

Human Dental Pulp Stem Cells associated to silk protein scaffold restore critical size bone defects *in vivo*

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The aim of this study is to evaluate potential of fibroin scaffold combined with human dental pulp stem cells (hDPSC) to reconstruct large sized cranial bone defects in animal model. We performed two symmetric full-thickness cranial defects on each parietal region of rats and we replenished them with collagen, poly-D,L-lactic acid (PDLLA) and silk fibroin scaffolds with or without stem cells already seeded into and addressed towards osteogenic lineage *in vitro*. Animals were euthanized after 4 weeks postoperatively and cranial tissue samples were taken for histological analysis. The presence of human cells in the new bone was confirmed by confocal analysis with an antibody directed to a human mitochondrial protein. We observed a mature bone formation and the most relevant defects correction in constructs with fibroin. Our findings demonstrated the strong potential of bioengineered constructs of stem cells-fibroin scaffold for correcting large cranial defects in animal model and constitutes a promising model for reconstruction of human large cranial defects in craniofacial surgery.

Keywords: human dental pulp stem cells, fibroin scaffold, bone regeneration, osteogenic differentiation