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论文

包埋PLGA微球壳聚糖支架的构建及其对蛋白释放的调节

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摘要：

目的制备能缓慢释放蛋白类药物的细胞生长支架。方法采用冷冻干燥制备壳聚糖支架，测定支架的孔隙率和吸水率。以牛血清白蛋白(BSA)为模型药物，制备乳酸-羟乙醇酸共聚物(PLGA)微球，并包埋于壳聚糖支架中，用扫描电镜观察微球和支架的形态，考察药物在各种支架上的体外释放。结果壳聚糖支架为多孔结构，当预冻温度为-70 ℃时，支架的孔隙率和吸水率分别为78.6%±1.5%和85.1%±6.2%。PLGA微球能够较均匀地覆在壳聚糖支架上。单用壳聚糖支架，BSA在24 h累积释放达90%以上，制成PLGA微球后，再包埋于壳聚糖支架中，则药物释放明显缓慢，168 h的累积释放量为33.5%。通过改变壳聚糖的用量和PLGA材料的型号，可以调控药物在复合支架上的释放。结论包埋PLGA微球的壳聚糖支架有望用于组织工程的支架材料和生长因子的缓慢释放。

关键词： 支架 壳聚糖 PLGA微球 牛血清白蛋白 体外释放

Preparation and release behavior of chitosan scaffolds encapsulating proteins loaded in PLGA microspheres

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Abstract:

AimTo prepare cells scaffolds with the characteristics of sustained release of proteins. MethodsChitosan scaffolds was prepared by freeze-drying. Porosity and water content of scaffolds were determined. Bovine serum album (BSA) was selected as a model protein. Poly (lactic-co-glycolic acid) (PLGA) microspheres were prepared by double emulsion solvent evaporation and encapsulated into chitosan scaffolds. The morphology of PLGA microspheres and various scaffolds were observed using scanning electron microscope. Release behavior of BSA from various chitosan scaffolds was investigated. ResultsThe chitosan scaffold represents porous. At the -70 ℃ of quenching temperature, the porosity and water content of chitosan scaffolds were 78.6%±1.5% and 85.1%±6.2%, respectively. PLGA microspheres can be uniformly encapsulated into scaffolds without any morphology change. Significant sustained release of BSA from PLGA microspheres encapsulated into scaffolds was obtained. The cumulative release at 168 h was only 33.5%, while that of BSA from chitosan scaffolds at 24 h was above 90%. The release behavior can be controlled by adjusting the amount of chitosan in scaffolds and the type of PLGA. ConclusionThe novel chitosan scaffolds encapsulating PLGA microspheres proved to be a promising cells scaffolds with controlling the release of growth factors in tissue engineering.

Keywords: chitosan PLGA microsphere BSA *in vitro* release scaffold

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