Biomaterials combined with cell therapy for treatment of spinal cord injury.

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Abstract

Spinal cord injury (SCI) is a devastating traumatic injury resulting in paralysis or sensory deficits due to tissue damage and the poor ability of axons to regenerate across the lesion. Despite extensive research, there is still no effective treatment that would restore lost function after SCI. A possible therapeutic approach would be to bridge the area of injury with a bioengineered scaffold that would create a stimulatory environment as well as provide guidance cues for the re-establishment of damaged axonal connections. Advanced scaffold design aims at the fabrication of complex materials providing the concomitant delivery of cells, neurotrophic factors or other bioactive substances to achieve a synergistic effect for treatment. This review summarizes the current utilization of scaffolding materials for SCI treatment in terms of their physicochemical properties and emphasizes their use in combination with various cell types, as well as with other combinatorial approaches promoting spinal cord repair.

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