Recovery of sensory function by stem cell transplants

8 June 2015

New research from Uppsala University shows promising progress in the use of stem cells for treatment of spinal cord injury. The results, which are published in the scientific journal *Scientific Reports*, show that human stem cells that are transplanted to the injured spinal cord contribute to restoration of some sensory functions.

Traffic accidents and severe falls can cause ruptures of nerve fibers that enter/exit the spinal cord. Most commonly, these avulsion injuries affect the innervation of the arm and hand, and lead to paralysis, loss of sensation and cause chronic pain. Surgical interventions can help the patient regain some muscle function, but there is currently no treatment able to restore sensory functions. The reason for this is the emergence of a "barrier" at the junction between the ruptured nerve fibers and the spinal cord which prevents them from growing into the spinal cord and restore lost nerve connections.

In a new study the PhD students Jan Hoeber, Niclas König and Carl Trolle, working in Dr.Elena Kozlova's research group transplanted human stem cells to an avulsion injury in mice with the aim to restore a functional route for sensory information from peripheral tissues into the spinal cord.

The results show that the transplanted stem cells act as a "bridge" which allows injured sensory nerve fibers to grow into the spinal cord, rebuild functional nerve connections, and thereby achieve long term restoration of major parts of the lost sensory functions. The transplanted stem cells differentiated to different types of cells with variable level of maturation, specific for the nervous system. No signs of tumor development or any functional abnormalities from the transplants were observed in the study, outcomes which are important in view of potential risks with transplantation of embryonic stem cells.

The results encourage further research on the use of stem cells for treatment of injury and disease in the spinal cord, and may contribute to the development of novel treatment strategies in these disorders.

More information: "Human Embryonic Stem Cell-Derived Progenitors Assist Functional Sensory Axon Regeneration after Dorsal Root Avulsion Injury." *Scientific Reports* 5, Article number: 10666 doi:10.1038/srep10666

Provided by Uppsala University