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Poster Presentation

Current Status of Fibrin-Based Scaffolds in the Treatment of Spinal Cord Injury

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Abstract

Spinal cord injury (SCI) results in the damage of motor and sensory pathways. The molecular and cellular structure of the injury milieu has been shown to be vital for endogenous regeneration in most tissues. Regeneration of Injured central nervous system (CNS) is limited by damaged cell environment. Biomaterial scaffolds can reconstruct injured CNS tissue following SCI by promoting the migration of support cells into the biomaterial and enhancing axonal regeneration. Fibrin gel self-assembles into a scaffold by simulating the last stage of blood clotting to support cell migration, proliferation, differentiation, and eventually tissue regeneration. Fibrin is a suitable biomaterial scaffold for nerve regeneration based on its role in wound repair and tissue renovation. Fibrin Gel also been investigated as an Injectable biodegradable scaffold and cell carrier for healing of spinal cord injury. Fibrin has been used as a matrix to seal nerve guidance tubes implanted following sciatic nerve injury in neural tissue engineering and was shown to promote axonal renewal and cell migration. Fibrin scaffolds have also been used in acute studies of whole spinal cord transection, and were found to elicit improved neural fiber sprouting at early time points. Fibrin scaffolds can be amended covalently to form an affinity-based delivery system for the regulated delivery of neurotrophins. Future work will study the effect of fibrin scaffolds in combination with other treatment techniques such as protein delivery on spinal cord regeneration following injury.

Keywords: Nerve, Scaffold, Spinal cord, Regeneration.

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