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多西他赛pH敏感嵌段共聚物胶束的制备

陈大为;鄢璐;乔明曦;胡海洋;赵秀丽;陈曦;邓意辉

沈阳药科大学 药学院, 辽宁 沈阳 110016

摘要:

本文在合成pH敏感两亲性嵌段共聚物聚(2-乙基-2-噁唑啉)-聚乳酸(PEOz-PDLLA)的基础上,采用薄膜分散法制备 多西他赛pH敏感嵌段共聚物胶束,利用芘荧光探针技术测定胶束的临界胶束浓度(CMC),通过高效液相色谱测定 胶束的载药量及包封率;分别利用透射电镜、动态光散射法和zeta电位分析仪对胶束的形态、粒径和表面电位进行 了表征;采用透析法考察了载药聚合物胶束的体外释放行为。结果表明,胶束的临界胶束浓度值为1.0×10<sup>-3</sup> g·L<sup>-</sup> <sup>1</sup>;载药量可达15.0%,包封率为91.1%;胶束的粒度分布很窄,平均粒径为28.7nm;胶束粒子为圆球形且分散 良好,其表面zeta电位值为(1.19±0.12)mV;在pH 7.4释放介质中,多西他赛胶束具有缓释作用;而在pH 5.0条 件下,胶束释药明显加快,体现出PEOz-PDLLA胶束释药行为的pH敏感性。综合上述研究可见,PEOz-PDLLA嵌段 ▶Email Alert 共聚物胶束作为疏水性抗肿瘤药物的给药系统具有很好的应用前景。

关键词: 多西他赛 pH敏感 嵌段共聚物 胶束 薄膜分散法

Preparation of docetaxel-loaded pH-sensitive block copolymer micelles

CHEN Da-wei; YAN Lu; QIAO Ming-xi; HU Hai-yang; ZHAO Xiu-li; CHEN Xi; DENG Yi-hui

### Abstract:

Basing on the synthesis of pH-sensitive amphiphilic block copolymer poly(2-ethyl-2-oxazoline)-poly(D,Llactide)(PEOz-PDLLA), this paper presents the preparation of docetaxel-loaded pH-sensitive block copolymer micelles using film dispersion method. The critical micelle concentration (CMC) was measured 事 乔明曦 by pyrene fluorescent probe technique. The entrapment efficiency and drug-loaded amount were determined by HPLC. The morphology, diameter and surface potential of the micelles were characterized by transmission electron microscopy (TEM), dynamic light scattering (DLS) and zeta potential analyzer, respectively. The *in vitro* release behavior of DTX from polymeric micelles was investigated using dialysis method. The results indicated that the CMC, drug-loaded amount and entrapment efficiency of the micelles was  $1.0 \times 10^{-3}$  g·L<sup>-1</sup>, 15.0% and 91.1%, respectively. The micelles had a narrow size distribution, with a mean diameter of 28.7nm. The micelle was globular-shaped and its zeta potential was (1.19±0.12) mV. In pH 7.4 PBS, docetaxel was released in a sustained manner from the micelles; while in PBS at pH 5.0, drug was released more rapidly, which suggested the pH-sensitive drug release behavior of the PEOz-PDLLA micelles. According to all the studies above, it can be concluded that the PEOz-PDLLA block copolymer micelles may be applied as promising drug delivery system for hydrophobic anti-tumor drugs.

Keywords: pH-sensitive block copolymer micelle film dispersion method docetaxel

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作者简介:

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