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论文

胆固醇-聚(D,L-乳酸)的制备及软骨细胞相容性研究

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摘要 依据胆固醇对细胞膜良好的热力学亲和力及可以调节细胞膜磷脂双分子层的结构和动态行为的生理学的特点,采用本体聚合的方法制备了胆固醇-聚(*D*,*L*-乳酸),经GPC,^{1}H-NMR分析证明产物分子量与理论分子量有较好的一致性,证明了聚合物的分子量可以通过调节*D*,*L*-丙交酯和胆固醇的量来控制.软骨细胞粘附率、增殖率以及3-(4,5-二甲基噻唑)-2,5-二苯基四氮唑溴盐(MTT)细胞活性的观测结果表明相比纯聚乳酸,胆固醇-聚乳酸明显促进了细胞的粘附与生长.通过激光共聚焦显微镜观察细胞形貌结果显示相比胆固醇-聚乳酸表面,纯聚乳酸表面的细胞数量较少且大多团聚没有正常铺展,而胆固醇-聚乳酸表面的软骨细胞则分布均匀,铺展充分.以上结果证明了胆固醇的存在有利于软骨细胞的生长和粘附,预示着胆固醇-聚乳酸在软骨组织工程以及其他相关的生物医疗领域有着广阔的应用前景.

关键词 胆固醇 聚乳酸 软骨细胞相容性

分类号

SYNTHESIS AND CHARACTERIZATION OF POLY(D,L-LACTIDE-CHOLESTEROL) AND ITS CHONDROCYTE COMPATIBILITY PROMOTION

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Abstract A narrow molecular weight distribution poly(*D*,*L*-lactide—cholester01)(LC)was synthesized by bulk polvmerization. The molecular weights of LC obtained from ^{1}H-NMR and GPC were in good agreement with the theoretical values. which indicate that the LC molecular weight can be adjusted by varying the *D*,*L*-lactide / chalesterol ratio. The chondrocyte cell attachment,proliferation and 3-(4,5-dimethyhhiazol-2-yl)-2,5-diphenyl-2H-tetrazolium bromide(M'IT)cell activity on LC and poly(*D*,*L*-latic acid)(PLA)were investigated. The results showed that LC exhibited improved cell attachment and significantly better proliferation compared with pure PLA. The confocal laser scanning microscopy(CLSM)images showed that the number of chondracytes on PLA films was 1ess than that on LC. The chondrocytes on LC are spreading uniformly and completely while the chondrocytes on PLA are clotted and not in a normal spreading status. A1l the results above demonstrate that cholesterol-containing materials can construct a chondrocyte compatible surface and may have potentials for cartilage tissue engineering and other biomedical applications.

Key words Poly（D L-lactic acid） Cholesterol Chondrocyte compatibility

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