Abstract

Testicular stem cells (TSCs) are relatively accessible potential source of pluripotent cells, which are particularly important for their application in regenerative medicine. *Xenopus tropicalis* is a useful model organism to study the migration and differentiation potential of stem cells. This amphibian is characteristic by outer fecundation and embryonic development of a great amount of embryos after fertilization. Oocytes and embryos are large enough (about 1 mm) to be suitable for micromanipulation micromanipulations. Laboratory of Developmental Biology, Faculty of Science, Charles University in Prague succeeded in the establishment of a mixed cell culture of TSCs growing on feeder layer of pre-Sertoli cells. This culture was derived from the testes of juvenile *Xenopus tropicalis* male. In the study of their differentiation potential it was found, that leukemia inhibitory factor (LIF) is the decisive factor allowing rapid proliferation of stem cells and their forming into characteristic colonies. This protein is produced by both types of cells which are present in the culture. The mouse LIF has the same positive effect on the proliferative potential of stem cells, which points at the evolutionary conservation of metabolic pathways associated with the maintenance of the stemness. RT-PCR analysis revealed an almost identical expression profile of TSCs and pre-Sertoli cell feeder layer. Based on these results their common origin and highly probable pluripotent nature of TSCs may be considered, which requires further demonstration by differentiation *in vitro* and *in vivo.* TSCs cultivated by Hanging drop method spontaneously transformed into cells of neural character. Previous experiments revealed the ability of transplanted vitally stained TSCs migrate into organs of all three germ layers. For transplantation experiments allowing long-term observation of the fate of introduced cells, or eventually their vertical transmission to the next generation, I prepared a stable transgenic *Xenopus tropicalis* TSC culture using nucleofection method, expressing Katushka RFP under the CAG promoter. Pilot microinjections of transgenic TSCs into tadpoles' peritoneum confirmed their broad migration potential.