Scaffold based tissue engineering aims to regenerate damaged tissues by culturing cells ex vivo on scaffolds that should provide with an adequate framework for biological interactions. This proposal involves the use of apical papilla stem cells in chitosan and lysine polyurethane based scaffolds that offer the potential for growth factors incorporation and delivery for a faster development of constructs.

Scaffolds containing Chitosan/PU/lysine with 100/0/0 to 50/50/80 component ratios have been manufactured by freeze drying. Porosity has been characterized by density measurements and SEM.

Apical papilla stem cells were isolated from impacted third molars of young healthy donors. CD44, Stro-1 positive and CD45 negative have been used as phenotype markers. Live and dead assays have been used for viability tests and MTT for proliferation at 7, 14 and 21 days.

Scaffolds with a three modal pore size distribution have been obtained. Interconnected pores with 80 micrometers interconnection sizes can be appreciated. A significant increase in cell viability and proliferation could be observed in lysine containing scaffolds. This study confirms that lysine may act as a favorable substrate for cell adhesion and proliferation.

The combination of lysine-polyurethane scaffolds and apical papilla stem cells offer a promising alternative for the development of a new family of constructs for tissue regeneration.

Keywords: Cell Proliferation, 3D scaffold, Cell modulation

References:


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