EuroSciCon

International Conference on

Wound Care, Tissue Repair and Regenerative Medicine

February 25-26, 2019
Prague, Czech Republic

Clin Pediatr Dermatol 2019, Volume: 5
DOI: 10.21767/2472-0143-C1-009

THE DEVELOPMENT OF NOVEL ANTIBODY-FUNCTIONALISED CORONARY ARTERY STENTS FOR THE PROMOTION OF ENDOTHELISATION

Despoina Kesidou and Brian Cousins
University College London, UK

Cardiovascular disease (CVD) is the leading cause of mortality worldwide claiming almost 17.7 million deaths annually. The primary cause is atherosclerosis and the main therapeutic approach is stenting. Despite much progress in stent development, unwanted side effects are yet to be resolved. Since the main cause is poor endothelisation surrounding damaged vessels, there is increasing need for the development of novel approaches to enhance endothelialisation. We have developed a simple approach using polycarbonate-urea urethane pre-polymers, which can be easily coated on to metallic biomaterials such as 316L stainless steel and chemically modified to produce amine groups. These groups can be exploited for site directed immobilisation of monoclonal antibodies such as CD34+, CD31+, CD133+ that bind to receptors on endothelial cell surface to promote endothelisation. Surface modification was verified by characterisation using contact angle (θ˚), ATR-FTIR, ToF-SIMS, orange II assay and ELISA. EC based assays used Alamarblue®, total DNA and immunohistochemical staining to study the effect of these platforms on human umbilical vein endothelial cells. Our results demonstrated that antibody immobilisation resulted in significantly increased cell metabolic activity and proliferation ($p < 0.05$). CD34 antibody immobilisation resulted in an increase of ~54% in metabolic activity and ~62% in total DNA, the immobilisation of CD31 antibody to ~60% increased metabolic activity and ~67% increased DNA, while CD133 immobilisation led to an increase of ~56% in metabolic activity and ~63% in total DNA when compare with controls. Moreover, co-immobilisation of an antibody mixture on a single platform resulted in ~65% increase in HUVEC metabolic activity and ~70% increase in total DNA. These results confirmed that our approach can promote endothelisation *in vitro* and current studies investigating blood compatibility of the antibody coatings will explore their influence on in-stent restenosis and thrombosis towards a new generation of biohybrid stent coatings that are now in demand.

rmhkdke@ucl.ac.uk