

Adult Stem Cells May Help Treat Multiple Sclerosis

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LITTLE FALLS, N.J., April 24 -- Adult stem cells taken from a patient's own fat tissue may help reverse the clinical manifestations of multiple sclerosis, a preliminary study suggested.

Three patients with multiple sclerosis who received infusions of cells from the stromal vascular fraction of adipose tissue -- which contains mesenchymal stem cells -- all had improvements in their conditions, Boris Minev, M.D., of the University of California San Diego, and colleagues reported online in the *Journal of Translational Medicine*.

"While obviously no conclusions in terms of therapeutic efficacy can be drawn from these reports," Dr. Minev said, "this first clinical use of fat stem cells for treatment of multiple sclerosis supports further investigations into this very simple and easily implementable treatment methodology."

No currently available treatment for multiple sclerosis selectively inhibits autoimmune destruction of the nervous system or stimulates regeneration of damaged myelin sheaths, according to the researchers.

Mesenchymal stem cells found in adipose tissue have been shown in previous studies to stop immune activation and to specifically target areas of tissue damage, they said.

In addition to stem cells, the stromal vascular fraction of adipose tissue contains T regulatory cells, endothelial precursor cells, preadipocytes, and anti-inflammatory M2 macrophages.

Preliminary studies in horses and dogs have demonstrated the anti-inflammatory and regenerative effects of these types of cells, and the safety of implanting autologous fat tissue has been supported by its use in cosmetic surgery, the researchers said.

Dr. Minev and colleagues assessed whether infusions of cells from adipose tissue could be used to treat multiple sclerosis in three patients.

The first was a 50-year-old man with relapsing-remitting disease who suffered from frequent painful tonic flexion spasms. He had a partial response to other multiple sclerosis treatments, but the seizures persisted at a rate of about 30 to 40 a month.

He received two IV infusions of autologous stromal vascular fraction cells and multiple infusions

of allogeneic mesenchymal stem cells and CD34+ cells.

Within months, his seizures stopped and he reported improvements in cognition, memory, hearing, sexual function, energy, and generalized pain. He had almost complete reduction of spasticity in his arms and legs.

The second patient was a 32-year-old man with relapsing-remitting disease accompanied by depression and fatigue. He was treated with antidepressants and other multiple sclerosis therapies before receiving stem cell infusions.

Three months later, he reported improvements in balance, coordination, energy, mood, and overall condition. His depression resolved.

Patients 1 and 2 had repeat MR imaging that showed lesions similar to their pretreatment scans.

The third patient, also male, was diagnosed with multiple sclerosis 15 years before receiving the stem cell infusions. Over the next several weeks, he reported improvements in gait, balance, and coordination.

"He is currently reporting a still continuing improvement and ability to jog, run, and bike for extended periods of time daily," the researchers said.

The infusions were well tolerated with no serious side effects for any of the three patients.

On the basis of these preliminary results, the researchers said, "we propose controlled trials of autologous stromal vascular fraction cells in various inflammatory conditions."

Two of the study authors are members of the management team and shareholders of Medistem, which has filed intellectual property claims on the use of adipose stromal vascular fraction cells for immune modulation.

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Riordan N, et al "Non-expanded adipose stromal vascular fraction cell therapy for multiple sclerosis" *J Transl Med* 2009; DOI: 10.1186/1479-5876-7-29.