Abstract

African clawed frogs (Xenopus) represent an ideal model organism for study of regeneration mechanisms. In frogs, complete regeneration occurs in the tadpole stage. In later stages the regeneration capacity is lost. The Laboratory of Developmental biology was successful in establishment of cell culture called *Xenopus tropicalis* immature Sertoli cells (XtiSCs) derived from *X. tropicalis* testes. These cells are common progenitors of Sertoli cells and peritubular myoid cells. XtiSCs show similar characteristics as mesenchymal stem cells. MSCs hold interest of scientists for their immunomodulatory properties and multipotent differential and regeneration potential.

In this thesis, we studied regeneration and migration potential of XtiSCs after *X. tropicalis* tadpole´s tail amputation in developmental stage 47 – 50. Transgenic XtiSCs culture expressing RFP was prepared to facilitate transplantation experiments.

Transplantation experiments showed preferential migration of XtiSCs into the site of injury. XtiSCs transplantations in *X. laevis* tadpoles with downregulated NO synthases eNOS and nNOS revealed their migratory dependence on nitric oxide signalization. Imunocytochemical staining of XtiSCs *in vitro* showed positive iNOS, nNOS and Pax7 expression. Imunohistochemical staining of tadpole´s tail vibratome sections containing transplanted XtiSCs confirmed partial colocalization of RFP positive XtiSCs and iNOS, nNOS and Pax7.

Later on, we focused on NO production. NO production wasn´t observed in XtiSCs *in vitro* even after stimulation. Nevertheless, fluorescent DAF-2DA NO indicator confirmed its production in XtiSCs *in vivo* after their transplantation into *X. tropicalis* tadpoles. Gene expression analysis using RT-PCR revealed positive expression of ROCs markers in XtiSCs. ROCs are crucial for proper regeneration. Results gained in this study suggested possible regeneration potential of XtiSCs.

Key words: regeneration, Xenopus tropicalis, Sertoli cells, amputation, tail, stem cells, nitric oxide, ROC, satellite cells