient would need close to a billion stem cells for the therapy -- which would be far too expensive and logistically difficult.

"This is a problem that's been experienced by everyone in the field," Lee said. He estimates that his method could be available clinically in five years, after researchers find ways to reduce the required number of cells by a factor of 10 or even 100.

Another therapeutic possibility is giving a patient an IV of stem cells, which would come from a stem cell bank or a company. The challenge is that the cells may not have the right homing receptors to land in the heart, Karp said.

Karp's group is working on an approach to chemically modify the surface of cells to enhance their targeting to specific sites. Results from animal models have shown promising results for targeting sites of inflammation, he said.

"Essentially we know the ZIP code of vessels within a certain tissue, we can program the address on the surface of the cell," he said.

Lee's and Karp's teams use adult mesenchymal stem cells, which may develop into connective tissue, lymphatic tissue, and blood vessels. These stem cells are largely interchangeable between patients and don't require matching, as organ transplants do. However, as more becomes known about the relatively new field of stem cell therapy, a more specific matching system may be required, said Dr. Joon Lee, cardiologist at the University of Pittsburgh Medical Center.

Some stem cell therapies for the heart are being tested in human clinical trials. Osiris Therapeutics Inc. is enrolling patients in a phase II trial for Prochymal, which contains mesenchymal stem cells. The company intends to use this drug, which gets injected into the vein, to repair heart damage in patients who have just experienced their first heart attack.

Publication	economictimes.indiatimes.com
Headline	Human clinical trials for stem-cell research on cards
Gist of the article	<p>In what is seen as a boost to the stem cell research in the country, India would soon get to host human clinical trials for therapies using umbilical blood cord (UBC) stem cell.</p> <p>Chennai-based Apollo Hospital, America's largest stem cell company StemCyte and Dr Wise Young, a leading expert on spinal cord injury, are in talks for conducting clinical trials in India using stem cell derived from UBC. The companies may ink an agreement by the end of this year.</p> <p>On Thursday, StemCyte announced setting up of StemCyte India Therapeutics (SCITPL), a joint venture with Ahmedabad-based pharma major Cadila Pharmaceuticals and Apollo Hospital. SCITPL will have its headquarters in Ahmedabad and the facility will be functional by the year-end.</p> <p>Clinical trials using UBC stemcell therapy would be carried out in three areas – thalassemia, muscular dystrophy and spinal cord injuries. Initially, the phase III trials would start for therapies to treat spinal cord injuries. The phase I & II trials have already been conducted in the US and China.</p> <p>While Bangalore-based Stempeutics Research recently got the clearance from the Drug Controller General of India (DCGI) to conduct trials for developing drugs using stem cells derived from the bone marrow of healthy donor, the latest move by StemCyte involves the use of UBC stem cell.</p> <p>Talking to ET, Dr Wise Young who is professor in Rutgers, the State University of New Jersey, said: "We had initial talks to conduct clinical trials using stem-cells derived from UBC in India. Hopefully, by the end of next year, we should begin our clinical trials here."</p> <p>According to StemCyte India Therapeutics president Tushar Dalal, the three parties met in New Delhi on Wednesday and had a video conference with Apollo chairman Pratap Reddy. "Dr Reddy has expressed his willingness and would come forward to undertake this project. StemCyte would provide UBC stem cells and its technology, while Apollo Hospital would provide its infrastructure and manpower for the trials," Mr Dalal said. A tripartite agreement is likely by this year-end, he said. Dr Young would head the trials.</p> <p>StemCyte has patented the plasma depletion technology that helps in collecting higher volume of stem cells and better cell counts, resulting in successful therapeutic applications for over 70 diseases. The location of the trials is significant, as India has a huge number of thalassemia patients. According to Dr Young, about 35% of the Indian population carries thalassemia genes and there is possibility of one-fourth of the children being</p>

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Publication	genomeweb.com
Headline	<u>Researchers Report Most Extensive Phosphoproteome Study of Human Embryonic Stem Cells</u>
Gist of the article	<p>Using phosphoproteomic technologies and methods, researchers in California have completed what they consider to be the most extensive study of the phosphoproteome of human embryonic stem cell tissue, providing a roadmap to better understand the mechanisms that control differentiation in stem cells and a basis for continued research leading to potentially new clinical therapies.</p> <p>Described in a study published in the Aug. 7 issue of Cell Stem Cell, the research, which took four years, resulted in a catalog of 2,546 phosphorylation sites on 1,602 phosphoproteins, a several-fold increase over previous numbers. Prior to the study, the number of phosphorylation sites and phosphoproteins for human embryonic stem cells, or hESCs, numbered a "few dozen," Laurence Brill, first author on the study and senior scientist at the proteomics facility at the Burnham Institute for Medical Research, told ProteoMonitor this week.</p> <p>In their study, Brill and his co-authors said that hESCs are "a model developmental system that may have potential clinical value for mitigating diseases," but the mechanisms involved in deciding whether stem cells divide or differentiate are "not well defined."</p> <p>In addition to transcriptional and translational regulation, protein phosphorylation controls cell fate determination, but protein phosphorylation has not been well-characterized in pluripotent cells, which, because they are undifferentiated and capable of being manipulated into different cell types, are of the greatest interest for the purposes of clinical therapeutic development.</p> <p>To address this, Brill and his colleagues performed a multidimensional liquid chromatography, mass spec-based phosphoproteomic analysis of undifferentiated hESCs and their differentiated derivatives. What they found was that a large number of regulators including epigenetic and transcription factors are phosphorylated in hESCs, suggesting proteins may play a crucial role in the fate of stem cells.</p> <p>Although some proteins have previously been implicated in hESC renewal, their functions were unclear. By significantly increasing the number of known phosphorylation sites, "our results expanded the repertoire of pathways that facilitate hESC culture and support the suggestion that multiple signaling inputs are needed to maintain undifferentiated hESCs,"</p>

	<p>the authors wrote.</p> <p>While Brill said that stem cell-based therapeutics are still several years away, "as phosphoproteins controlling pluripotent behavior are understood better, methods for developing model systems with stem cells, and potential therapeutic applications, may become increasingly clear."</p>
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Publication	latimes.com
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Headline	<u>Study confirms limits on stem cell research</u>
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Gist of the article	<p>Only a handful of available embryonic stem cell lines have been used by scientists, an analysis finds, attributing the figures in part to Bush-era policies.</p> <p>Scientists have long complained that the Bush administration's stem cell funding policy restricted their research to only a handful of human embryonic stem cell lines. A study published Friday in Nature Biotechnology confirms that the majority of lab experiments over the last decade has indeed focused on two or three cell lines -- the result of choices made by both President George W. Bush and the scientists themselves.</p> <p>Researchers from Stanford University, the Mayo Clinic and the University of Michigan analyzed all 1,217 requests for stem cell lines that were made to the National Stem Cell Bank between 1999 and 2008. What they found was "far less diversity of materials than most believe," they wrote.</p> <p>Though the Bush administration said the bank maintained 21 cell lines eligible for funding from the National Institutes of Health, three of those lines have never been available to researchers, and a fourth line just became usable this year, the researchers said.</p> <p>Of the remaining 17 cell lines, more than three-quarters of all requests from scientists involved just two. The H1 line accounted for 39% of the orders, and the H9 line made up an additional 38%, according to records from the stem cell bank. The only other line that has been requested more than 100 times is H7. Nine of the lines haven't even made it into the double digits. It's not clear if only those three lines were easy to work with, or if they were favored for other reasons.</p> <p>The researchers also examined requests for human embryonic stem cell lines developed and maintained by the Harvard Stem Cell Institute. Harvard offers 28 cell lines, though the researchers focused on the 17 that have been available since 2004. (The others were too new to have been requested very often, they reasoned.) None of the Harvard lines could be used in NIH-funded experiments until the Obama administration's more expansive funding policy took effect last month.</p> <p>There was considerably more diversity in Harvard's 946 shipments, according to the study. The two most popular cell lines accounted for only</p>
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25% of requests.

The researchers also scanned 534 stem cell studies published in peer-reviewed journals between 1999 and 2008. The H9 cell line appeared in 83% of studies, while the H1 line was in 61% and H7 was in 24%. Less than 36% of the publications included any of the other NIH lines.

The Harvard lines showed up in fewer than 3% of the studies, according to the analysis.

The researchers speculated that scientists using federal funds might have been more conservative about their experiments and thus tended to cluster around the most popular NIH-approved lines. The pattern might also reflect a "first-mover advantage," because laboratories seeking to replicate previous experiments would strive to use the same materials.

"The lasting legacy of Bush-era policies," the researchers concluded, is a human embryonic stem cell field "that relies very heavily on a small number of well-used but less than ideal cell lines."