**Abstract**

The damage of ocular surface represents one of the most common causes of decreased quality of vision or even blindness. If the injury is extensive and includes the region of limbus, niche of limbal stem cells (LSC), LSC deficiency occurs and the natural corneal regeneration is stopped. Conjunctival epithelium migrates into the injured area. Neovascularization, local inflammation and corneal opacity occur. Corneal transplantation is an insufficient treatment in such case. If the injury is bilateral, the allogenic limbal graft or LSC transplantation is required. In such cases systemic immunosuppressive drugs with many negative side-effects must be administered. The search for an adequate autologous substitution is important for avoid immunosuppressive medication. Mesenchymal stem cells (MSC) represent a perspective substitution for the reason of their immunomodulatory properties and the capability to differentiate in many cell types. There is possibility to isolate sufficient number of these cells from adipose tissue or bone marrow which are relatively easily accessible.

Our goal was to observe local production of cytokines and other molecules which are present in inflammatory reaction after the chemical burn of the murine cornea and after the treatment with stem cells growing on nanofiber scaffold. We compared therapeutic effects of MSC isolated from the adipose tissue or the bone marrow with LSC isolated from the limbal tissue on local cytokine production and we evaluated the corneal regeneration was affected after MSC and LSC transplantation. The results showed inhibition of local inflammatory reaction after the treatment with stem cells and more rapid corneal regeneration in stem cell-treated recipients.