

Proceedings of German Society for Stem Cell Research (PGSSCR)

Spermatogonial stem cells from adult human testis and the generation of pluripotency *in vitro* and *in vivo*

Conrad S¹, Renninger M², Hennenlotter J², Just L¹, Wiesner T¹, Sievert KD², Stenzl A², and Skutella T^{1,3}

¹Institute of Anatomy, Department of Experimental Embryology, Section of Tissue Engineering, Tubingen, Germany

²Department of Urology, University Clinic Tubingen, Germany

³Centre for Regenerative Biology and Medicine (ZRM), Tubingen, Germany

Published online on 16 May 2007

Objectives:

Recent literature reported the isolation of spermatogonial stem cells from adult mouse testis and their response to differentiating culture conditions in a pluripotent manner similar to embryonic stem cells. Aim of the present study was to show the possibility of isolation and differentiation of adult spermatogonial stem cells from human testicular parenchyma into the different tissues of all of the three human germ layers.

Materials and Methods:

Regular testicular parenchymas from orchiectomy specimens, determined by a pathologist, were collected. Cells were cultured in knockout culture medium with GDNF. After 7-10 days the medium was changed to basic medium with LIF. Clusters formed which contain the spermatogonial stem cells and for higher purification a MACS separation with CD49f followed. The isolated cells were transposed into specific established culture mediums and protocols for neuronal,

pancreatic, osteogenic and myogenic differentiation of embryonic stem cells. The precursor cells were transplanted in utero and adult nude mice for testing the potency of the cells.

Results:

Adult spermatogonial stem cells could spontaneously differentiate into derivatives of all three primary germ layers: differentiation towards insulin producing cells, osteogenic cells, smooth muscle cells, and neuronal live cells was confirmed by PCR analysis, ELISA and immunohistochemistry. Transplanted cells showed characteristics of neural and pancreatic tissues.

Conclusions:

Adult spermatogonial stem cells seem to keep their pluripotency and plasticity throughout life. Human stem cells from testicular tissue may allow individual cell based therapy without the ethical problems associated with human embryonic stem cells and immunological problems of nowadays transplantation of allografts.