

Mesenchymal stem cells in chemotherapy-induced peripheral neuropathy: A new challenging approach that requires further investigations

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Abstract

Chemotherapeutic drugs may disrupt the nervous system and cause chemotherapy-induced peripheral neuropathy (CIPN) as side effects. There are no completely successful medications for the prevention or treatment of CIPN. Many drugs such as tricyclic antidepressants and anticonvulsants have been used for symptomatic treatment of CIPN. Unfortunately, these drugs often give only partial relief or have dose-limiting side effects. Thus, the treatment of CIPN becomes a challenge because of failure to regenerate and repair the injured neurons. Mesenchymal stem cell (MSC) therapy is a new attractive approach for CIPN. Evidence has demonstrated that MSCs play important roles in reducing oxidative stress, neuroinflammation, and apoptosis, as well as mediating axon regeneration after nerve damage in several experimental studies and some clinical trials. We will briefly review the pathogenesis of CIPN, traditional therapies used and their drawbacks as well as therapeutic effects of MSCs, their related mechanisms, future challenges for their clinical application, and the additional benefit of their combination with pharmacological agents. MSCs-based therapies may provide a new therapeutic strategy for patients suffering from CIPN where further investigations are required for studying their exact mechanisms. Combined therapy with pharmacological agents can provide another promising option for enhancing MSC therapy success while limiting its adverse effects.

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