Development of Stabilized Cytomimetic Thin Films for Blood Compatible Materials

김광명, 변영로*, 김현균, 김철희[1]
광주과학기술원 신소재공학과; [1]인하대학교 고분자공학과
(yrbyun@kjist.ac.kr*)

Toward the goal of developing a versatile model for blood compatible materials, a series of stabilized and nano-structure controlled cytomimetic thin films was prepared. The acrylated phospholipid and PEG were used to produce cytomimetic thin films onto acrylated silicon wafers and polymer substrates using vesicle fusion method. Then, phospholipid and PEG covered lipid monolayers containing acryloyl groups in the monolayer were in-situ polymerized onto acrylated substrates. As confirmed by atomic force microscopy, X-ray reflectivity and X-ray photoelectron spectroscopy, pure phospholipid and PEG covered phospholipid monolayers were chemically anchored to substrates and they formed lipid and PEG covered lipid monolayer structures with the thickness of 3 nm and 9 nm, respectively. These chemically anchored phospholipid and PEG covered lipid monolayers showed good stability to PBS, surfactant, and EO gas sterilization. Moreover, these stabilized cytomimetic thin films greatly increased the blood compatibility with respect to protein adsorption, platelet adhesion, in vitro, and immune reaction, in vivo.