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Preparation and testing of cefquinome-loaded poly lactic-co-glycolic acid microspheres for lung targeting

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The short elimination half-life of cefquinome limits its use for treating lung infections caused by *Klebsiella pneumonia* in veterinary clinic. The aim of this study was to prepare cefquinome-loaded poly lactic-co-glycolic acid (PLGA) microspheres and to evaluate their *in vitro* and *in vivo* characteristics and pharmacodynamics for therapy of pneumonia in a rat model. Microspheres were prepared using a spray-drying method and were characterized in terms of morphology, size, drug-loading coefficient, encapsulation ratio and *in vitro* release. The prepared microspheres were spherical with smooth surfaces and uniform size ($12.4 \pm 1.2 \mu\text{m}$). The encapsulation efficiency and drug loading of cefquinome was $91.6 \pm 2.6\%$ and $18.3 \pm 1.3\%$, respectively. *In vitro* release of cefquinome from the microspheres was sustained for 48 h and was supported by the Korsmeyer-Peppas model. *In vivo* studies identified the lung as the target tissue and the region of maximum cefquinome release. A partial lung inflammation was observed, but disappeared spontaneously as the microspheres were removed through *in vivo* decay. We have successfully prepared a drug-loaded microsphere delivery system for the treatment of pneumonia caused by *Klebsiella pneumonia* ATCC 10031. The sustained cefquinome release from the microspheres revealed its applicability as a drug delivery system that minimized exposure to healthy tissues while increasing the accumulation of therapeutic drug at the target site. Our study highlights the targeted drug delivery of cefquinome as the promising alternatives to control the important zoonotic pathogens.

Biography

Zhihui Hao has completed her PhD from China Agricultural University and Post-doctoral studies from Lanzhou Institute of Husbandry and Pharmaceutical Sciences of CAAS. She has published more than 30 papers in reputed journals and has been serving as an Editorial Board Member in journals of repute.

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