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### CL8 - BIODEGRADABLE IMPLANTS FOR THE TREATMENT OF PERIODONTITIS

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#### PURPOSE

The major aim of this work was to develop new biodegradable in situ-forming implants for the treatment of periodontitis with: (i) improved bioadhesive and mechanical properties and (ii) controlling drug release within the periodontal pocket.

#### MATERIALS AND METHODS

Poly(lactic-co-glycolic) acid (PLGA) and polylactic acid (PLA) solutions were prepared by dissolving the polymer and doxycycline hyclate in N-methyl pyrrolidone and were subsequently injected in phosphate buffer pH 7.4 or agarose gels. Optionally plasticizers and hydroxypropyl methylcellulose (HPMC) were added to the initial polymeric solution to improve the mechanical properties of the implants. The resulting implants were characterized with a texture analyzer and drug release was measured in small vials. The antibacterial activity was determined on Columbia agar plates inoculated with different bacterial strains.

#### RESULTS

Doxycycline hyclate release can be controlled by varying the type and amount of biodegradable polymer. Addition of small amounts of plasticizer can effectively decrease the strength of the implants and increase their bioadhesion without affecting the resulting antibacterial activity. Bioadhesivity of the implants could be further increased by addition of small amounts of bioadhesive material (HPMC). Increasing the content and molecular weight of HPMC significantly increased the bioadhesive properties of the implant and allowed to modulate the release rate.

#### CONCLUSIONS

Biodegradable in-situ forming implants with controlled drug delivery could successfully be prepared. The addition of plasticizer and HPMC to the formulation is a very interesting tool to modulate drug release and improve the bioadhesive and mechanical properties of the implants.