Kantonsspital St.Gallen

Inhibiting epidermal growth factor receptor improves structural, locomotor, sensory, and bladder recovery from experimental spinal cord injury

Matthias Erschbamer,Karin Pernold & Lars Olson

Lack of axon regeneration in the adult CNS has been attributed partly to myelin inhibitors and the properties of astrocytes. After spinal cord injury, proliferating astrocytes not only represent a physical barrier to regenerating axons but also express and secrete molecules that inhibit nerve growth, including chondroitin sulfate proteoglycans (CSPGs). Epidermal growth factor receptor (EGFR) activation triggers astrocytes into becoming reactive astrocytes, and EGFR ligands stimulate the secretion of CSPGs as well as the formation of cribriform astrocyte arrangements that contribute to the formation of glial scars. Recently, it was shown that EGFR inhibitors promote nerve regeneration in vitro and in vivo. Blocking a novel Nogo receptor interacting mechanism and/or effects of EGFR inhibition on astrocytes may underlie these effects. Here we show that rats subjected to weight-drop spinal cord injury can be effectively treated by direct delivery of a potent EGFR inhibitor to the injured area, leading to significantly better functional and structural outcome. Motor and sensory functions are improved and bladder function is restored. The robust effects and the fact that other EGFR inhibitors are in clinical use in cancer treatments make these drugs particularly attractive candidates for clinical trials in spinal cord injury.

type	journal paper/review (English)
date of publishing	13-6-2007
journal title	J Neurosci (27/24)
ISSN electronic	1529-2401
pages	6428-35