Evaluation of ceftiofur-PHBV microparticles in rats



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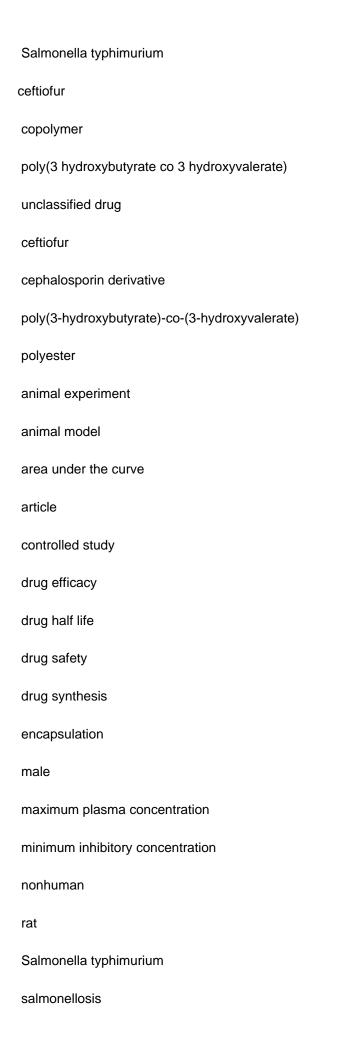
Despite the high number of antibiotics used for the treatment of infectious disease in animals, the development of slow release formulations presents a significant challenge, particularly in using novel biomaterials with low cost. In this report, we studied the pharmacokinetics, toxicity, and therapeutic activity of ceftiofur-PHBV (ceftiofur-poly(3-hydroxybutyrate-co-3-hydroxyvalerate)) in rats. The pharmacokinetic study demonstrated a sustained release of ceftiofur into the bloodstream, with detectable levels over the minimum inhibitory concentration for at least 17 days after a single intramuscular injection of ceftiofur-PHBV (10 mg/kg weight). In addition, the toxicological evaluation of biochemical, hematological, and coagulation blood parameters at the therapeutic dose demonstrated the safety of ceftiofur-PHBV, with no adverse effects. In addition, ceftiofur-PHBV exhibited a therapeutic effect for a longer time period than the nonencapsulated ceftiofur in rats challenged with Salmonella Typhimurium. The slow release of ceftiofur from the ceftiofur-PHBV, its low toxicity in the blood parameters evaluated, and the efficacy in the rats infected with Salmonella Typhimurium make ceftiofur-PHBV a strong candidate for biotechnological applications in the veterinary industry. © 2014 Vilos et al.

Blood parameters

Drug delivery

Microparticles

Rat infection model



sustained drug release
time to maximum plasma concentration
toxicity testing
animal
disease model
dose response
drug effects
erythrocyte
intramuscular drug administration
microbial sensitivity test
microbiology
Salmonella enterica serovar Typhimurium
Salmonella Infections
Sprague Dawley rat
structure activity relation
Animals
Cephalosporins
Disease Models, Animal
Dose-Response Relationship, Drug
Erythrocytes
Injections, Intramuscular
Male
Microbial Sensitivity Tests
Polyesters
Rats
Rats, Sprague-Dawley

Salmonella Infections

Salmonella typhimurium

Structure-Activity Relationship