EVALUATION OF ENGRAFTMENT AND DIFFERENTIATION OF DIFFERENT SOURCES OF HUMAN STEM CELLS IN FETAL SHEEP BRAIN

Roll Receanu Cristina 1,2, J. Wood1, E. Colletti1, Graca Almeida-Porada1, E. Zanjani1

1University of Nevada Reno, Department of Animal Biotechnology MS#202, Reno NV 89557 USA
2University of Agricultural Sciences and Veterinary Medicine, 3-5 Manastur Street, 400372 Cluj-Napoca, Romania, email: criss_roll@yahoo.com

Key words: stem cells, brain, engraftment, differentiation, immunohistochemistry

SUMMARY

It is known that the brain can be affected by many diseases/disorders for which therapies are not yet available. Recently, different investigators have reported on the ability of stem cells to differentiate into different neural cell types in vitro and in vivo. This knowledge opened new perspectives in stem cell therapy for neurological disorders/diseases. Hematopoietic (HSC), mesenchymal (MSC) and neural (NSC) stem cells are the most promising source of stem cells given either their easiness of harvest or their differentiative ability. Upon grafting into the brain, stem cells could give rise directly to new neurons or could generate other cells of the central nervous system, such oligodendrocytes, or glial cells, that may contribute to neural growth. Furthermore these cells could be therapeutic by secreting missing substances or enzymes that are needed for the normal function of the brain. Since mesenchymal stem cells (MSCs) have been shown to suppress T-cell activation in vitro and in vivo, transplantation of these cells into the brain could led not only to a source of new neural cells but also could provide an anti-inflammatory response. In order to investigate the therapeutic potential of different sources of stem cells, pre-immune fetal sheep were transplanted by intraperitoneal injection, at 60 days of gestation, with HSC, NSC or MSC. Animals were euthanized at 60-80 days post transplantation and tissues were collected from different regions of the brain and analyzed by flow cytometry and immunohistochemistry using different antibodies for known neural markers. Levels of donor cell engraftment and types of neural cells obtained were then correlated to the source of the transplanted cells. We hope that these studies will be able to discern what is/are the best source(s) of stem cells to use for neural cell replacement therapies.

BIBLIOGRAPHY