P33 Efficient Induction of Oligodendrocytes from Human Embryonic Stem Cells

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Objectives: we introduce our newly developed protocol, the embryoid body (EB)-based 5 stage method, by which oligodendrocyte precursors and mature oligodendrocytes can be efficiently induced.

Materials and Methods: we attempted to devise a protocol for the induction of oligodendrocytes from human embryonic stem (ES) cells to treat demyelinated axons. Four days after embryoid body formation, human ES cells were differentiated into neural precursors through selection and expansion procedures. Neural precursors were then grown in the presence of EGF and then PDGF to generate oligodendrocyte precursor cells. Finally, the cells were treated with thyroid hormone upon the withdrawal of growth factors to induce oligodendrocytes.

Results: the *in vitro* protocol that we have developed provides a high level of functional oligodendrocytes and their progenitors from human ES cells.

Conclusions: Our study may pave the way for human ES cell-derived oligodendrocyte therapy in various CNS myelin disorders.

Key words: ES cells, Differentiation, Oligodendrocytes, Myelination, CNS disorders

P34 Expression of Junctional Adhesion Molecules in Testis and Epididymal Spermatozoa

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Objectives: The junctional adhesion molecule (JAM) immunoglobulin superfamily shows both distinct and overlapping patterns of tissue expression in the tight junctions of epithelial and endothelial cells. Each molecule is composed of an extracellular domain comprised of two immunoglobulin V loops, a single-span transmembrane domain, and a short cytoplasmic tail. JAMs also associate intracellularly with other TJ-associated proteins such as ZO-1, AF-6, MUPP1, ASIP/PAR-3, and cingulin, suggesting that JAM is a critical component of the multiprotein complex of TJs. JAMs are also known to modulate the transmembrane cell migration of neutrophils and monocytes in the endothelium. To date, three members of JAM (JAM-1, -2, and -3) have been identified.

Materials and Methods: Immunohistochemical analysis was conducted to localize the JAMs in the human testis tissues. Immunocytochemical localization of JAM-1, -2, and -3 was conducted to mouse spermatozoa using confocal microscopy.

Results: Moderate immunoreactivity of JAM-1 was found in round spermatids together with weak nuclear signals in germ cells in human seminiferous tubule. Sertoli cells were also positive for JAM-1. Weak immunoreactivity of JAM-2 was found in cell contacts in human seminiferous tubule. Strong immunoreactivity of JAM-3 was found in cytoplasm and plasmamembrane of Sertoli cells and early spermatocytes. Germ cells were all positive for JAM-3 in human seminiferous tubule. Negligible expression of JAMs was found in interstitial tissue. In mouse epididymal spermatozoa, faint signal JAM-1 was found in plasma membrane. Weak immunioreactivity of JAM-2 was detected in acrosome together with principal piece of sperm tail. Strong immunoreactivity of JAM-3 was found in acrosome.

Conclusions: Among JAMs, JAM-1 may be involved in post-meiotic differentiation of male germ cells, especially in acrosome genesis. JAM-3 is the major TJ molecule developed in Sertoli cells in human testis. In view of the physiological significance of JAMs in cell movement, JAM-3 might be important for the migration of preleptotene /leptotene spermatocytes across the blood-testis barrier during spermatogenesis in human testis. Expression of JAM-3 in acrosome of mouse spermatozoa suggests possible involvement of JAM-3 in the fertilization process.

Key words: Junctional Adhesion Molecules, Testis, Epididymal spermatozoa