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VASCULAR AND NEURONAL TISSUE REGENERATION USING FIBROUS BASED SCAFFOLDS

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Bioengineering approaches are been intensively used to develop vascular grafts for small diameter arteries and for neuronal regeneration. In this study, we have designed and fabricated novel non-woven fibrous vascular graft with biomechanical properties closely resembling those of native vessels and fibrous structures with appropriate topology for neuron extension. Vascular cell growth, preservation of cell phenotype and retention of vasoactive properties effects on the cellular interaction with the scaffolds were investigated as well as the recovery in a damaged area of mice brain for neuronal scaffolds. The fibrous scaffolds were made from polyethylene terephthalate (PET), polylactic acid (PLA) and polyglycolic acid (PGA).
The scaffold variables were fiber diameter distribution and topology. The results indicated that the biomechanical and biocompatible properties of the novel vascular scaffold are promising for the development of a vascular graft with similar characteristics to those of native vessels on one hand, and, on the other hand, that an aligned fibrous structure allowed for neuron extension and partial repair of a damaged area in mice brain.