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## **Hadassah's Innovative Treatment for Neurodegenerative Diseases such as MS and ALS**

**Muscular Sclerosis (MS) and Amyotrophic Lateral Disease (ALS) impact many people around the world. Hadassah research is providing new ways to treat these two diseases.**

**Hadassah's Stem Cell Research has resulted in two different methods of treating Muscular Sclerosis and ALS that have both proven to be successful.**



- Hadassah researchers have developed a method of taking the patient's own stem cells, treating them, and then reintroducing the cells into the patient's spine. Using this method, known as "harvested stem cell infusion therapy," Hadassah has been able to show a remarkable improvement in the patient's ability to function shortly after the treatment.

At the recent 12<sup>th</sup> Annual World Stem Cell Summit in the US, Hadassah Medical Organization Senior Neurologist Prof. Dimitrios Karussis and his patient, Malia Litman, shared their personal, groundbreaking stem cell success stories in treating neurodegenerative diseases, such as multiple

sclerosis (MS) and amyotrophic lateral sclerosis (ALS). Prof. Karussis reported on his latest ALS clinical trial in which 87 percent of the patients responded positively to the treatment—either in terms of respiratory function or general motor ability, with no serious adverse effects. “I believe we are in the early stages of something new and revolutionary with this harvested stem cell infusion therapy,” related Prof. Karussis. “While this is absolutely by no means a cure for these neurodegenerative diseases, it is the first step in a long process which we anticipate will lead to a cure.”



Malia Litman explained how just three stem cell treatments brought her tremendous physical improvement. For example, she said, she was able to host 31 people for Thanksgiving, including doing cooking and baking herself, whereas before she was treated, she would have to take a nap after exerting any energy—even doing something small like taking a shower. She is now a leading stem cell research activist.



Mark Lewis, is a celebrity British lawyer, who also participated in the clinical trials for MS at Hadassah. Mr. Lewis recently stated that “I honestly feel that the treatment I received is not just life changing, it’s life giving.” He thinks it is a miracle! For the first time in many years, he can use his right arm and hand again, walk unaided, and speak more clearly. After years in a wheel

chair, he experienced a remarkable reversal of his Multiple Sclerosis symptoms within two hours of participating in a medical trial at Hadassah Medical Center using Stem Cells to treat MS.



Offering a dose of optimism, Prof. Karussis, in explaining his stem cell protocol, said: “I see this treatment as being one of the major future tools to treat degenerative diseases of the brain and spinal cord. I am confident that within the next three to five years, we may provide a treatment to patients that can stop the progression of these diseases and induce some kind of recovery.”

- A second group of researchers at Hadassah are looking at the use of Embryonic Stem Cells that are not derived from the individual patient to treat Neurodegenerative diseases. This research is quite advanced, and is at the point of going to clinical trials at Hadassah. This research is being led by Prof. Benjamin Reubinoff, Director of Hadassah's Human Embryonic Stem Cell Center and Prof. Tamir Ben-Hur, Chairman of the Department of Neurology and Director of the Division of Clinical Neurosciences at the Hadassah Medical Center.



- For those who have not been able to participate in the Hadassah Clinical trials, the used of medications for MS and ALS is standard treatment. Hadassah researchers have developed a way to predict Clinical Outcomes for Multiple Sclerosis Patients. More than two million people--two to three times more women--have multiple sclerosis (MS)--the leading cause of neurological disability among young adults. What is their prognosis?



"We don't really know what an individual's prognosis will be when we first diagnose the disease," relates Dr. Adi Vaknin, Senior Neurologist at Hadassah Hospital Ein Kerem. That is because there is so much heterogeneity in outcomes, she explains. While 15 to 20 percent of MS patients do very well, 50 to 70 percent need strong medicines to live a quality life. It is this uncertainty that has led Prof. Vaknin to start a biobank with which to study clinical outcomes for newly diagnosed patients. By identifying a set of proteins (biomarkers) within an individual's peripheral

blood, Dr. Vaknin and her research team have been able to predict, for example, a patient's response to interferon, a common treatment for MS.

- The past 15 years have seen the development of very effective medications to treat MS. Currently, Dr. Vaknin reports, there are 10 medications available, but their effectiveness varies from person to person. "There is also a limited time window to start treatment," Dr. Vaknin says, "because if you miss that window, some of the medicines are not very effective." There are, however, two new medications on the market, she notes, specifically designed to treat progressive MS.
- One common thread in MS is the degeneration of myelin, the sheath that protects the nerve fibers. Dr. Vaknin is researching the ability of certain proteins, found in the fluid surrounding the brain, to renew damaged myelin. Being able to rebuild myelin in MS patients is only in the research stage--though she estimates that "it will happen in the next five years."
- In the meantime, what advice does Dr. Vaknin have for those who suffer with MS? She recommends 2,000 units per day of Vitamin D--particularly found to be effective in preventing the occurrence of the disease in any offspring. Dr. Vaknin also suggests exercise and a healthy diet--and no smoking. She adds living a less stressful life to the list, but acknowledges that this "is not so easy to do."