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Study on liver targeting 5-fluorouracil solid lipid nanoparticles

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Abstract

AIM: To prepare 5-fluorouracil solid lipid nanoparticles (5-FuE-SLN) with liver targeting.

METHODS: 5-Fu was employed as model drug to acylate with stearyl chloride and obtain 5-Fu precurser N1-stearyl-5-Fu (5-FuE). The precurser was determined by nuclear magnetic resonance and infrared spectrometry and used to prepare 5-FuE-SLN by the method of physical agglomeration. Transmission Electron Microscopy (TEM) was employed to study the shape, mean size and particle distribution of 5-FuE-SLN. The drug loading, and releasing characteristics *in vivo*, the drug distribution and pharmacokinetics *in vivo* were also investigated by HPLC method.

RESULTS: The average diameter was 240.19 nm, and the drug loading was 20.53%. The releasing characteristics *in vivo* was fitted to first-order pharmacokinetic model. The distribution of 5-FuE-SLN in mice showed that 5-FuE-SLN had significant liver targeting being compared with 5-Fu injection. The concentration of 5-FuE-SLN group in mice liver was double over that of control group. The main pharmacokinetics parameters in rabbits were as follows: Vc = 0.04336 $L \cdot kg^{-1}$, $T_{1/2}\beta$ - 1.2834 h, CL = 0.1632 $L \cdot h^{-1}$.

CONCLUSION: 5-FuE-SLN has the characteristic of liver targeting. Using 5-Fu precurser to enhance its liposoluble properties and the method of preparation presented in this paper seems to have significant advantages and important reference value.

Key words: Liver; Fluorouracil; Solid lipid nanoparticles; Frug delivery systems; Pharmacokinetics

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