Gene expression profiling of the olfactory ensheathing glia cell

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Finding new ways to facilitate neuroregeneration may create novel therapies for neurodegenerative diseases such as Alzheimer's disease, Parkinson's disease and nerve trauma in general. The peripheral nervous system is known to regrow axons, but in the central nervous system neuroregeneration is hard to achieve and mainly because of growth-inhibitory properties of the scar formed at the site of the lesion.
The olfactory nervous system, however, harbours a mechanism to facilitate not only neurogenesis, but also axonal outgrowth over considerable distances with a high accuracy towards and into the central nervous system. Axonal outgrowth is not only achieved by the neuron itself, but is also supported by the olfactory ensheathing glia cells (OEG) engulfing the olfactory axons. Recent studies demonstrate that OEGs transplanted into spinal cord injury lesions not only mix with scar tissue cells, but also migrate and sustain long-distance axonal outgrowth. In this respect, OEGs are superior to Schwann cells, because in contrast to Schwann cells OEGs can mix with scar tissue.
Our aim is to reveal molecular mechanisms involved in the facilitation of axonal outgrowth in OEGs. Several models have been chosen to unravel these mechanisms. Firstly, the OEG and the olfactory neuron in the olfactory system. Secondly, OEGs and Schwann cells purified in primary cultures.
So far, an olfactory lesion model was established, in which the olfactory nerve layer and olfactory epithelium was sampled at different time points after the lesion. RNA was isolated from the olfactory nerve layer and processed for gene expression profiling and preliminary data will be shown at the meeting.
Furthermore, primary cultures of OEGs were set up with robust expression of glial cell markers, such as p75, S100 and GFAP. These cells will be compared with Schwann cells by gene expression profiling.
Future work will focus on the analysis of the data from the gene expression profiling study of the olfactory lesion model and secondly, on the actual comparison of OEGs with Schwann cells by microarray.

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