Background: Mesenchymal stem cells (MSC) are a type of multipotent stem cells, originally isolated from the bone marrow. In addition to multilineage differentiation and participation in the haematopoietic niche, they exert powerful immnomodulatory effects. MSC can interact with cells of both the innate and adaptive immune system, leading to the modulation of several effector functions.

Methods: To assess the immunosuppressive properties of MSC proliferation studies were performed. Spleen cells proliferation in response to mitogens concanavalin A and lipopolysaccharide and anti-CD3 antibody was determined in the presence or absence of MSC in the culture. The same proliferation study was performed with the use of transwell system to specify the role of cell-to-cell interaction in inhibitory activity of MSC. The effect of MSC presence in culture was determined for interleukin-2 (IL-2), interferon-γ (IFN-γ), IL-4 and IL-10 on the level of gene expression by RT-PCR and protein production by ELISA. Moreover, the influence of MSC on induction of $CD4^+CD25^+FoxP3^+$ regulatory T cells and expression of early activation markers of T cells was investigated by the use of flow cytometric analysis.

Results: MSC inhibited T cell and B cell proliferation in response to mitogens in dose-dependent manner. Using a transwell system in the culture, the inhibitory activity of MSC was abrogated. Whereas MSC reduced the levels of IFN-γ, no significant effect on production of other cytokines was observed. Flow cytometric analysis revealed that the presence of MSC in the culture caused an increase in the proportion of regulatory T cells. The expression of early lymphocyte activation-associated markers CD25 and CD69 decreased in the presence of MSC.

Conclusion: The obtained results suggest that MSC affected lymphocyte proliferation, cytokine production, expression of activation-antigen and proportion of regulatory T cells in culture.