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PRODUCTION OF A PLGA FIBROUS SCAFFOLD FUNCTIONALIZED WITH DECELLULARIZED SPINAL CORD AND CELL VIABILITY TESTING WITH PC12 AND MESENCHYMAL STEM CELLS

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The spinal cord injury (SCI) is a debilitating condition that compromises multiple normal life activities of the patient. For that reason, new and innovative approaches are required in order to develop treatments that can give patients better life conditions. A field of study for the treatment of SCI is cell therapy, which consists of the transplantation of different cell types. However, one of the problems encountered with this approach is maintaining good cell viability. The aim of the study was to develop a scaffold that can support cell viability and growth for regenerative purposes. For this reason, the viability of two different cell lines on a scaffold composed of poly (lactic-co-glycolic acid) (PLGA) and a decellularized spinal cord (DSC) from rats was tested. The spinal cord tissue of rats was collected and submitted to the decellularization process with 1% sodium dodecyl sulfate (SDS) for 9 hours. The PLGA scaffold consisted of aligned fibers 18% PLGA in hexaflour and was made using the electrospinning technique. The PLGA solution was electrospun at 22º C, a humidity of 45%, a flow of 1ml/h, a distance of 15cm from the needle to the rotor, a rotor velocity of 3000 RPM and a voltage of 20Kv (+16 to -4). The MTT assay was performed in order to test the cell viability. Two cell lines were used: mesenchymal stem cells from the deciduous tooth pulp (MSC) and PC12, a neural model from pheochromocytoma of the rat adrenal medulla. The four test groups consisted of cells on PLGA fibers, PLGA fibers+DSC, DSC and control cells on culture plate. For each test group, 104 cells/well were seeded and after 24 hours, MTT was performed. The experiments were done in triplicates. The results showed an increase of cell viability for both lines cultivated on the PLGA and PLGA+DSC groups. For the MSC, the absorbance for the PLGA group was 6-fold higher than the control, whereas the PLGA+DSC group had an absorbance 8-fold higher than the control. For PC12 cell line, the cells cultivated on the DSC presented an absorbance of 0.204, while the cells cultivated on the PLGA and PLGA+DSC presented an absorbance of 0.363 and 0.338 respectively, the control group's absorbance was 0.162. In conclusion, the PLGA aligned fibers and the decellularized spinal cord hydrogel suggests that these materials are suitable to be used as cell supporting scaffolds, increasing the cell viability of both stem cells and neural-like cells.