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STEM CELL THERAPY IN THE TREATMENT OF DIABETIC NEPHROPATHY

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Abstract:

Diabetic nephropathy (DN) is one of the most serious complications of diabetes mellitus and a leading cause of end-stage renal disease (ESRD) worldwide. Current therapeutic strategies mainly focus on controlling blood glucose levels and slowing disease progression, but they are often unable to completely prevent renal damage. In recent years, stem cell-based therapy has emerged as a promising approach for the treatment of DN. Among the different types of stem cells, mesenchymal stem or stromal cells (MSCs) have gained considerable attention due to their regenerative potential, immunomodulatory properties, and ability to promote tissue repair. Several preclinical studies and early-phase clinical trials have demonstrated that MSC therapy may improve renal function, reduce inflammation, and inhibit fibrosis in diabetic kidneys. The therapeutic effects of MSCs are mainly attributed to their paracrine signaling, anti-inflammatory activity, and capacity to enhance cellular regeneration. This chapter reviews the recent advances in MSC-based therapy for diabetic nephropathy, highlighting the underlying mechanisms involved in renal protection and repair. In addition, the potential benefits, limitations, and possible risks associated with MSC therapy are discussed. Understanding these mechanisms may contribute to the development of novel therapeutic strategies and drug targets for the effective management of diabetic nephropathy.

Keywords: Diabetic nephropathy, Diabetes mellitus, End-stage renal disease, Stem cell therapy, Mesenchymal stem cells.

