Increased GFAP immunoreactivity by astrocytes in response to contact with dorsal root ganglia cells in a 3D culture model

Conference or Workshop Item

B123

Increased GFAP immunoreactivity by astrocytes in response to contact with dorsal root ganglia cells in a 3D culture model.

Emma East, Jon Golding, James Phillips

The Open University, Milton Keynes, UK

Failure of repair mechanisms in the injured CNS is widely attributed to the inhibitory environment of the lesion site, most notably the formation of the glial scar which forms a physical and physiological barrier to axon regeneration. We developed an in vitro 3D cell culture model to investigate the response of astrocytes to cells found at the inhibitory interfaces formed following damage to the spinal cord. CellTrackerTM labelled dissociated DRGs were seeded onto astrocyte-populated collagen gels and maintained in culture for 5 days. Astrocytes near the DRG interface showed marked GFAP up-regulation and adopted a reactive morphology which was observed up to 1mm away. Intensity of GFAP fluorescence at this interface was 3 fold higher than that seen away from the interface or in controls (astrocyte only gels).

Furthermore, the presence of DRG conditioned medium was not capable alone of eliciting this response. In conclusion this model may provide a useful tool for understanding reactive astrogliosis in response to cells found at inhibitory interfaces following spinal cord or dorsal root injury. The contact between astrocytes and satellite cells may be enough to induce astrocyte reactivity and formation of the gliotic scar, or this contact may induce the secretion of a soluble factor which is not released from DRG cultures under physiological conditions.