

Mesenchymal stem cells repair damage in an animal model

Researchers at Tel Aviv University have introduced and tracked mesenchymal stem cells as they migrate into the damaged areas of the brain in a neurotoxin rat model of Huntington's Disease.

Mesenchymal stem cells are multi-potent cells that can develop into a variety of cell types. They are mainly found in the bone marrow. The researchers, led by Dr. Yoram Cohen, attached magnetic iron oxide nanoparticles to the stem cells so they could be tracked using the the in-vivo MRI at the Strauss Centre for Computational Neuro-Imaging. The stem cells were then injected in to the brains of rats which had been given a neurotoxin which mimics the damage seen in Huntington's Disease.

Dr.Cohen and colleagues were able watch the stem cells migrating towards the diseased area of the brain in real time. "Cells that go toward a certain position that needs to be rescued are the best indirect proof that they are live and viable. If they can migrate towards the target, they are alive and can read chemical signaling," explains Dr. Cohen.

He describes the significance of the work. "We have been able to prove that these stem cells travel within the brain, and only travel where they are needed. They read the chemical signaling of the tissue, which indicate areas of stress. And then they go and try to repair the situation."

Mesenchymal stem cells may become an important therapy for Huntington's Disease, other neurodegenerative diseases, and stroke. A clinical trial is planned for HD patients and is expected tot start in about 18 months.

In April, Dr. Jan Nolte of the University of California, Davis, received a \$2.75 million translational grant from The California Insitute for Regenerative Medicine (CIRM). The goal of CIRM is to fund promising projects which will translate basic research into stem cells into a cure in the clinic. Dr. Nolte and colleague Dr. Vickie Wheeler will use mesenchymal stem cells in a Phase I clinical trial. As the stem cells move through the affected areas of the brain, they will merge with and repair damaged brain cells and also reduce levels of the HD protein. Mesenchymal stem cells have not been associated with tumors and appear to be immunologically privileged.

References:

Friends of Tel Aviv University press release

Ofer Sadan, Noam Shemesh, Ran Barzilay, Merav Bahat-Stromza, Eldad Melamed, Yoram Cohen, and Daniel Offen. "**Migration of Neurotrophic Factors-Secreting Mesenchymal Stem Cells Toward a Quinolinic Acid Lesion as Viewed by Magnetic Resonance Imaging.**" Stem Cells Vol. 26 No. 10 October 2008, pp. 2542 -2551.

- *Marsha L. Miller, Ph.D., August 24, 2009*