Mesenchymal stem cells (MSCs) were initially described as a group of multipotent, self-renewal cells derived from bone marrow, adipose tissue, umbilical cord, dental pulps, and other tissues. Although there are different voices recently about the name or concept of MSCs, studies in the latest decades showed that these groups of cells could mediate a variety of immunomodulatory properties, which may affect both innate and adaptive immune responses. Moreover, dysfunction of the immunoregulatory function of MSCs has been suggested to play a role in the pathogenesis of autoimmune and inflammatory diseases. Therapeutic effects of MSCs on experimental and clinical autoimmune diseases and inflammation including Sjogren’s syndrome, Crohn’s disease, systemic lupus erythematosus, and rheumatoid arthritis have also been reported. However, the mechanisms mediating the immunosuppressive effects of MSCs remain incompletely understood.

Here, we highlight some of the critical ongoing challenges published in this special issue. Y. Su et al. found that the impairment of immunoregulatory function in MSCs from Sjogren’s syndrome, Crohn’s disease, systemic lupus erythematosus, and rheumatoid arthritis have also been reported. However, the mechanisms mediating the immunosuppressive effects of MSCs remain incompletely understood.

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