

In-vitro study of drug loading on polymer-free oxide films of metallic implants

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摘要

Abstract

Traditionally, a drug that is loaded onto a metallic surface has to use various polymer bondings as its platform. Unfortunately, polymer coatings on a metallic surface cause numerous problems after implantation, such as late thrombosis, inflammation, and restenosis. This research was conducted to investigate whether an oxide layer can be used as a polymer-free platform for drug loading, especially for cardiovascular stents. The interaction and loading of heparin onto different oxide films on 316LVM stainless steel wire was confirmed in vitro by experimental studies using linear voltammetry, electrochemical impedance spectroscopy, and electron spectroscopy for chemical analysis. The eluting of heparin from heparinized surface was studied by using high-performance liquid chromatography, and activated clotting time in addition to linear voltammetry and electron spectroscopy for chemical analysis. Experimental results show that amorphous oxide could be a potential substitute for the polymer coating of drug-loaded stents for minimizing metallic corrosion, inflammation, late thrombosis, and restenosis.