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Ti-O-N表面肝素分子的共价固定及抗凝血性研究

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摘要 利用磷酸化学吸附方法扩增Ti-O-N薄膜表面的羟基, 扩大与3-氨丙基三乙氧基硅烷(APTES)化学反应的位点, 进而增加Ti-O-N薄膜表面固定的肝素量. 荧光染色法定性分析证明了APTES末端氨基的存在, 甲苯胺蓝法定量测定H_3PO_4处理后的Ti-O-N表面肝素浓度为6.6μg/cm^2. 体外血小板粘附实验表明, 经磷酸处理并固定肝素的Ti-O-N膜表面能够有效抑制血小板的粘附和变形, 具有良好的抗凝血性能. 这为制备无机材料的抗凝血表面构建提供了一个有效的技术手段.

关键词 Ti-O-N薄膜 磷酸化学吸附 共价固定肝素 抗凝血性

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Study on Covalent Immobilization of Heparin on Ti-O-N Surface and Antithrombogenicity

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Abstract Fourier transform infrared spectroscope (FTIR) and X-ray photoelectron spectroscope (XPS) were used to characterize the surface component and bonding state, and these analyses show that the content of hydroxyl group on the surface of Ti-O-N film is enhanced by the chemisorption of phosphoric acid, and the reaction sites with 3-aminopropyltriethoxysilane (APTES) are amplified, furthermore the concentration of immobilized heparin molecules are increased. Fluorescence staining analysis qualitatively proves that the terminal amino groups of APTES are in existence. The result of the toluidine blue method shows that the concentrations of the immobilized heparin on the Ti-O-N film treated by phosphoric acid are 6.6μg/cm^2. The evaluation of the platelet adhesion test in ~vitro indicates that the Ti-O-N film treated by phosphoric acid and then immobilized with the heparin molecules can effectively suppress the adhesion and activation of the platelets, and has a better antithrombotic property.

Key words Ti-O-N film chemisorption of phosphate covalent immobilization of heparin antithrombogenicity

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