Enhanced anti-inflammatory effects of nanoencapsulated diclofenac

ABSTRACT

This study was conducted to compare the anti-inflammatory efficacy of nanoencapsulated and free-form diclofenac in rat. Diclofenac-loaded liposomes were prepared using the proliposome method. The anti-inflammatory effects of nanoencapsulated and free diclofenac were evaluated using the carrageenan-induced paw edema, formalin-induced paw licking and cotton-pellet-induced granuloma tests in vivo. For carrageenan-induced paw edema, 2 and 20 mg/kg liposome-encapsulated diclofenac showed significant paw volume reduction compared to free form diclofenac of equivalent dosage groups. In the formalin test, significant reduction in paw-licking time was observed in late phase for both liposome-encapsulated and free-form diclofenac (2 and 20 mg/kg) with the percentage of inhibition of 28.62, 60.17% for free-form diclofenac and 31.45, 78.84% for liposome-encapsulated diclofenac, respectively. In cotton-pellet-induced granuloma test 20 mg/kg free-form diclofenac showed significant reduction in the size of granuloma in both transudative and granuloma weight with percentage of inhibition of 42.93 and 49.26%, respectively, when compared to controls. Interestingly, 20 mg/kg nanoencapsulated diclofenac showed a larger reduction of the parameter with percentage of inhibition of 48.43 and 63.55%, respectively. Collectively, these results indicated that nanoencapsulated diclofenac exhibited statistically higher efficacy than free-form diclofenac when orally administered. Hence, clinical dosage may be reduced thereby reducing the drug's adverse effects.

Keyword: Diclofenac; liposome; Efficacy and anti-inflammation; Nanoencapsulation