

Stem cells and exosomes as treatment for Peripheral Neuropathy:

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Overview:

Diabetic neuropathy is one of the most common and serious complications of diabetes mellitus and metabolic syndrome. Diabetic peripheral neuropathy (DPN) is one of the major complications of diabetes, which contributes greatly to morbidity and mortality. The current therapy strategies, which consists of tight glucose control and pain management, are not effective for many patients. Growing evidence suggests that infiltration of inflammation factors and deficiency of local neurotrophic and angiogenic factors contribute significantly to the pathologies of diabetic neuropathy. These conditions are hopefully reversible to some degree.

Diabetes mellitus also could lead to **autoimmune abnormality**, which is a major cause of inflammation in the nerves and subsequent nerve damage. In one recent study, researchers found that blood serum autoimmune antibodies were significantly present in the patients with peripheral diabetic neuropathy.

Microvascular insufficiency in diabetes mellitus may also contribute to the pathogenetic mechanism in nerve neuropathy. The adequate blood supply from microvessels is crucial to maintain the normal structure and function in nerves.

BMAC Stem Cells:

Experimental and clinical studies have shown that bone marrow-derived stem cells (BMCs) therapy may represent a novel and promising strategy for tissue repair through paracrine secretion of multiple cytokines, which has a potential to inhibit inflammation and promote angiogenesis and neurotrophs in diabetic neuropathy. Current research suggests the functional restoration of BMCs could

improve the therapeutic effect and enable their wide applications in diabetic neuropathy (Lui, W et al, 2017).

Animal research-Exosomes:

Exosomes are cell derived nanovesicles that play an important role in intercellular communications. Fan et al, group showed that Mesenchymal stromal cell derived exosomes demonstrated some benefit in ameliorating peripheral neuropathy symptoms in a mouse model after given the mice weekly intravenous injections. (Fan et al, 2020). Systemic administration of MicroRNA-146a reduce peripheral neuropathy in type 2 diabetic mice. Type 2 Diabetic mice with DPN exhibit substantial down regulation or miR146a in sciatic nerve tissue. The mice had substantially improved motor and sensory nerve conduction velocities (Lui, XS, et al, 2017). Exosomes derived from Schwann cells ameliorate peripheral neuropathy in type 2 diabetic mice. (Wang, lei et al, 2020).

Here at the Cedar Stem cell Institute, we offer a wide variety of treatment options in hopes of helping you heal yourself to some degree and make living with diabetes more tolerable.

References:

Fan,B, et al,: Mesenchymal stromal cell-derived exosomes ameliorate peripheral neuropathy in a mouse model of diabetes. Diabetologia. 2020. Feb;63(2):431-443.

Lui, XS, et al, MicroRNA-146a Mimics reduce the peripheral neuropathy in type 2 diabetic mice. Diabetes. 2017. Dec 66(12):3111-3121

Wang, lei et al,: Exosomes derived from Schwann cells ameliorate peripheral neuropathy in type 2 diabetic mice. Diabetes. 2020 Apr;69(4): 749-759

Wei Liu, et al,: Autologous Bone Marrow-Derived Stem Cells for Treating Diabetic Neuropathy in Metabolic Syndrome. Biomed Res Int. 2017; Published online 2017 Oct