



## THERAPEUTIC POTENTIAL OF MESENCHYMAL STEM CELLS IN ATHEROSCLEROSIS: PROGRESS AND FUTURE PERSPECTIVES

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Atherosclerosis is a chronic inflammatory disease of the arterial intima characterized by the formation of atheromatous plaques leading to the occlusion of arteries. In these regards, atherosclerosis is at the core of cardiovascular diseases that lead to myocardial infarction, coronary heart disease, stroke and lower limb ischemia. Despite the available drug therapy that is designed to reduce cholesterol and low-density lipoprotein in the blood of patients, atherosclerosis is the most common cause of disability and premature mortality of the population around the world. Taking into consideration inflammation of endothelium as one of the main processes involved in all stages of atherosclerosis, suppressing inflammation and balancing immunity was a promising treatment strategy for atherosclerosis. Mesenchymal stem cells (MSCs) are multipotent stromal cells that can be derived from various tissues including bone marrow, muscle, adipose tissue, umbilical cord blood, dental pulp, placenta and gingival. MSCs have unique features of self-renewing, immune-tolerance and differentiation into a number of specialized cell types such as adipocytes, osteoblasts, chondrocytes, muscle and endothelial cells. Moreover, recent studies reveal that MSCs possess strong anti-inflammatory and immunomodulatory properties as well as participate in the lipid metabolism, reducing plasma cholesterol during the development of atherosclerosis. Thus, MSCs have attracted the attention of scientists and clinicians as a novel therapeutic tool for treatment of atherosclerosis. A number of animal studies demonstrated that transplantation of MSCs occur beneficial therapeutic effects on atherosclerosis development such as restoring endothelial function, suppressing inflammatory processes, reducing plaque formation and dyslipidemia. However, these effects of MSCs on development of atherosclerosis still remain limited. Thus, how to enhance the therapeutic potential of MSCs for effective atherosclerosis treatment is the key current issue. In this report, we summarize the current literatures on MSCs and their potential application for preventing and regressing atherosclerosis as well as discuss preconditioning strategies for improving the efficacy of MSC-based therapy.