Understanding Nfr2's role on muscle regeneration is essential to optimize effective strategies for muscle repair during aging, Soorappan said.

Going forward, Soorappan plans to continue his studies to see whether spontaneous exercise (active lifestyle) favors stem cells and muscle regeneration. But he's also looking into studies to see whether exercise affects Nfr2 activation in people.

Although the results of this study haven't been replicated in people yet, Soorappan believes there's a clear message for couch potatoes.

"If you don't use your muscles, you will lose them. At the same time, overdoing endurance training may detract from muscle regeneration," he cautions.

Contact: http://bit.ly/1g79bJ6

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Brain Cell Regeneration May Alleviate Symptoms Of Alzheimer's Disease

TEL AVIV, Israel, March 11, 2014 – Israeli scientists have discovered that by reestablishing a population of new cells in the part of the brain associated with behavior, some symptoms of Alzheimer's disease significantly decreased or were reversed altogether.

The research byDaniel Offen and Adi Shruster of Tel Aviv University's Sackler School of Medicine was conducted on mouse models. It provides a promising target for Alzheimer's symptoms in human beings as well.

Alzheimer's disease is the most widespread degenerative neurological disorder in the world. Over five million Americans live with it, and one in three senior citizens will die with the disease or a similar form of dementia.

While memory loss is a common symptom of Alzheimer's, other behavioral manifestations – depression, loss of inhibition, delusions, agitation, anxiety, and aggression – can be even more challenging for victims and their families to live with.

"Until 15 years ago, the common belief was that you were born with a finite number of neurons. You would lose them as you aged or as the result of injury or disease," said Offen, chief scientific officer at BrainStorm, a stem cell company. "We now know that stem cells can be used to regenerate areas of the brain."

After introducing stem cells in brain tissue in the laboratory and seeing promising results, Offen leveraged the study to mice with Alzheimer's disease-like symptoms. The gene (Wnt3a) was introduced in the part of the mouse brain that controls behavior, specifically fear and anxiety, in the hope that it would contribute to the formation of genes that produce new brain cells.

According to Offen, untreated Alzheimer's mice would run heedlessly into an unfamiliar and dangerous area of their habitats instead of assessing potential threats, as healthy mice do. Once treated with the gene that increased new neuron population, however, the mice reverted to assessing their new surroundings first, as usual.

Normal mice will recognize the danger and avoid it. Mice with the disease, just like human patients, lose their sense of space and reality. New neuronal cells were produced in the areas injected with the gene. Symptoms were diminished as a result of this neuron repopulation.

The loss of inhibition is a cause of great embarrassment for most patients and relatives of patients with Alzheimer's. Often, patients take off their pants in public, having no sense of their surroundings. We saw parallel behavior in animal models with Alzheimer's.

After concluding that increased stem cell production in a certain area of the brain had a positive effect on behavioral deficits of Alzheimer's, Offen has moved to research into the area of the brain that controls memory. He and his team are exploring it in the laboratory and are confident that the results of the new study will be similar.

Citation: "Targeting neurogenesis ameliorates danger assessment in a mouse model of Alzheimer's disease"; Adi Shruster & Daniel Offen; *Behavioral Brain Research*, 2014; 261: 193 DOI: 10.1016/j.bbr.2013.12.028

Abstract:
http://dx.doi.org/10.1016/j.bbr.2013.12.028
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Promising Stem Cell Treatment Of Degenerative Disc Disease

ROCHESTER, Minn., March 8, 2014 – Stem cell transplantation proved viable and effective in halting or reversing degenerative disc disease of the spine, a meta-analysis of animal studies showed, in a development expected to open up research in humans.

Recent developments in stem cell research have made it possible to assess its effect on intervertebral disc (IVD) height, Mayo Clinic researchers reported in a scientific poster today at the annual meeting of the American Academy of Pain Medicine.

In preclinical animal studies stem cell therapy for disc degenerative disease was shown to be a potentially effective treatment for the very common condition that affects people's quality of life and productivity.

Qu said not only did disc height increase, but stem cell transplant also increased disc water content and improved appropriate gene expression. "These exciting developments place us in a position to prepare for translation of

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stem cell therapy for degenerative disc disease into clinical trials," he said.

The increase in disc height was due to restoration in the transplant group of the nucleus pulposus structure, which refers to the jelly-like substance in the disc, and an increased amount of water content, which is critical for the appropriate function of the disc as a cushion for the spinal column, the researchers concluded.

The researchers performed a literature search of MEDLINE, EMBASE and PsycINFO databases and also manually searched reference lists for original, randomized, controlled trials on animals that examined the association between IVD stem cell transplant and the change of disc height. Six studies met inclusion criteria. Differences between the studies necessitated the use of random-effects models to pool estimates of effect.

What they found was an over 23.6 percent increase in the disc height index in the transplant group compared with the placebo group (95 percent confidence interval). None of the six studies showed a decrease of the disc height index in the transplant group. Increases in the disc height index were statistically significant in all individual studies.

The authors said it is time to turn attention to the much-needed work of determining the safety, feasibility, efficacy of IVD stem cell transplant for humans.

A hallmark of IVD degenerative disease is its poor self-repair capacity secondary to the loss of IVD cells. However, current available treatments fail to address the loss of cells and cellular functions. In fact, many invasive treatments further damage the disc, causing further degeneration in the diseased level or adjacent levels.

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Animal Study: Cord Blood Stem Cells Improved Heart Function After Heart Attack

MINNEAPOLIS, Minn., March 5, 2014 – When human umbilical cord blood stem cells were transplanted into rats that had undergone a simulated myocardial infarction (heart attack), left ventricular (LV) heart function in the treated rats was improved over those that did not get the stem cells. The animals were maintained without immunosuppressive therapy.

The researchers were investigating the long term effects of the transplantation.

Myocardial infarction induced by coronary artery disease is one of the major causes of heart attack.

Because of the loss of viable myocardium after an MI, the heart works under elevated wall stress, which results in progressive myocardial hypertrophy and left ventricular dilation that leads to heart failure.

The researchers investigated the long term effects of stem cell therapy using human non-hematopoietic umbilical cord blood stem cells (nh-UCBCs). These cells have exhibited neuro-restorative effects in a rodent model of ischemic brain injury in terms of improved LV function and myocardial fiber structure, the three-dimensional architecture of which make the heart an efficient pump.

According to the authors, stem cell therapy for myocardial repair has been investigated extensively for the last decade, with researchers using a variety of different animal models, delivery modes, cells types and doses, all with varying levels of LV functional response.

They also note that the underlying mechanisms for improvement are "poorly understood," and that the overall regeneration of muscle cells is "low."

To investigate the heart's remodeling processes and to characterize alterations in the cardiac fiber architecture, the research team used diffusion tensor MRI (DTMRI), used previously to study myofiber structure in both humans and animals.

While most previous studies have been focused on the short term effects of UCBCs, their study on long term effects not only demonstrated evidence of significantly improved heart function in the treated rats, but also showed evidence of delay and prevention in terms of myocardial fiber structural remodeling, alterations that could have resulted in heart failure.

When compared to the age-matched but untreated rat hearts with MI, the regional myocardial function of nh-UCBC-treated hearts was significantly improved and the preserved myocardial fiber structure may have served as an "underlying mechanism for the observed function improvements."

The data demonstrate that nh-UCBC treatment preserves myocardial fiber structure that supports the improved LV regional and chamber function, concluded the researchers.

Citation: "The Structural Basis of Functional Improvement in Response to Human Umbilical Cord Blood Stem Cell Transplantation"; Chen, Y et al.; *Cell Transplantation*. available online, December 10, 2013.

Abstract: http://bit.ly/1eL95l3

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