

论文

A549细胞对壳寡糖及其纳米粒的摄取作用

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摘要:

目的研究壳寡糖及其纳米粒的A549肺上皮细胞摄取作用,探讨壳寡糖纳米粒作为药物载体的可能性。方法溶剂扩散法制备壳寡糖纳米粒,以A549肺上皮细胞评价壳寡糖及其纳米粒的细胞毒性,由荧光倒置显微镜、流式细胞仪研究A549细胞对壳寡糖及其纳米粒的摄取作用。结果壳寡糖及其纳米粒的细胞毒性均较低,IC₅₀分别为944.36和643.16 mg·L⁻¹。壳寡糖及其纳米粒的细胞摄取作用与其浓度及细胞孵育时间相关;在同一孵育时间壳寡糖纳米粒的摄取量比等浓度的壳寡糖增加0.49~13.9倍。结论壳寡糖及其纳米粒的细胞毒性较低。壳寡糖形成纳米粒后,可显著增加A549细胞的摄取作用。

关键词: 壳寡糖 纳米粒 A549细胞 细胞毒性 细胞摄取

Study of the uptake of chitosan oligosaccharide nanoparticles by A549 cells

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Abstract:

AimTo study the cellular uptake of chitosan oligosaccharide nanoparticles by A549 cells and evaluate the possibility of chitosan oligosaccharide nanoparticles used as a potential drug carrier. MethodsChitosan oligosaccharide (CSO) was obtained by ultrafiltration separation after regulation of the condition of chitosanase degradation. The molecular weight of CSO was determined by gel permeation chromatography (GPC). Chitosan oligosaccharide nanoparticles (CSO-NPs) were prepared by a novel solvent diffusion method in an oil system after the carrier material grafted fluorescein isothiocyanate (FITC) and the particle size distribution and zeta potential were determined by light scattering and electrophoretic mobility. The cytotoxicity and uptake of FITC-labeled CSO-NPs in A549 cells following various incubation periods were studied by the MTT method and fluorescence microscopy, flow cytometric analysis, respectively. ResultsThe molecular weight (M_w) of CSO was 18 678 u and the particles sizes of CSO-NPs were 133.3 nm (number average) and 368.2 nm (volume average), respectively. The IC₅₀ of CSO and CSO-NPs were 944.36 and 643.16 mg·L⁻¹, respectively, and the result showed low cytotoxicity. Cellular uptake of CSO and CSO-NPs were relative to the concentration and the incubation time. Internalization of CSO-NPs increased 0.49-13.9 times more than that of the CSO with the same incubation time. ConclusionCSO and CSO-NPs have low cytotoxicity. CSO-NPs can significantly improved the uptake of CSO-NPs by A549 cells compared to the same molecular weight of CSO.

Keywords: nanoparticles A549 cell cytotoxicity cellular uptake chitosan oligosaccharide

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