

Clinical Application of Mesenchymal Stem Cells for Cancer Therapy: A Review of Registered Clinical Trials

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Abstract : Mesenchymal stem cells (MSCs) were discovered in the 1970s with their unique properties of differentiation, immunomodulation, multiple secreting, and homing factors to injured organs. MSC-based therapies have emerged as a promising strategy for various diseases such as cancer, tissue regeneration, or immunologic/inflammatory-related diseases. This study evaluated the clinical application of MSCs for cancer therapy in trials registered on Clinical Trial as of July 2022. The results showed 40 clinical trials used MSCs in various cancer conditions. 62% of trials used MSCs for therapeutic purposes to minimize the side effects of cancer treatment. Besides, 38% of trials were focused on using MSCs as a therapeutic agent to treat cancer directly. Most trials (38/40) are ongoing phase I/II, and 2 are entering phase III. 84% of trials used allogeneic MSCs compared with 13% using autologous sources and 3% using both. 25/40 trials showed participants received a single dose of MSCs, while the most times were 12 times in a pancreatic cancer treatment trial. Conclusion: MSC-based therapy for cancer in clinical trials should be applied to (1) minimize the side effects of oncological treatments and (2) directly affect the tumor via selectively delivering anti-cancer payloads to tumor cells. Allogeneic MSCs are a priority selected in clinical cancer therapy.

Keywords : mesenchymal stem cells, MSC-based therapy, cancer condition, cancer treatment, clinical trials

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