**Abstract:**

With the discovery of adipose stem cells (ASCs), 40 years after the identification of bone marrow stem cells, a new era of active stem cell therapy has opened. The abundance of stem cells harvested from adipose tissue enables us to instantly apply primary cells without culture expansion. ASCs are already clinically applied in many other purposes such as cell-enriched lipotransfer, wound healing, skin rejuvenation, scar remodeling and skin tissue engineering. Although cellular mechanism of ASCs is not completely understood, recent researches have disclosed some of their unique functions as mesenchymal stem cells. There have been increasing numbers of scientific reports on the therapeutic effect of ASCs on skin repair, scar remodeling and rejuvenation. Wound healing and scar remodeling are complex, multi-cellular processes that involve coordinated efforts of many cell types and various cytokines. Recent reports showed ASCs as a powerful source of skin regeneration because of their capability to provide not only cellular elements, but also numerous cytokines. Currently, other attractive functions of ASCs in the recovery of extrinsic aging and radiation damage are under active investigation. It seems that autologous ASCs have great promise for applications in repair of skin, rejuvenation of aging skin and aging-related skin lesions. This review will focus on the specific roles of ASCs in skin tissue, especially related with wound healing, radiation injury, scar remodeling, skin rejuvenation and skin engineering.

**Keywords:**Adipose stem cell, skin repair, wound healing, scar, radiation