Stem Cell Worx Health News

Stem Cell Therapies Are Set To Transform Healthcare

When it comes to the advancement of stem cell therapies and stem cell education, 2014 has been a remarkable year in terms of progress. The health benefits are endless for everyone; for those with a debilitating disease; those recovering from injury or a health setback; through to the extremely fit and healthy individual who wants that cutting edge to ensure they maintain their health and vitality for many years to come.

The speed at which most scientific discoveries are made is excruciatingly slow. The good news is, for medical research, disease treatment, gene and stem cell therapy the speed at which these discoveries are now occurring is nothing short of incredible. A number of these treatments and therapies are already available to the general public either as part of a clinical trial, a simple outpatient treatment or through stem cell supplementation.

In 2013, Spanish Scientists released a pub med paper outlining nine predominant hallmarks of aging. This scientific research showed seven of the hallmarks of aging have an association at the cellular level.

Here’s a snapshot of stem cell news, research and science that has been published in the last three months.

1. **Diabetes**
   - Research into a cure for diabetes could result in an end to insulin injections.
   - It has been hailed as the biggest medical breakthrough since antibiotics.
   - Harvard researcher Doug Melton promised his children he’d find a cure.
   - Treatment involves making insulin-producing cells from stem cells.
   - Scientists hope to have human trials under way within a few years.

Scientists have hailed stem-cell research into a cure for diabetes as potentially the biggest medical breakthrough since antibiotics. This could result in an end to insulin injections, and to the disabling and deadly complications of the disease, such as strokes and heart attacks, blindness and kidney disease.

The treatment, which involves making insulin-producing cells from stem cells, was described as a 'phenomenal accomplishment' that will 'leave a dent in the history of diabetes'.

2. **Joint Pain Repair including Knee and Back Injuries – Why More Athletes are Turning To Stem Cell Treatment?**
   - In November 2014, Rafael Nadal’s Doctor announced the 14-time Grand Slam winner will receive stem cell treatment on his ailing back.
Angel Ruiz-Cotorro told The Associated Press “we are going to put cells in a joint in his spine” next week in Barcelona.

Nadal experienced severe back pain during the final of the Australian Open in January when he lost to Stan Wawrinka.

Nadal has a problem typical in tennis with a back joint, he had it at the Australian Open, and we have decided to treat it with stem cells,” Ruiz-Cotorro said. He said Nadal is expected to return to training in early December 2014.

Nadal’s fellow Spaniard Pau Gasol, center of the Chicago Bulls, received stem cell treatment on his knee in 2013.

Many professional athletes are turning to autologous stem cell treatment. It’s no surprise as the downtime is significantly shorter and for most, a lot more effective than surgery. One of the most talked about cases in the U.S.A is Payton Manning. As a quarterback in the National Football League, Manning suffered a number of hits that led to a herniation in one of the discs in his neck. Unable to throw, he had to sit out an entire season trying to rehabilitate his neck with surgeries and rest. In 2011 Manning decided to travel to Europe and there he had his own stem cells injected into his neck in an attempt to heal the disc and nerves. Soon afterwards, within a couple of months, he began throwing again. His sporting career continues and he has been playing ever since. In 2013, at the age of 37, Manning showcased the best season ever for an NFL quarterback and his 2014 season has also been very impressive.

Stem cell treatment is considered perfectly legal by many professional sports leagues. Treatments do however vary and full stem cell replacement treatment remains very restricted in the U.S.A due to FDA regulation. Many Physicians and Health Practices here in the U.S.A provide platelet rich plasma therapy and not stem cell treatment. They are different procedures.

Stem cell therapy is the gold standard. Anyone seeking full adult stem cell treatment should always check the credentials of the Doctor, the Clinic and always speak to patients who have received the same treatment administered by the same Doctor.

Why are so many athletes turning to stem cell treatment?

- It is non invasive.
- It is an outpatient procedure with virtually no downtime.
- There is almost no risk of rejection as it involves the patient’s own stem cells.
- Despite some continued skepticism (i.e. often from those who are misinformed or those who push an alternative agenda for the wrong reasons), adult stem cell clinical studies, research, reviews and testimonials provide compelling evidence.

As biologic research continues to improve, the U.S.A will become more accepting of stem cell treatments. Athletes will be able to recover from injury more quickly than ever before and not have to travel overseas to receive treatment. Leading Sports Physician, Doctor James Andrews tells Sports Illustrated: “We have had one big revelation in sports medicine over the last 50 years, and that was the arthroscope. I’ve been looking for the next wave, and I think the biologics, particularly stem-cell therapy and enhancement of the healing properties, will be it.”

### 3. Parkinson’s Disease

- Scientists have successfully used stem cells to replaced damaged neurons.
- This animal study was published in the December 2014 issue of Stem Cells Translational Medicine.
- The research team in Germany at the University of Bielefeld (UB) and Dresden University of Technology used adult human stem cells to “cure” rats with Parkinson’s disease, a neurodegenerative illness that currently has no cure.
- They were able to produce mature neurons using inferior turbinate stem cells (ITSCs). ITSCs are stem cells taken from tissue that would generally be discarded after an adult patient undergoes sinus surgery.
- The team transplanted ITSCs into a group of rats with Parkinson’s disease. Prior to transplantation, the animals showed severe motor and behavioral deficiencies.
- 12 weeks after receiving the ITSCs, the cells had migrated into the animals’ brains and functional ability was not only fully restored, but significant behavioral recovery was also witnessed. In addition, another positive sign was no tumors were found in any of the animals after the transplantations.

### 4. Multiple Sclerosis

Below are the findings from the Multiple Sclerosis and Related Disorders (MSARD) Journal. This is an international journal supported by key researchers from all neuroscience domains that focus on MS and associated disease of the central nervous
Multiple sclerosis (MS) is an autoimmune and neurodegenerative disease of the central nervous system (CNS). Stem cells (SCs) have uncovered a new view as a therapeutic tool in neurological disorders such as MS. Adult stem cells include hematopoietic stem cells, mesenchymal stem cells (MSCs) and neural stem cells. MSCs are self-replicating cells which can play a role in differentiating in multidirectional pathways, such as osteoblasts, chondrocytes, marrow stromal cells, tendon–ligament fibroblasts, adipocytes and neural cells. The MSARD Journal studied recent (2007–2014) clinical trials and reviewed articles of stem cell therapy for multiple sclerosis to achieve the best adult stem cell type and the most effective and safest route in order of managing them. According to research of data from 7 clinical trials, the MSARD Journal recommended the best stem cell to transfer to MS patients was mesenchymal stem cells and their findings reported injecting intravenously is the best way to administrate. They conclude it is clear that more studies should be done to prove efficacy and safety of these therapeutic approaches.

5. **Alzheimer’s Disease**

- Alzheimer’s is a fatal disease with no cure and no meaningful agents to delay its course. The disorder slowly robs people of their ability to remember and perform daily tasks. This leads to most sufferers requiring long term care.
- Over 5 million people in the U.S.A have Alzheimer’s; 3.2 million are women; 1.8 million are men.
- Worldwide, 35.6 million people have Alzheimer’s or a related form of dementia.
- As the baby boomer population ages, many regard Alzheimer’s as a tsunami that could swamp the nation’s health care system if a better intervention is not discovered, in part because of how costly it is to care for its victims.
- In 2014, direct costs in the U.S.A. to care for those with Alzheimer’s is estimated at $214 billion, including $150 billion in Medicare and Medicaid costs, according to the Alzheimer’s Association. By 2050, those costs are expected to soar to an estimated $1.2 trillion.

Four weeks ago the findings of University of Michigan’s Doctor Eva Feldman were reported. Feldman, a UM Professor and Neurologist began testing stem cells years ago.

Doctor Feldman pioneered the nation’s first clinical trial using stem cells in patients with amyotrophic lateral sclerosis (ALS), also known as Lou Gehrig’s disease. While Feldman’s ALS trial is not complete, it is showing promise with some participants in this human study either improving or stabilizing. This is why Doctor Feldman began an experiment to see how stem cells might fare in treating Alzheimer’s disease, another neurodegenerative disorder.

Although it's very early in the research, the Alzheimer’s experiment is producing remarkable results thus far.

Feldman reports "When you get something that works so beautifully (like this experiment), you can quickly see its translational potential. I am looking at a mouse but someday I could be looking at a man. As a clinician scientist, those are the moments you live for."

The mice that got the stem cells retained their ability to think, as a mouse does, to recognize objects so they looked just like an animal that doesn't have Alzheimer's disease," Feldman said. "It's really remarkable."

6. **Blindness and Eye Diseases**

- Stem cells implanted into human retina
- Elderly female patient receives stem cell implant at the Institute for Biomedical Research and Innovation in Kobe, Japan for age-related macular degeneration (AMD)
- Dr. Masayo Takahashi reprogrammed cells from the patient’s skin to produce pluripotent stem cells (iPS cells)

On September 12, 2014, a team of eye specialists led by ophthalmologist Yasuo Kurimoto implanted a 1.3 by 3.0 millimeter sheet of retinal pigment epithelium cells into the eye of an elderly female patient at the Institute for Biomedical Research and Innovation in Kobe, Japan. The patient suffers from age-related macular degeneration (AMD), the most common cause of
visual impairment in the elderly. AMD is characterized by gradual damage to the retinal pigment epithelium, a protective layer of cells adjacent to the photoreceptors of the retina.

This new technique reprograms the subject’s own cells, which also reduces the risk of the body rejecting the implanted tissue.

While promising, iPSC cell treatments are still new. The elderly female patient was the first of six patients planned for this human pilot study in Japan. Scientists hope to use this technology in regenerative medicine to help numerous patients. It is hoped this groundbreaking technique is the first step in a series of advances that will help millions worldwide.

7. Cancer Treatments Are Set To Change and Significantly Improve Thanks To Key Innovators Like Soon-Shiong

On December 7th, 2014 Dr. Sanjay Gupta interviewed Doctor Patrick Soon-Shiong of Los Angeles on 60 Minutes.

Dr. Soon-Shiong is frustrated with what he calls the trial and error cycle of cancer care that has existed for years and he is setting forward significant change.

Soon-Shiong was a respected surgeon before making his name in the cancer world. In the early 90s, he invented a drug called Abraxane that treats pancreatic, lung and breast cancer. Initially, few thought the drug would work and it was over a decade before the FDA approved it.

Soon-Shiong is progressing forward with a number of pathways that are far more advanced than the conventional way cancer is currently treated. He has appointed himself to lead this revolution. One of Dr Soon-Shiong’s pursuits involves cancer genome sequencing; another pathway is immunotherapy where he has customized cancer formulations that trigger T-cells that target and kill cancer cells.

One of his immunotherapy therapies combines Abraxane with other cancer drugs, and this combination is currently treating David Roy who is a participant in one of Doctor Soon-Shiong’s clinical trials. David Roy was diagnosed two years ago with stage four, metastatic pancreatic cancer. At the time he was given four and a half months to live and told to settle his affairs.

Genome sequencing is not new but what's different about Soon-Shiong's project is the scale. He has spent nearly a billion dollars of his own money to build a massive infrastructure, run by super computers, to find every single genetic mutation that could drive cancer. His plan is to do a complete genetic map of tumor cells, have the tumor biopsied, and what takes months now could be done in a day. The ultimate goal is for personalized information for each cancer patient to show up in the palm of his hand.

Patrick Soon-Shiong: 'Look, if we can figure out which mutation's driving cancer, we're gonna be able to find the drugs that treat cancer.'

Doctor Sanjay Gupta: “And what's it going to mean?”

Patrick Soon-Shiong: “Well, it's going to mean you have a better shot at having a better outcome and having a quality of life and actually turn the cancer hopefully into a chronic disease.”

Watch the full 60 minutes video here:

8. Lung Regeneration

This month a research team from The Jackson Laboratory in Connecticut said they have gained a better understanding of the inner workings of the still emerging concept of lung regeneration. Reporting on the role of certain lung stem cells in regenerating lungs damaged by disease, the study (referred to as the p63+Krt5+ distal airway stem cells are essential for lung regeneration”), published in Nature, points to therapeutic strategies that harness lung stem cells.
Dr. McKeon and his colleagues had previously identified a type of adult lung stem cell known as p63+/Krt5+ in the distal airways. In the new paper, published November 2014, the research team reports that the p63+/Krt5+ lung stem cells proliferate upon damage to the lung caused by H1N1 infection. Following such damage, the cells go on to contribute to developing alveoli near sites of lung inflammation. Alveoli are tiny sacs within our lungs that allow oxygen and carbon dioxide to move between the lungs and bloodstream. The scientists also showed that when individual lung stem cells are isolated and subsequently transplanted into a damaged lung, they readily contribute to the formation of new alveoli, underscoring their capacity for regeneration.

In the U.S. approximately 200,000 people have Acute Respiratory Distress Syndrome (ARDS), a life-threatening lung condition that prevents enough oxygen from getting to the lungs and into the blood. This disease has a death rate of 40%, and there are 12 million patients with COPD. The researchers hope their research will lead to new ways to help those with lung conditions and disease.

**In Conclusion**

Of all the stem cells, adult stem cells are providing the most promise. These stem cells work on the reversal of the aging process.

Hans Clevers is the President of the Royal Dutch Academy of Arts and Sciences (KNAW) and a world-renowned researcher into stem cells. He was the first scientist to identify intestinal stem cells and remains one of the leading researchers in this field. Hans Clevers best summarized the potential of adult stem cells when speaking at a recent TEDx audience, stating: “Cells are the working blocks of our body, our life. If they don’t work, you get ill. Stem cells are very good in one thing: they can divide and create daughter cells. Stem cells are the most basic building blocks of every organism on the planet. A human stem cell has the capacity to create a complete human being starting from a single cell. So those daughter cells create tissue for the organs in our body. So wouldn’t it be great, if we can create those cells and make organs ourselves? Wouldn’t it be a fantastic breakthrough if we could culture a new kidney for someone with renal failure? The reality is this is now only years away and no longer decades.”

Cowan, an associate professor in Harvard’s Department of Stem Cell and Regenerative Biology, this week reported: “The good news/bad news is that science is slow. Just establishing proof of concept takes an enormous amount of time. We thought that working with stem cells would lead to the discovery of new drugs and therapies, and now it’s really starting to happen. A decade of hard basic scientific work is paying off.”

*From the Stem Cell Worx Team*

Web:  [www.stemcellworx.com](http://www.stemcellworx.com)
Email:  stemcellworx@bigpond.com
Tel:  1800 665 9679 (calling within U.S.A) or +1 310-513-3002 / +1 310-513-3007 (calling from outside U.S.A)

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