(OP 261) Starch/Gellan Gum Hybrid 3D Guidance Systems for Spinal Cord Injury Regeneration: Scaffolds Processing, Characterization and Biological Evaluation

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Spinal cord injury (SCI) represents a significant health and social problem and therefore it is urgent to find strategies that can specifically target this problem. In this sense the objective of the present work was to develop a new range of 3D tubular structures aimed at inducing the regeneration within SCI sites. Up to six different 3D tubular structures were initially developed by rapid prototyping-3D bioplotting–based on a biodegradable blend of starch. The mechanical properties of these structures were assessed by DMA, in both dry and wet conditions, and their morphologies/porosities analysed by micro-CT and SEM. Afterwards, gellan gum hydrogel was injected in the central area of structures. Biological evaluation was then carried out by determining their cytotoxicity, using MEM extraction and MTS test, as well as by encapsulation of oligodendrocytes (M0III cell line) within the hydrogel phase. The histomorphometric analysis showed a fully interconnected network of pores with porosity ranging from 70%–85%. Scaffolds presented compressive modulus ranging from 17.4 to 62.0 MPa and 4.42 to 27.4 MPa in dry conditions and wet conditions respectively. Cytotoxicity assays revealed that the hybrid SPCL/Gellan Gum scaffolds were non cytotoxic as they did not cause major alterations on cell morphology, proliferation and metabolic activity. Finally, preliminary direct contact assays showed that the hybrid scaffolds could support the *in vitro* culture of oligodendrocyte like cells. Further work will focus on the behaviour of these scaffolds when implanted in SCI animal models.