J Bioremed Biodeg 2016, 7:5(Suppl)
http://dx.doi.org/10.4172/2155-6199.C1.003

Biodegradable poly(propylene carbonate)-based composite: An alternative biomaterial to polylactic acid

Fariba Dehghani[1], **Iman Manavitehrani**[1], **Ali Fathi**[1], **Yiwei Wang**[1] and **Peter K Maitz**[1,2]
[1]University of Sydney, Australia
[2]Concord Repatriation General Hospital, Australia

Poly(lactic acid) (PLA) and other polyester-based polymers are broadly used in biomedical applications due to their favourable mechanical strength and biodegradable properties. However, the acidic properties of their degradation products may lead to clinical complications, such as inflamation, long-term osteoporosis and other unpredictable issues. In this study, we demonstrate the superior properties of the poly(propylene carbonate) (PPC)-starch composite as an alternative to polyester-based biomaterials. The degradation products of PPC-starch are mainly carbon dioxide and water. Hence, the pH in the surrounding tissues of an implant fabricted from this composite does not decrease. Moreover, the mechanical strength of PPC-starch composites is tuneable within the range of 0.2±0.03 MPa to 33.9±1.51 MPa, by varying the starch content from 0-50 w%. PPC-starch composites are cytocompatible as osteoblast cells adhere and proliferate on their surface within seven days. The long-term biocompatibility of PPC-starch is assessed via subcutaneous implantation in mice. The results of histological analysis demonstrate no symptom of inflammation for PPC-starch composite after eight weeks implantation, while the biodegradation of PLA lead to massive immune cell infusion and inflammation. These results underline that PPC-starch is suitable for biomedical applications and can be used for the musculoskeletal tissue regeneration.

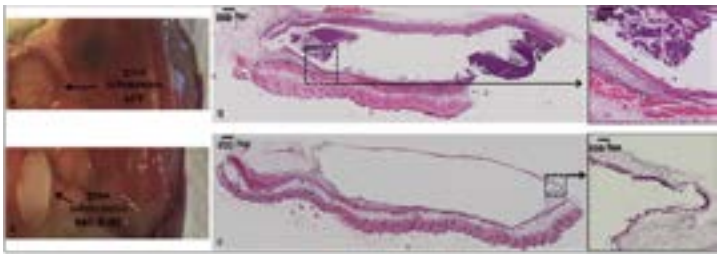

Figure 1: The explanation site of PPC-ST50 (a) and PLA (b) 8 weeks post-surgery, and haematoxylin and eosin staining of paraffin sections of the implantation site at 8 weeks around PPC-ST50 composite (c) and PLA (d). After 8 weeks a prominent foreign body reaction is observed around PLA implantation zone. However, the inflammatory response to the PPC-ST50 composite is resolved dramatically.

fariba.dehghani@sydney.edu.au

Preparation of some chitosan derivatives and study of their effect on human genetic material

Hadi S Al-Lami, Sara H Mutasher and **Afrodet A Salih**
University of Basrah, Iraq

Chitosan is a polycation biopolymer material. It has several applications, especially in the biopharmaceutical and biomedical fields. Chitosan was produced from shrimp waste by chemical method involving demineralization, deproteinization and deacetylation. It was characterized by intrinsic viscosity measurement and Fourier transform infra-red in order to determine the average molecular weight and degree of deacetylation of purified chitosan. Chitosan was modified by grafting process with maleic anhydride, poly(adipic anhydride) and poly(sebacic anhydride) to evaluate their effect on binding to the human genomic DNA. The grafted chitosan derivatives appeared as promising materials to be used as a model for DNA and gene delivery. Grafted chitosan-DNA complexes were determined by gel electrophoresis technique and ultraviolet spectroscopy.

hadisalman54@yahoo.com