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Stem Cell Transplantation Produces Remarkable Therapeutic Effects on Neuropathic Pain in Animal Models

March 16, 2017, ORLANDO, Fla. – Chronic pain from nerve injury is common and often debilitating. Current treatment options for neuropathic pain include physical, cognitive, behavioral, pharmacological, interventional, and surgical therapies. Unfortunately, none of these therapies is particularly effective, according to Jianguo Cheng, MD PhD, professor of anesthesiology and director of the Cleveland Clinic Multidisciplinary Pain Medicine Fellowship Program.

A recent study presented today by Dr. Cheng and his colleagues in a scientific poster at the 33rd Annual Meeting of the American Academy of Pain Medicine suggests that mesenchymal stem cell transplantation (MSC-TP) may offer an alternate and promising solution to alleviate neuropathic pain based on results achieved in animal models.

The study investigated whether the sources of MSCs and routes of transplantation affect the therapeutic efficacy in rats in order to translate laboratory findings into clinical applications. Researchers isolated and characterized bone-marrow-derived MSCs (BM-MSCs) and adipose-derived MSCs (AD-MSCs) by flow cytometry and functional differentiation. Rats with chronic constriction injury (CCI) of the sciatic nerve were treated with either intravenous (IV) or intrathecal (IT) transplantation of BM-MSCs or AD-MSCs.

The therapeutic effects were evaluated by paw withdrawal thresholds in response to mechanical and thermal stimuli and immunohistochemistry of the sciatic nerve and dorsal root ganglion (DRG). Both BM-MSCs and AD-MSCs produced powerful analgesic effects. Either IT or IV MSC-TP produced significant long-lasting analgesic effects. MSCs substantially decreased the number of NPY+ fibers (injured fibers) and restored the expression of CGRP in peptidergic C fibers and IB4 in non-peptidergic C fibers in the sciatic nerve and DRG. MSCs decreased inflammatory cell infiltration (monocytes/macrophages) at the sciatic nerve injury site and the

DRG. A substantial number of MSCs, labeled with Dil dye, were found at the injury site after either IV or IT MSC-TP.

“This novel therapy may be translated to clinical applications to treat many neuropathic pain conditions that afflict millions of Americans,” says Dr. Cheng. He noted that preclinical and translational studies using human stem cells are needed before clinical trials in humans.

Poster 239 – Stem Cell Transplantation for Neuropathic Pain in Rats

About AAPM

The American Academy of Pain Medicine is the premier medical association for pain physicians and their treatment teams with some 2,000 members. Now in its 34th year of service, the Academy’s mission is to optimize the health of patients in pain and eliminate pain as a major public health problem by advancing the practice and specialty of pain medicine through education, training, advocacy and research. Information is available on the Academy’s website at www.painmed.org.

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