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论文

葡聚糖双亲性衍生物修饰PLA亚微粒子的制备及其表面多重生物因子功能化

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摘要 以胆固醇半琥珀酸酰氯对$NaIO_4$氧化的醛化葡聚糖进行疏水改性, 制备了醛基化双亲性葡聚糖衍生物Chol-Dex-CHO;利用醛基与己二酰肼酰胺化反应, 实现葡聚糖主链的氨基化;生物素经二环已基碳二亚胺活化后与双亲性葡聚糖衍生物主链上的氨基偶联, 形成生物素化(3%)双亲性葡聚糖(Chol-Dex-Biotin). 将聚乳酸(PLA)与Chol-Dex-Biotin溶液共透析可形成亚微粒子, 双亲性多糖可通过疏水基团锚定于PLA亚微粒子表面, 透射电子显微镜与原子力显微镜测试观察到清晰的球形核壳结构, 激光粒度仪测定亚微粒子粒径与粒径分布表明调节Chol-Dex-Biotin与PLA的配比可以控制亚微粒子的粒径(150~200 nm), X-射线光电子能谱证明亚微粒表面存在Chol-Dex-Biotin. 在此基础上, 以FITC标记的转铁蛋白(Tf-FITC)和生物素化兔IgG为模型生物功能因子, 分别通过共价偶联及生物素-亲合素物理结合两种机理对葡聚糖包覆的PLA纳米微粒表面进行多重生物因子功能化修饰, 得到表面Tf和IgG双重修饰的PLA亚微粒子(Tf-PLA-IgG submicron particles). 亚微粒子表面Tf和...

关键词 葡聚糖 聚乳酸 亚微粒子 表面 生物功能化

分类号

SURFACE MULTI-BIOFUNCTIONALIZATION OF PLA SUBMICRON PARTICLES COATED WITH AMPHIPHILIC DEXTRAN DERIVATES

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Abstract Amphiphilic dextran bearing biotin,cholesterol and hydrazide side groups was synthesized by esterifying of dextran polyaldehyde with cholesterol 3-hemisuccinyl chloride,followed by reacting aldehyde groups with adipic dihydrazie. and then conjugating carbodiimide—activated biotin to amino groups. The resultant dextran derivates were used to co-dialyze with poly(lactic acid)(PLA)DMSO solutions against water to form PLA submicron particles with dextran derivates anchored on the surface. The morphologies of the submicron particles were observed by TEM and AFM,and the diameter and diameter distribution were measured using photon correlation spectrum.The results showed that the submicion particles were spherical in shape,and the diameters could be controlled by adjusting the ratio of the Chol-Dex-Biotin to the(PLA). The surface structure of the submicron particles was measured by XPS and the results demonstrated the existing of the dextran derivates. By conjugating these submicron particles with transferrin through acryl hydrazone reaction and IgG *via* biotin—avidin mediated physical linking,respectively,PLA submicron particles bearing transferrin and IgG protein simultaneously on the surface were obtained. The conjugation of transferrin and IgG was proved by fluorescence microscope and color development reaction of antiIgG—HRP.

Key words Dextran Poly（lactic acid） Submicron particles Surface Bio-functionalization

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