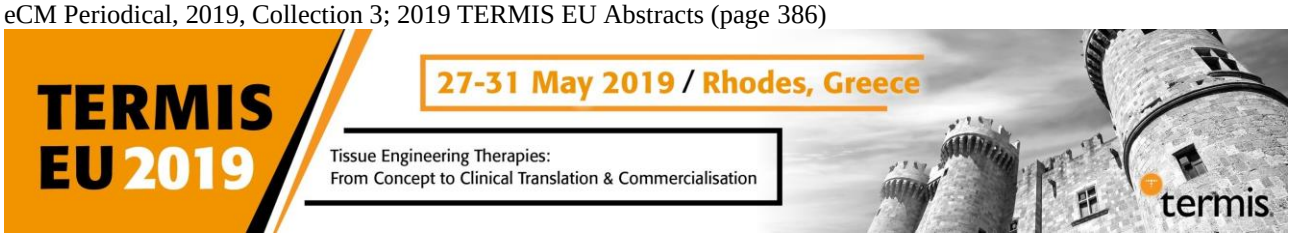

TGF-β-laden polysaccharide material to modulate fibroblast-to-myofibroblast transition for scarring control

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INTRODUCTION: During the reconstitution, and restoration of the integrity of injured skin, scar formation is frequently observed. A way to study and understand mechanisms underlying scaring and in turn, prevent it, is to focus on the fibroblast-to-myofibroblast transition. This work proposes the development of an ECM like material, linked with TGF-β1 and TGF-β3 growth factors, to generate a 3D platform in which their role and overlapping functions in the fibroblast-to-myofibroblast transition, and consequently on healing and scaring, can be unraveled.

METHODS: Several covalent or non-covalent chemical approaches have been considered, in order to graft gellan gum hydrogel (GG) with TGF-β1 and TGF-β3, implicated in the fibrotic scarring response and the scarless healing process. The obtained modified-GG was analyzed by 1H NMR and intrinsic viscosity tests. In addition, morphological and biological characterization of human dermal fibroblast phenotype after seeding within modified-GG will be performed, coupled to the expression pattern analysis of TGF-β-related proteins.

RESULTS & DISCUSSION: The incorporation of the growth factors within the hydrogel without any chemical bonding showed that although the proteins are retained in the higher concentration polymer network, they are rapidly released into the reacting medium from less concentrated polymeric networks. The first chemical strategy based on carbodiimide chemistry, bonded the growth factors via a non-reversible reaction. The BSA-FITC protein was linked to the GG, avoiding its release, independently of the GG concentration used.

CONCLUSIONS: TGF-βs-laden hydrogels show potential to work as 3D platforms to further investigate the implication of these growth factors in the scar formation during wound healing by modulating the TGF-β1/TGF-β3 ratio.

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