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1. Switching On The Power Of Stem Cells

20 August, 2009

Scientists have uncovered a vital link in the chain of events that gives stem cells their remarkable properties

Researchers from the Wellcome Trust Centre for Stem Cell Research at the University of Cambridge have pinpointed the final step in a complex process that gives embryonic stem cells their unique ability to develop into any of the different types of cells in the body (from liver cells to skin cells). Their findings, published in the journal *Cell*, have important implications for efforts to harness the power of stem cells for medical applications.

In the last few years, huge strides have been made in stem cell research. Scientists are now able to transform adult skin or brain cells into embryonic-like stem cells in the laboratory. Just like natural embryonic stem cells, these reprogrammed cells can make all the body's cell types. This extraordinary ability is known as pluripotency – 'having several potential outcomes'. It is the basis for the hope that stem cells will one day help fight illnesses like diabetes, Parkinson's or Alzheimer's disease.

Despite such exciting developments, scientists still have only a very basic understanding of how cells become pluripotent. Dr Jose Silva, who led the Cambridge research with his colleague Dr Jennifer Nichols, says: "Exactly how pluripotency comes about is a mystery. If we want to create efficient, safe and reliable ways of generating these cells for medical applications, we need to understand the process; our research provides additional clues as to how it occurs. "

The researchers, funded by public and charitable sources, studied how the rather poetically named protein Nanog helps give cells pluripotency. Nanog takes its name from the celtic phrase 'Tir Nan Og', or 'land of the ever young'. It was identified as a key player in pluripotency in 2003, but until now its exact biological role remained unclear.

Dr Silva says: "It was clear that Nanog was important, but we wanted to know how it works. Our research shows that this unique protein flips the last switch in a multi-step process that gives cells the very powerful property of pluripotency."

Without Nanog, cells remain in a sort of half-way house. As a result, the embryo can't develop and attempts to reprogramme adult cells fail.

But Nanog does not work alone. It appears to be the conductor in charge of an orchestra of genes and proteins that must all play at the right time and in perfect harmony to create pluripotency. Dr Silva added: "The next challenge is to find out exactly how Nanog influences all these other molecules."

This research was supported by the Wellcome Trust, the Biotechnology and Biological Sciences Research Council, and the EC Framework 7 project EuroSyStem.

2. New grants awarded to boost California stem cell research

21 August, 2009

The California Institute for Regenerative Medicine (CIRM) announced that it has awarded more than 10 million U.S. dollars in grants to promote stem cell research.

The grants, which will go to three universities in Southern California, are intended to generate new ideas for future therapies and lead to advances in understanding the basic mechanisms underlying stem cell biology, cellular plasticity and cellular differentiation,the CIRM said.

Alan Trounson, CIRM president, said the grants will help maintain the flow of ideas entering the research pipeline.

"These basic biology grants will generate new ideas for future therapies and also provide information to help overcome barriers in bringing therapies to patients," he said.

Grants of at least 1.3 million dollars each were awarded to the University of California in Los Angeles (USLA), the University of Southern California (USC) and the University of California in San Diego (UCSD), the CIRM said.

Pera, director of the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at USC, said the funds should give new insight into how embryonic stem cells multiply in the laboratory and how they become specialized tissues.

"The scientists will also learn more about the reverse of this process, specifically how cells from adult tissues can undergo conversion to a state resembling embryonic cells," he said. "These findings will help in large-scale production of various specialized cells for use in research or the treatment of disease. "

Given their unique regenerative abilities, stem cells offer potential for treating diseases such as diabetes and heart disease.

CIRM was established in 2004 with the passage of Proposition 71, the California Stem Cell Research and Cures Act.

The statewide ballot measure, which provided three billion dollars in funding for stem cell research at California universities and research institutions, was approved by voters, and called for the establishment of an entity to make grants and provide loans for stem cell research, research facilities, and other research opportunities.

To date, the CIRM governing board has approved 294 research and facility grants totaling more than 761 million dollars, making CIRM the largest source of funding for human embryonic stem cell research in the world, the CIRM said.

3. Lawsuit charges that NIH embryonic stem cell funding policy violates federal law

21 August, 2009

A federal lawsuit seeking to overturn the National Institutes of Health (NIH) guidelines for public funding of human embryonic stem cell research was filed on 19TH August. The suit claims the regulations violate a federal law which bars the institute from funding research in which human embryos are destroyed.

Plaintiffs in the suit include the Christian Medical Association (CMA) and embryo adoption agency Nightlight Christian Adoptions. Dr. James L. Sherley, a senior scientist at the Boston Biomedical Research Institute and Dr. Theresa Deisher, founder of AVM Biotechnology, are also parties to the suit.

The Alliance Defense Fund is serving as co-counsel on the case and is providing financial support.

Thomas G. Hungar, a lawyer for the plaintiffs, said the language of the statute is "clear."

"It bans public funding for any research that leads to the destruction of human embryos. NIH's attempt to avoid Congress's command by funding everything but the act of 'harvesting' is pure sophistry. The guidelines will result in the destruction of human embryos and are unlawful, unethical, and unnecessary."

The Dickey-Wicker Amendment has been part of the annual appropriations bill for the Department of Health and Human Services in every year since 1996. It bars federal funding for the creation of a human embryo or embryos for research purposes and also research in which a human embryo or embryos are "destroyed, discarded, or knowingly subjected to risk of injury or death."

The lawsuit argues that the NIH guidelines violate the law because they "necessarily condition funding on the destruction of human embryos."

The plaintiffs also allege that the NIH guidelines were invalidly implemented. They charge that the decision to fund embryonic stem cell research (ESCR) was made without the proper procedures required by law and without properly considering other forms of adult and induced pluripotent stem cell research.

Sherley, an expert stem cell researcher and former Massachusetts Institute of Technology professor, said that stem cells derived from human adults and other sources present "the same if not greater potential for medical breakthroughs without any of the troubling legal and ethical issues related to embryonic stem cell research."

The NIH promulgated its guidelines with a "preconceived determination" to fund ESCR without considering "scientifically and ethically superior alternatives," the plaintiffs' legal team charged.

Dr. David Stevens, executive director of the 16,000-member Christian Medical Association, said his organization is opposed to the "illegal and unethical federal funding of destructive embryo research." Funding the research would compel every American to cooperate with "unlawful human experimentation" and would violate fundamental research ethics never to lethally experiment on one human being for the benefit of others.

Sam Casey, co-counsel for the plaintiffs and general counsel of Advocates International's Law of Life Project, reported that the majority of the 50,000 comments that the NIH received were opposed to funding ESCR.

"The so-called spare human embryos being stored in IVF clinics around the United States are not 'in excess of need,' as the NIH in its guidelines callously assert. They are human beings in need of biological or adoptive parents," Casey commented.

4. Health Ministry of Malaysia Targets 10,000 Units Of Cord Blood Next Year

20 August, 2009

The Health Ministry is targeting to have 10,000 units of umbilical cord blood by the end of next year as it promises the treatment of many important disease such as leukaemia and lymphoma.

Minister Datuk Seri Liow Tiong Lai said that currently Malaysia had only 3,000 units of umbilical cord blood in the National Blood Bank.

More cord blood was needed for successful compatibility match-ups between donor and recipient, he told reporters after opening the Stem Cell Research and Therapy Seminar at the Ampang Hospital here Thursday.

"About 70 to 80 leukaemia patients have recovered after undergoing haemopoietic stem cell transplant from umbilical cord blood compared with using chemotherapy and other cancer treatments," Liow said.

He also said that the National Transplant Registry 2007 reported that 1,312 haemopoietic stem cell transplants had been performed and registered in the country and 37 per cent of them were performed in government hospitals. "Presently we have 12 centres performing haemopoietic stem cell transplants in the country such as the Paediatric Institute of the Kuala Lumpur Hospital, Ampang Hospital and Universiti Kebangsaan Malaysia Medical Centre," Liow added.

He encouraged parents to store umbilical cord blood of their babies either in government or private hospitals but it would be used for difference purposes.

"The government hospital will use umbilical cord blood depending on patients' needs, no matter whether the donors and patients are related or not, while the private hospital will use it only among donors' families or for the donors themselves," he said.

Since last year, the government has restricted the licensing of private stem cell companies in the country to only four and these companies collect and store umbilical cord blood and peripheral blood stems cell for newborns and their parents.

"They charge an initial fee of up to RM2,800 per client and an annual maintenance fee of RM250. Some also charge a deposit of up to RM800," Liow said.

Earlier he launched the national guidelines for conducting stem cell research and therapy which were produced in collaboration with the ministry, academicians and various expertise from both government and private hospitals.

The books published are Guidelines for Stem Cell Research and Therapy, National Guidelines for Haemopoitic Stem Cell Therapy, National Standards for Stem Cell Transplantation: Collection, Processing, Storage and Infusion of Haemopoietic Stem Cell and Therapeutic Cells and National Standards for Cord Blood Banking and Transplantation.

5. Cleveland: NE Ohio stem cell research is cutting edge

19 August, 2009

The scientists in the laboratories at Case Western Reserve University, University Hospital, and the Cleveland Clinic don't usually make big splashy headlines. But the work quietly going on in Cleveland for the last 20 years has propelled Northeast Ohio into the forefront of stem cell research around the world.

"Well, people really listen to us, nationwide and worldwide, frankly," said Dr. Stanley Gerson, Director of the UH Ireland Cancer Center and also Director of the Center for Stem Cell and Regenerative Medicine.

Added Gerson, "That's why we have so many people from across the country and across the world here in Cleveland for this great three-day conference."

More than 200 of the world's leading researchers and stem cell scientists are gathering for "MSC2009" at the Marriott Key Center in downtown Cleveland.

The idea is to bring together investigators of adult and neonatal stem cells to share the latest advances and innovations of cell-based therapies.

Many cancer patients, like Nick Olbrysh, of Parma Heights, know all about the work at the Center for Regenerative Medicine and Adult Stem Cell Therapy.

Nick is alive because of a stem cell transplant last year performed in Cleveland. Nick smiles when asked about his good fortune for living so close to the stem cell research.

"I think about it," said Olbrysh, "and tell myself, 'boy, am I lucky.'"

Dr. Katarina LeBlanc traveled from the Karolinska Institute in Stockholm, Sweden for the conference. LeBlanc is a professor of clinical stem cell research in the hematology department.

"This work has really grown and Cleveland is still at the forefront of all the research and where it all started," said LeBlanc.

Cleveland stem cell pioneers, like Dr. Arnold Caplan, have been leading the way in the cutting-edge adult stem cell research for 20 years.

Caplan has been on the CWRU faculty for 40 years. Caplan beamed when asked about the overwhelming response of the scientific community to the stem cell work initiated in Cleveland.

"Oh, I love it," said Caplan. "I like to say that I wish my mother could come back and spend a day. Wouldn't she be proud?"

6. FDA Delays Geron's Human Embryonic Stem Cell Research Trials, Seeks Data

18 August, 2009

The Food and Drug Administration is delaying a bid by biotech company Geron to become the first to conduct human trials with embryonic stem cells. The move is drawing applause from pro-life advocates who oppose the use of the cells because they involve the destruction of human life to obtain.

Geron officials said today that the FDA is reviewing new data from studies of the therapy, called GRNOPC1, in its use with animals.

Scientists and pro-life advocates say human embryonic stem cells are not ready for trial because problems associated with the cells in animals haven't been solved. The embryonic stem cells still cause tumors and have issues with the immune system rejecting the injection of the cells.

Geron had planned to begin the trials this summer but said it will halt that pending the FDA review and did not know how long it would take the regulatory agency to conduct its evaluation.

The FDA initially cleared the trials in January, which would involve 8 to 10 patients.

Embryonic stem cell research has never cured or helped any patients to this point. Only the use of adult stem cells and treatments derived from them have cured or reduced the effects of any diseases or conditions afflicting patients.

Geron Corp., based in California, will use the treatment with 10 spinal cord patients with injuries the company hopes to treat with an experimental drug containing embryonic stem cells.

The patients in the trial will be ones who can receive treatment within 14 days after a spinal cord injury has left them paralyzed. They will need to be followed for a year to determine if the treatments had any effect.

Evan Snyder, a neuroscientist who heads up the stem cell research center at the Burnham Institute for Medical Research in San Diego, warns that the research may not be ready for humans.

"There's a lot of debate among spinal cord researchers that the pre-clinical data itself doesn't justify the clinical trial," Snyder, who is working on using neural stem cells himself, says.

Snyder says the mice Geron used to conduct pre-human trial research had more excessive injuries that scientists would normally prefer to see prior to trying the procedure on human patients.

He suggests that Geron should have done experiments involving larger animals before seeking FDA permission to use the controversial embryonic stem cells in humans.

Those concerns existed as early as 2005 and may not have been addressed.

Snyder said then that Geron should do more animal testing first to make sure the tests would be on the same injuries humans have.

"I'm not convinced they have done that yet," Snyder said.

Jerry Silver, a neuroscience professor and stem-cell researcher at Case Western Reserve University in Cleveland, told Knight Ridder back in November 2005 that Geron was moving too fast and needed to do more tests on animals before seeking human patients.

"Frankly, I cannot conceive of a human trial with the use of human embryonic stem cells following immediately from experiments in rodents only," he said then. "Many treatments that work in rodents to alleviate disease fail miserably in humans."

Bioethicst Wesley J. Smith said in January that he's concerned the FDA didn't make Geron offer more proof its experiments were ready for human trials.

"Why wouldn't the FDA require such work as they usually do in approving new drugs? Indeed, when the FDA said no to Geron last year, I expected successful larger animal work would be a necessary precondition to obtaining the FDA's approval," he said.

Smith is worried the decision may have been made for political rather than scientific reasons -- ironic given Obama's complaint that the Bush administration did the same thing.

He said some noted the decision may have been political "coming as it did within days of the change of the presidential guard."

"I wasn't among those, but perhaps I should have been more cynical," he says. "The FDA should be above politics. I hope that it was in this case. Otherwise, if things go wrong, the moral consequences will be on the commissioners' heads."

7. Stem Cell ask regents for help

23 August, 2009

Victorian stem cell scientists from Monash University have modified a human embryonic stem cell (hESC) line to glow red when the stem cells become red blood cells. The modified hESC line, ErythRED, represents a major step forward to the eventual aim of generating mature, fully functional red blood cells from human embryonic stem cells.

The research, conducted by a team led by Professors Andrew Elefanty and Ed Stanley at the Monash Immunology and Stem Cell Laboratories that included scientists at the Murdoch Children's Research Institute, was published in the August 24 issue of the prestigious journal,*Nature Methods*. The work, funded by the Australian Stem Cell Centre (ASCC), will help scientists to track the differentiation of embryonic stem cells into red blood cells.

Whilst hESCs have the potential to turn into any cell type in the body, it remains a scientific challenge to reliably turn these stem cells into specific cell types such as red blood cells. The development of the ErythRED embryonic

stem cell line, which fluoresces red when haemoglobin genes are switched on, is an important development that will help researchers to optimise the conditions that generate these cells.

Professor Joe Sambrook, Scientific Director of the ASCC said that "The elegant work of the Elefanty-Stanley group unlocks the entrance to the long sought and elusive differentiation pathway that leads to expression of adult haemoglobin genes"

"Not only will the ErythRED cell line lead to more efficient creation of red blood cells from human embryonic stem cells, but these cells are a crucial tool for monitoring the behaviour of the cells when transplanted into animal models" said Professor Andrew Elefanty.

The research was supported by the Australian Stem Cell Centre, the Juvenile Diabetes Research Foundation and the National Health and Medical Research Foundation.

8. Stem Cells a Central Topic at GTCbio's 5th Annual Modern Drug Discovery & Development Conference

19 August, 2009

TCbio's 5th Annual Modern Drug Discovery & Development Conference (to be held October 14-16, 2009 in San Diego, CA) has an important focus on Stem Cell Discovery & Development. The Stem Cell track is to deliver information regarding cutting-edge developments in all areas of stem cell research.

With the lift of the federal ban on stem cell research, new and exciting research opportunities and funding sources will arise. The 5th Annual Modern Drug Discovery & Development Summit presents its attendants with information regarding cutting-edge developments in all areas of stem cell research including the biology, medicine, applications, regulations, and business of stem cells. Recent developments in pre-clinical and clinical trials of stem cell therapy, regenerative medicine and tissue engineering, cancer stem cells, stem cell reprogramming, FDA and NIH policies regarding funding for stem cell research, and private funding from the pharmaceutical industry will be addressed. M3D is an opportunity for members of the biotech and pharmaceutical professional community to learn about the current state of stem cell research, network with high-level executives, and explore the future of stem cell R&D togeth

9. Web Entrepreneur Promotes the Stem Cell Revolution with New Blog

19 August, 2009

Bruce Higgins is the founder of www.MakeMoreStemCells.com, but when he was introduced to stem cell enhancement three years ago, he was a skeptic.

"I got a phone call from a friend who thought I might be interested in stem cell enhancement, and he asked me to take a look at the product," said Higgins. "I was apprehensive at first, but after doing some research, I got a better understanding of stem cell enhancement, and decided to try it out."

In late spring of 2006, Higgins was spending twelve and fourteen hours a day crawling around in attics and crawlspaces to install air conditioners.

"The heat was miserable, and I was also suffering from lower back and hip discomfort," said Higgins. "Then I started taking a couple stem cell enhancement capsules a day, and it was like my whole life changed over the course of a week."

Higgins felt immediate relief, with fewer aches and a feeling of liveliness that had been absent from his life for a long time. "I spent the next eight months recommending the stem cell enhancer to friends," said Higgins. "I later wound up retiring from my day job to pursue a career promoting stem cell enhancement."

In order to share his unique experience with others, and promote the product that changed his life for the better, Higgins created www.MakeMoreStemCellsInfo.com.

"Thus far I've been talking with others face to face about stem cell enhancement, but with the blog, I'm hoping to reach out to a larger audience," said Higgins. "I'll be talking about how stem cell enhancement was revealed to researchers, the science behind current stem cell research, and how people can benefit their health and their wallet with stem cell enhancers."

Higgins believes his blog will make a big difference towards promoting his website as he seeks to field questions from others, address concerns and lift the veil on stem cell enhancement.

10. Hope for Parkinson's cure stems from cell transplant

21 August, 2009

A 55-year-old Mulund resident may be the first to be cured of Parkinson's disease if an experiment by a team of doctors from Jaslok Hospital is successful

The doctors claim the disease can be cured by transplanting stem cells into the patient's brain. And they are waiting to see how Bhawarlal Jain, the first human to receive such a transplant, responds to the treatment. If Jain's operation, conducted on August 8, is a success -- which will be known after he spends 18 months in observation--it will be the first known cure in the world for the debilitating disease of the central nervous system.

Already, doctors claim that Jain is showing signs of improvement. Jain had been suffering from advanced symptoms of Parkinson's Disease for six years. The spondyilitis and joints pain began in 2004 and as the disease progressed, his movements became slow, and he had trouble walking and talking. "I managed my business until my speech became so impaired that I had to repeat everything at least four times to be understood,'' said Jain.

He came to Jaslok Hospital in February, when he was told about a new clinical study to evaluate the effect of stem cells on Parkinson's. Ten patients were to be enrolled and Jain chose to be the first volunteer. "When I heard I was going to be the first human to be treated using stem cell transplant, I was excited and scared. I had told my family that I may never return,'' said Jain.

But 10 days after the operation, both he and his family --wife, two sons, their wives and a grand-daughter--are happier. "I was scared initially but now I am happy that we opted for this operation,'' said his wife Sukhi (54). The doctors at Jaslok said they did not have to convince Jain for the transplant at all. "All we did was tell him about the procedure and he volunteered himself,'' said neurologist Pettarusp Wadia, from Jaslok Hospital.

"We chose the stem cells from the marrow of the patient's hip bone as these cells are readily isolated. They can expand in culture and the body can accept them easily. Small quantities of these cells were injected at an interval of every 1mm in his brain,'' said Dr Paresh Doshi, head of the team who performed the eight-hour-long operation.

However other neurosurgeons are sceptical. Dr Milind Sankhe from Hinduja Hospital in Mahim said, "There is no material or evidence present anywhere which suggests a stem cell transplant can cure Parkinson's. Moreover, it

will be tough to prove it is the stem cells which are responsible for the improvement in the patient.'' Added Atul Goel, neurosurgeon at KEM hospital, "Stem cell transplantation is a complex procedure. The cells have to be taken from the body, cultured in a lab, inserted in some other part of the body and then they can enter the normal functioning of the body. It can't be done in 10 days. Moreover, there is no scientific proof or literature explaining that Parkinson's can be cured this way.'

11. Nanomagnets Guide Stem Cells To Damaged Tissue

17 August, 2009

Microscopic magnetic particles have been used to bring stem cells to sites of cardiovascular injury in a new method designed to increase the capacity of cells to repair damaged tissue, UCL scientists have announced.

The cross disciplinary research, published in *The Journal of the American College of Cardiology: Cardiovascular Interventions*, demonstrates a technique where endothelial progenitor cells – a type of stem cell shown to be important in vascular healing processes – have been magnetically tagged with a tiny iron-containing clinical agent, then successfully targeted to a site of arterial injury using a magnet positioned outside the body.

Following magnetic targeting, there was a five-fold increase in cell localisation at a site of vascular injury in rats. The team also demonstrated a six-fold increase in cell capture in an in vitro flow system (where microscopic particles are suspended in a stream of fluid and examined to see how they behave).

Although magnetic fields have been used to guide cellular therapies, this is the first time cells have been targeted using a method directly applicable to clinical practice. The technique uses an FDA (U.S. Food and Drug Administration) approved agent that is already used to monitor cells in humans using MRI (magnetic resonance imaging).

Dr Mark Lythgoe, UCL Centre for Advanced Biomedical Imaging, the senior author on the study, said: "Because the material we used in this method is already FDA approved we could see this technology being applied in human clinical trials within 3-5 years. It's feasible that heart attacks and other vascular injuries could eventually be treated using regular injections of magnetised stem cells. The technology could be adapted to localise cells in other organs and provide a useful tool for the systemic injection of all manner of cell therapies. And it's not just limited to cells – by focusing tagged antibodies or viruses using this method, cancerous tumours could be much more specifically targeted"

Panagiotis Kyrtatos, also from the UCL Centre for Advanced Biomedical Imaging and lead researcher of the study, added: "This research tackles one of the most critical challenges in the biomedical sciences today: ensuring the effective delivery and retention of cellular therapies to specific targets within the body.

"Cell therapies could greatly benefit from nano-magnetic techniques which concentrate cells where they are needed most. The nano-magnets not only assist with the targeting, but with the aid of MRI also allow us to observe how the cells behave once they're injected."

This work was supported by public and charitable funding from the UCL Institute of Child Health (Child Health Research Appeal Trust), The British Heart Foundation, the Alexander S. Onassis Public Benefit Foundation and the Biotechnology and Biological Sciences Research Council (BBSRC).

12. Gene Vital To Brain's Stem Cells Implicated In Deadly Brain Cancer

18 August, 2009

Researchers from Columbia University Medical Center's Herbert Irving Comprehensive Cancer Center have identified a protein that activates brain stem cells to make new neurons – but that may be hijacked later in life to cause brain cancer in humans. The protein called Huwe1 normally functions to eliminate other unnecessary proteins and was found to act as a tumor suppressor in brain cancer.

These findings, published in the August 18 issue of *Developmental Cell*, were co-led by Antonio Iavarone, M.D., associate professor of neurology and pathology & cell biology and Anna Lasorella, M.D., assistant professor of pediatrics and pathology & cell biology, both of Columbia's Institute for Cancer Genetics at the Herbert Irving Comprehensive Cancer Center.

"By identifying the normal function of Huwe1, we were able to learn that deregulation of Huwe1 function is involved in tumor development," say Dr. Iavarone.

"This demonstrates that a gene's basic function must be understood before we can learn how it also plays a role in the development of cancer," says Dr. Lasorella.

During normal brain development, neural stem cells grow and divide rapidly before developing into neurons. To successfully change into neurons, they must remove all proteins that keep the cells in an immature, stem cell state. To understand how brain tumors develop, Drs. Iavarone's and Lasorella's teams decided that they needed to understand the development of normal neural stem cells. Their research demonstrated that Huwe1 is responsible for "crowd control" for the mechanism that regulates the stem cell mass in the developing brain – effectively weeding out unnecessary stem cell-specific proteins – and promoting neurogenesis. Without Huwe1, Dr. Lasorella discovered that in mice, too few mature neurons form in the brain, resulting in the brain failing to properly develop.

Because the stem cells and cancer cells share the capacity for rapid proliferation, but cancer cells have lost crowd control, Dr. Iavarone then looked for signs of Huwe1 alterations in human brain tumors. Compared to normal brain tissue, he found that Huwe1 activity in tumors was significantly lower than in normal brain tissue.

"The loss of Huwe1 may be an important factor in the development of brain cancer, suggesting that Huwe1 protein function may be used for new therapeutic targets to fight deadly brain cancer," says Dr. Lasorella.

"Our next step will be to analyze the structural changes in Huwe1, and research ways to restore this gene in brain tumor patients," says Dr. Iavarone. "In mice, giving Huwe1 back blocks the ability of normal stem cells to proliferate and develop tumors. We are hopeful that if we can restore Huwe1 activity in brain tumor cells resulting from Huwe1 deletion, then we can stop the tumor growth."

Considering the relevance of the new findings, the paper has been selected for feature on the cover of this Aug. 18 issue of *Developmental Cell*. The coverage image (available upon request by emailing eas2125@columbia.edu) shows the alterations of neural cells in the mouse brain carrying inactivation of Huwe1 with the superimposed molecular network responsible for those alterations. The network was assembled by the lab of research team member Andrea Califano, Ph.D., a computational biologist at Columbia University Medical Center's Herbert Irving Comprehensive Cancer Center. The Califano lab developed computational algorithms to dissect transcriptional and post-transcriptional interaction that helped the team analyze the data – pinpointing the role of Huwe1. Dr. Califano is professor of biomedical informatics and founding director of Columbia's new Systems Biology Initiative.

Brain tumors are among the most devastating cancers for both children and adults.

According to the American Brain Tumor Association, brain cancer is the leading cause of cancer-related death in patients younger than age 35. Approximately 17,000 people in the United States are diagnosed with brain cancer each year and nearly 13,000 die of the disease. The annual incidence of primary brain cancer in children is about 3 per 100,000.

Brain tumors do not discriminate. Primary brain tumors – those that begin in the brain and tend to stay in the brain – occur in people of all ages, but they are statistically more frequent in children and older adults.

Metastatic brain tumors – those that begin as a cancer elsewhere in the body and spread to the brain – are more common in adults than in children.

Brain tumors are the most common of the solid tumors in children, and the leading cause of death from solid tumors. Brain tumors are the second leading cause of cancer-related deaths in children under the age of 20. Leukemia remains the first.

There are few effective treatments for brain tumors, which are typically very aggressive –necessitating high doses of chemotherapy, which may result in neuro-deficiencies and learning disabilities in patients.

13. Stem cell researchers see red

24 August, 2009

Scientists have genetically modified human embryonic stem cells to glow red when they develop into premature red blood cells.

The research, published in today's edition of *Nature Methods*, is seen as the next step in producing artificial blood.

Stem cell researcher, Dr Andrew Elefanty, of Monash University in Melbourne, and his team inserted specific genes that code for colour, into the DNA of a manufactured stem cell line.

Stem cells are the template from which all cell types in the body form.

He says the coloured genes, known as 'reporters', highlight the emergence of certain cell types.

"What we've said to the stem cells is when you're going to turn on the gene for globin we want you to also turn on a red light."

Elefanty says fluorescing cells are a useful tool to help work out the best way to engineer specific cells.

"We learn what the right growth enhancing substances are that the body normally uses and we put those into the laboratory."

He says fluorescing cells also allows scientists to monitor the cells when they've been injected into animals.

"Sometimes it's not that easy to tell the difference between the ones you put in and the ones that were already there."

Artifical blood

Elefanty says his team are hoping the development of glowing stem cell lines will help them work out how to develop mature red blood cells faster.

But he says they are still a way off producing artifical blood that could be used in human blood transfusions.

He says his team is working with researchers in Queensland to develop ways to mature the cells, but there are still many issues to resolve.

"We've got to make sure the cells are safe, that they don't keep growing and form tumors and that the immune system doesn't reject them.