A critical challenge in spinal cord injury (SCI) research is to understand how to promote regeneration of dystrophic axons beyond the glial scar. A major factor of the glial scar’s extracellular matrix that limit regeneration are chondroitin sulfate proteoglycans (CSPGs) deposited by astrocytes. Post-SCI, while elimination of CSPGs has proved efficacious, spatial/temporal localization of CSPGs and astrocytes in human is still poorly defined. In the present study, we use our porcine model of SCI to capitalize on anatomical and physiological similarities between humans and pigs to investigate CSPG and astrocyte localization in the spinal cord.

Using female Yucatan pigs, a T10 contusion/compression SCI was induced. At 7 days and 12 weeks following SCI, spinal cords were harvested and processed for cryostat sectioning. Cross-sections were assessed for astrocytes (glial fibrillary acidic protein/GFAP), and CSPG’s (CS-56) using immunofluorescent staining. Age/sex-matched animals subjected to similar surgery without SCI were used as controls.

Immunofluorescence labeling of spinal cords from SHAM animals demonstrated a mesh-like structure of CS-56/GFAP. SCI was marked by a robust increase of CS-56/GFAP immunoreactivity expression at 7 days and 12 weeks post-SCI, compared to SHAM. This was demonstrated at the vicinity and 15mm rostral to the injury. By 12 weeks, the CSPG-GFAP meshwork increased in complexity. Increased CSPG/astrocyte expression and changes that occur both in the center/distal sites of injury, suggest a broad inhibitory environment to regeneration for many months post-injury. Better understanding of histopathological patterns of injury will additionally advance the effective use of this model in preclinical studies.

Themes:

Check (highlight) the most applicable theme according to the abstract.

| Innovation and Technology | Health and Wellness | Culture and Society | Sustainability and Conservation |

Comments: Overall well-presented but consider revising to reduce the use of jargon; could be difficult to understand for those without a life sciences background. Perhaps provide concise definitions of specialist terms. Best at MURC!