

· 基础与临床研究 ·

钛表面接枝溴代十六烷后的杀菌效果研究

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【摘要】目的 在钛表面沉积透明质酸(HA)和壳聚糖(CHI)聚电解质多层膜,并用溴代十六烷对CHI上的氨基季铵化,以评价其杀菌效果。**方法** 在碱化处理过的钛片上吸附带正电荷的聚乙烯亚胺(PEI),再用层层自组装的方法在钛表面交替沉积带负电荷的HA和带正电荷的CHI,并用溴代十六烷($C_{16}H_{33}Br$)对CHI上的氨基季铵化,形成 $Ti-PEI-(HA-CHI)_{20}-N^+(C_{16}H_{33})_3Br$ 涂层,扫描电子显微镜(SEM)对涂层断面进行表征;以纯钛为对照组, $Ti-PEI-(HA-CHI)_{20}$ 和 $Ti-PEI-(HA-CHI)_{20}-N^+(C_{16}H_{33})_3Br$ 为实验组,分别在其表面进行变形链球菌(*S.m*)培养24h后用荧光显微镜和SEM检测钛片表面的细菌活性。**结果** SEM显示聚电解质多层膜已沉积到钛片表面并具有一定的厚度。荧光显微镜显示纯钛表面有大量的活细菌, $Ti-PEI-(HA-CHI)_{20}$ 上细菌数量较少,且有部分死菌;而 $Ti-PEI-(HA-CHI)_{20}-N^+(C_{16}H_{33})_3Br$ 上细菌几乎全为死菌。SEM结果显示纯钛、 $Ti-PEI-(HA-CHI)_{20}$ 、 $Ti-PEI-(HA-CHI)_{20}-N^+(C_{16}H_{33})_3Br$ 3组钛片上的细菌数量依次减少。**结论** 钛表面沉积HA/CHI聚电解质多层膜,并对多层膜中的CHI季铵化后,其表面具有显著的杀菌作用。

【关键词】 钛 聚电解质多层膜 壳聚糖 溴代十六烷 杀菌

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Effect of grafting 1-Bromohexadecane onto titanium surface on bactericidal ability

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【Abstract】Objective To evaluate the effect of grafting 1-Bromohexadecane onto polyelectrolyte multilayer films assembled by HA and CHI of Titanium (Ti) surface on bactericidal ability. **Methods** Firstly, the poly(ethylene imine)(PEI) was deposited on Ti surface, and then polyelectrolyte multilayer films were prepared by layer-by-layer assembly with HA and CHI, subsequently the $Ti-PEI-(HA-CHI)_{20}-N^+(C_{16}H_{33})_3Br$ coatings formed by the quaternization CHI with 1-Bromohexadecane. The Ti sample embedded in resin was observed under SEM. After the culture of *Streptococcus mutans* (*S.m*) on the Ti surface for 24 hours, the bactericidal ability was tested by fluorescence microscopy and SEM. **Results** SEM showed the $PEI-(HA-CHI)_{20}-C_{16}H_{33}Br$ was successfully deposited on Ti surface. Fluorescence microscopy showed that a large number of live bacterial on bare Ti, and on $Ti-PEI-(HA-CHI)_{20}$ surface, the number of bacteria was less than that on the bare Ti, and some of the bacteria were dead; while on the $Ti-PEI-(HA-CHI)_{20}-N^+(C_{16}H_{33})_3Br$ surface, the number of bacteria was dramatically