

**Photocrosslinkable Hyaluronan Hydrogels Incorporating Platelets Lysate for Periodontal Tissue Regeneration Exhibit Mitogenic and Anti-microbial Properties**

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Guided Tissue Regeneration, as well as various combinatory therapies have been employed in the repair of periodontal defects with some success; however an optimal strategy capable of restoring the anatomy and functionality of the lost periodontal tissues is still to be achieved.

Platelet Lysate (PL) has great potential for tissue regeneration, as source of growth factors involved in essential stages of wound healing and regenerative processes such as chemotaxis, cell proliferation and differentiation<sup>1</sup>. Herein we report the development an injectable photocrosslinkable hydrogels, prepared from methacrylated Hyaluronic Acid (me-HA) and incorporating PL.

The photocrosslinking reaction, triggered after UV excitation of the photoinitiator Irgacure 2959, produced stable and versatile hydrogels. The viscoelastic properties and resilience to degradation by hyaluronidase of the hydrogels were enhanced with the incorporation of PL. Moreover, human Periodontal Ligament Fibroblasts (hPDLFs), either seeded or encapsulated into the hydrogels, showed enhanced biological performance, proportionally to the amount of PL incorporated. Additionally, the hPDLFs seeded on the surface, tend to migrate into the hydrogels incorporating PL. Remarkably, the PL provided antimicrobial properties against methicillin-resistant *Staphylococcus aureus*.

The unique mitogenic, chemotactic and prophylaxis-maintenance properties displayed by the photocrosslinkable HA-PL hydrogels here reported, makes them outstanding materials for tissue engineering approaches targeting various tissues, namely the periodontium.

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#### Reference

1. Santo VE, *et al.* Tissue Engineering B 4, 308, 2013.