

## Anti-apoptotic, anti-inflammatory and immunosuppressive effects of mesenchymal stem cells: Novel concept for future therapies

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Therapeutic effects of mesenchymal stem cells (MSCs) are believed to occur not only by direct differentiation into injured tissue cells but also by production of paracrine and autocrine factors. MSCs at the injured tissue environments can promote the secretion of a variety of cytokines and growth factors that have both paracrine and autocrine activities. On this line several studies were performed. For instance, in probing the mechanism of treating effects of MSCs transplanted into the infarcted heart, several researchers noticed that MSCs undergoing hypoxia environments stimulated the infarcted heart local microenvironment to secrete more amounts of cardioprotective vital growth factors to inhibit cardiomyocytes' apoptosis compared with MSCs in vitro cultured under normoxia. It has been demonstrated that in vitro expanded and purified rat MSCs spontaneously secrete transforming growth factor-beta1 (TGF- $\beta$ 1), hepatocyte growth factor (HGF) and IL6, but not interferon gamma (IFNG), IL4, IL5 or IL10. It was considered rather that MSCs promote tissue repair by secreting soluble factors that modulate inflammation and angiogenesis. In the recent study, it has been suggested that immunosuppressive effects of MSCs can be through IL6 by inhibiting lymphocyte apoptosis. In another report, IL6 mediated anti-apoptotic effects and drug-resistance mechanisms through both STAT3 and bcl-xL pathways in prostate cancer cells were revealed. In addition, it has been shown that MSCs suppress various immune functions through release of an immunosuppressive soluble factor, TGF- $\beta$ 1. Recently, we have shown that the co-cultivation of rat bone-marrow-MSCs with islets and STZ-damaged islets induce the expression of IL6 and TGF- $\beta$ 1 into the culture medium, besides the expression of the anti-apoptotic genes (Mapkapk2, Tnip1 and Bcl3) implying the cytoprotective, anti-inflammatory and anti-apoptotic effects of rBM-SCs through paracrine actions. This speech will focus on recent advances in the clarification of MSC properties and discussion of future perspectives.

### Biography

Dr. Karaoz received his Ph.D. degree in Histology & Embryology at Gazi University in 1994. In his early academic career, he lectured in Histology & Embryology Department at Suleyman Demirel University (Isparta/TURKEY). After the visiting period at Joslin Diabetes Center (Boston) in 2005, he established the Center for Stem Cell and Gene Therapies Research and Application (SCGTR) in 2006 at Kocaeli University. He has been still holding the positions of director in the research center and the head of the Stem Cells Department since its opening in 2010. His main interests are Tissue Regeneration, Immune Suppression by Stem Cells, and Diabetes. He has participated in various evaluation procedures of national research projects and has been appointed as a referee.

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