

Drug Release from a Chemically Anchored Phospholipid Monolayer on Polymer Substrates

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We report a novel method of preparing a multi-layer polymer film as a matrix for local drug delivery that can be used for drug-coated stenting. The first layer is an acrylated polymer film (poly(octadecyl acrylate-co-hydroxybutyl acrylate), poly(OA-co-HA)) with echinomycin dispersed therein. The second layer is comprised of a chemically grafted phospholipid polymeric monolayer onto the acrylated polymer film which was prepared by using in situ photopolymerization of a pre-assembled acrylated phospholipid (1-stearoyl-2-[12-(acryloyloxy)-dodecanoyl]-sn-glycero-3-phosphocholine) monolayer, produced by lipid vesicle fusion, onto the acrylated polymer film. The multi-layer polymer film was capable of reducing the burst release of the drug, due to the highly dense phospholipid monolayer. This multi-layer system also inhibited platelet adhesion and smooth muscle cell proliferation. In these same preferred embodiments, the multi-layered system is capable of reducing the burst release of the biologically active agents from the first layer and sustaining a release of an effective amount of these agents for a relatively extended period of the time.