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超声辐照在增强多西他赛纳米粒抑制人胰腺癌裸鼠移植瘤增殖中的作用

Ultrasound irradiation for improvement of antitumor effects of docetaxel nanoparticles for human pancreatic cancer xenograft nude mouse models

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作者	单位	E-mail
杨菁	福建医科大学附属协和医院药学部,福建 福州 350001	
张秀娟	福建医科大学附属协和医院超声科,福建 福州 350001	
林礼务	福建医科大学附属协和医院超声科,福建 福州 350001	
薛恩生	福建医科大学附属协和医院超声科,福建 福州 350001	
陈志奎	福建医科大学附属协和医院超声科,福建 福州 350001	jimchen2003@163.com

中文摘要:

目的 探讨超声辐照对多西他赛纳米粒抑制人胰腺癌裸鼠移植瘤增殖作用的影响。 方法 采用乳化-溶剂挥发法制备多西他赛纳米粒,测定载药纳米粒的粒径、载药率、包封率;以彩色多普勒超声检查超声辐照前后肿瘤血流丰富程度的变化,高效液相色谱法测定超声辐照对肿瘤组织药物分布量的影响;经荷瘤裸鼠尾静脉注射多西他赛纳米粒,联合肿瘤局部超声辐照治疗,28天后剥离肿瘤,计算抑瘤率。 结果 多西他赛纳米粒平均粒径为189.71 nm,包封率为85.62%,载药率为4.28%;超声辐照后,肿瘤组织的血流分布面积占肿瘤面积比为(11.37±2.52)%,明显高于超声辐照前的 [(5.42±0.65)%,*P*<0.01];多西他赛纳米粒联合超声辐照后的肿瘤组织内多西他赛药物量为(3.73±0.76)μg/g蛋白,明显高于单纯多西他赛纳米粒注射的肿瘤组织[(1.87±0.35)μg/g蛋白(*P*<0.01);联合静脉注射多西他赛纳米粒与超声辐照治疗的肿瘤生长抑制率达64.69%。 结论 超声辐照具有增强多西他赛纳米粒抑制人胰腺癌裸鼠移植瘤增殖的作用。

英文摘要:

Objective To investigate the influence of ultrasound irradiation on docetaxel nanoparticles inhibiting the growth of pancreatic cancer on xenograft nude mouse models. **Methods** Docetaxel nanoparticles were prepared with the method of emulsion-solvent evaporation, and the particle size, drug-loading rate and encapsulation efficiency were characterized. Color Doppler flow imaging was employed to observe the change of tumor hemoperfusion before and after ultrasound irradiation. After intravenous injection of docetaxel nanoparticles and the following ultrasound irradiation, the content of docetaxle accumulating in tumor tissue was detected with high-performance liquid chromatography. Twenty-eight days after management, the tumor growth inhibition rate was calculated. **Results** The prepared docetaxle nanoparticles had the mean size of 189.71 nm, the drug-loading rate of 4.28% and encapsulation efficiency of 85.62%. Under docetaxle nanoparticles combined with ultrasound irradiation, the ratio of blood flow distribution area in whole tumor accounted for (11.37±2.52)%, and the docetaxel accumulating in tumor tissue was detected as (3.73±0.76)μg/g protein, much higher than those given single docetaxel nanoparticles ([5.42±0.65] %, [1.87±0.35]μg/g protein, both *P*<0.01). The combination of docetaxel nanoparticles and ultrasound irradiation achieved the highest tumor growth inhibition rate (64.69%). **Conclusion** Therapeutic ultrasound irradiation can enhance docetaxel nanoparticles accumulating in pancreatic cancer tissue, and thus improve its antitumor effects on human pancreatic cancer xenograft nude mouse models.

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