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壳聚糖纳米微粒荧光探针的制备及特性研究(PDF) 分享到:

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Title: Preparation and characterization of fluorescent chitosan nanoprobe

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关键词: 纳米技术; 分子探针; 壳聚糖; 核酸适配子; 转化生子因子βⅡ型受体; Tenon’s囊成纤维细胞

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摘要: 目的 制备出壳聚糖纳米微粒荧光探针，对其物理特性进行研究，并观察其靶向性及细胞毒性。 方法 使用离子交联法制备出壳聚糖纳米微粒荧光探针（chitosan-nanoparticles-fluorescein isothiocyanate，CS-NP-FITC）。Zeta粒径分析仪观察其粒径及表面电位情况；扫描电镜观察其形态特点；接着用靶向转化生子因子βⅡ型受体（TGF-β receptor Ⅱ，TβRⅡ）的核酸适配子S58标记CS-NP-FITC，作用于人Tenon’s囊成纤维细胞（human Tenon’s capsule fibroblasts，HTFs），观察其靶向结合特异性受体的情况；用LDH释放实验检测其细胞毒性。 结果 制备出的壳聚糖纳米微粒荧光探针CS-NP-FITC的平均粒径为274.6 nm，平均表面电位为+24.3 mV，扫描电镜下可观察到呈球形的微粒，分布均匀；激光共聚焦显微镜下观察到适配子S58标记的CS-NP-FITC能够与TβRⅡ特异性结合；LDH释放试验证实CS-NP-FITC的使用浓度在0.18～18 mg/mL时，细胞毒性很小，具有良好的生物相容性。 结论 壳聚糖纳米微粒荧光探针CS-NP-FITC经适当的适配子或抗体标记后具有靶向结合特异性受体的能力，且细胞毒性小，具有应用于生物成像中的潜力。

Abstract: Objective To synthesize a novel chitosan-nanoparticles-fluorescein isothiocyanate fluorescent nanoprobe (CS-NP-FITC), and to explore its physical properties, targeting ability and cytotoxicity. Methods CS-NP-FITC was synthesized by ionic cross-linking. A Zetasizer Nano ZS instrument was used to measure the diameter and zeta potential of CS-NP-FITC. The morphology of CS-NP-FITC was examined using a scanning electron microscope. CS-NP-FITC was labeled by aptamer S58 targeting transforming growth factor-β receptor Ⅱ (TβR

Ⅱ) to test the targeting ability to specific receptors in human Tenon，s capsule fibroblasts. At last, the cytotoxicity of CS-NP-FITC was studied by LDH cytotoxicity assay. Results The mean diameter of CS-NP-FITC was 274.6 nm, and the zeta potential of CS-NP-FITC was +24.3 mV. The spherical particles were uniformly distributed shown by the scanning electron microscopy. CS-NP-FITC labeled by aptamer S58 could specifically bind to TβRⅡ under a laser scanning confocal microscope. LDH cytotoxicity assay showed that CS-NP-FITC at concentration between 0.18 mg/mL to 18 mg/mL had low cytotoxicity and fine biocompatibility. Conclusion Our study reveal that CS-NP-FITC labeled by suitable aptamer or antibody can specificly bind to target receptors. Due to its low cytotoxicity, CS-NP-FITC has the potential to be applied in bio-imaging.

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