Aims & Scope:
Nowadays, curative strategies are lacking to treat spinal cord disorders such as amyotrophic lateral sclerosis, spinal cord injury and multiple sclerosis. While redundancy or rewiring of surviving circuits can partially recover functions, endogenous CNS stem cells do not provide sufficient substrate to fully replace damaged cells or axons. Increasing evidences demonstrate that exogenous transplants have remarkable efficacy for CNS repair in preclinical models. Mesenchymal or neural stem cells provide paracrine factors that repair or protect from damage caused by excitotoxic, ischemic or traumatic insult. Some of these studies are now moving forward to clinical trials, including human embryonic stem cell-derived oligodendrocyte progenitors for spinal cord remyelination. However, embryonic allografts are less than optimal and still raise ethical and availability issues. The cell reprogramming field has considerably developed by virtually trans-differentiating any somatic cells into distinct cell types, while addressing the histocompatibility concerns of allografts and the tumorigenicity potential of embryonic stem cells. So far cell reprogramming allows to generate induced pluripotent stem cells from fibroblasts, which can be further differentiated into subsets of neurons. Recent advances also describe the direct conversion from somatic cells into neurons or glia. These “induced” cells can serve as a therapeutic reservoir to replace lost cells or support endogenous lesioned cells during spinal cord disorders. This mini-thematic issue of three articles reviews both the methodology for obtaining induced neural cells and the current state-of-the-art of their therapeutical applications in animal models of amyotrophic lateral sclerosis, spinal cord injury and multiple sclerosis.

Key words:
Induced pluripotent stem cell, transplantation, spinal cord disorder, cell therapy, cell reprogramming

Subtopics:
1) « Modelling or treating amyotrophic lateral sclerosis through induced pluripotent stem cells ».
Delphine Bohl, PhD (Institut Pasteur, Paris, France) ; Roland Pochet, PhD (Université Libre de Bruxelles, Brussels, Belgium) & Dinko Mitrecic, PhD (Croatian Institute for Brain Research, Zagreb, Croatia); Charles Nicaise, PhD (University of Namur, Namur, Belgium)

2) « iPS-based transplantation for targeting spinal cord injuries ».
Angelo Lepore, PhD (Thomas Jefferson University, Philadelphia, USA) ; Ké Li, PhD (Thomas Jefferson University, Philadelphia, USA) ; Aditi Falnikar, PhD (Thomas Jefferson University, Philadelphia, USA)

3) “Induced cell-based transplantation to therapeutically target multiple sclerosis”
Guang-xian Zhang, MD PhD (Thomas Jefferson University, Philadelphia, USA)
Schedule:

Manuscript submission deadline: December 2014

Peer Review Due: January 2015

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Final manuscripts due: April 2015