

Abstract

Cardiac failure is one of the leading cause of deaths worldwide. Potential therapeutic approach, which overcome invasive organ transplantation and delivery of immunosuppressive drugs, is lacking nowadays. However, research of mesenchymal stem cells (MSCs) therapy displays immunomodulation potential, which can further promote variety of organ regeneration without need of drug treatment.

Xenopus tropicalis immature Sertoli cells (XtiSCs) culture was established in our laboratory from juvenile *Xenopus tropicalis* male. XtiSCs possess immunomodulatory capacity and differentiation to cardiomyocytes after the treatment with the inhibitor of glycogen synthase kinase-3 (GSK-3) CHIR99021. To test the survival rate of transplanted XtiSCs we firstly microinjected treated cells directly inside tadpole's heart. XtiSCs proliferated there for the whole tested time period (30 days). However, after direct heart XtiSCs injection and subsequent cardiac injury in adult frog, no cells were localized in wound area. Thus, we focused on remote control of cardiac regeneration using XtiSCs without CHIR99021 treatment. We injected cells inside skeletal muscle bed and confirmed their survival and proliferation. Moreover, if cells were transplanted 3 days before heart injury, it resulted in significant reduction of fibronectin deposition levels and increase in cardiac muscle levels within 7 days after heart injury. We further optimized preparation of heart sections by three different techniques: vibratome, microtome, and cryotome. Cryotome displayed the best results in structure and antigenicity preservation.

Just like MSCs, Sertoli cells display promising way to modulate immune response after cardiac injury by secretion of paracrine and growth factor. Moreover, by significant reduction of fibrosis, XtiSCs treatment may promote cardiac regeneration in adult *X. tropicalis* and Sertoli cells may be new promising source of cells for regenerative medicine.

Key words: heart, regeneration, Sertoli cells, *Xenopus tropicalis*