**In vitro Differentiation of Human and Rat ASC Towards Schwann Cell-Like Cells**

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**Introduction**

The aim of this study was to investigate human and rat adipose-derived stem cells with regard to their ability of differentiation into Schwann cell-like cells that show specific characteristics including expression of Schwann cell markers and support of neurite outgrowth in vitro and furthermore to establish a method to mobilize sufficient amounts of autologous SC-like cells within a short period of time. This is the first demonstration of differentiation of human ASC towards SC-like cells.

**Materials and Methods**

ASC isolation from human and rat fat tissue.

Fat tissue was digested with collagenase. Human tissue was additionally lysed with erythrocyte-lysis buffer. The cells were washed, filtered and seeded into cell culture flasks.

Differentiation of human and rat ASC to SC-like cells. 24 h after seeding ASC into cell culture plates the medium was replaced by 1 mM β-mercaptoethanol in cell culture medium. Medium was replaced after 24 h with 35 ng/ml all-trans-retinoic acid. After 48 h, medium containing 14 µM forskolin, 5 ng/ml platelet-derived growth factor, 10 ng/ml fibroblast growth factor and 200 ng/ml heregulin was added. Human SC-like cells were harvested after 2½ weeks, rat SC-like cells after 3½ weeks.

Co-culture of SC-like cells with PC12, a rat adrenal phaeochromocytoma cell line. PC12 cells were cocultured with human or rat SC-like cells, ASC supernatant and for control in DMEM with 15% horse serum and undifferentiated human and rat ASC cells.

**Results**

Immunocytochemistry showed that differentiated human and rat ASCs expressed SC markers like S100, glial fibrillary acidic protein, Nestin, p75 and p0, in contrast to undifferentiated cells. Co-culturing SC-like cells with PC12 cells resulted in promotion of neurite outgrowth of PC12 cells. (Fig. 1. and 2.)

**Discussion and Conclusions**

The SC-like cells were positive for several SC markers, however, the formation of myelin structures, being the most important feature of genuine Schwann cells, is yet to be determined in coculture with PC12.

In the future, autologous SC-like cells applied in grafts in order to direct, protect and enhance the growth of neuronal cells might accelerate the healing process of nerve regeneration.

**References**


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**Disclosures**

Authors have nothing to disclose.