Nanoparticles of heparins of marine invertebrates: anti-inflammatory effect on model of inflammatory bowel disease.

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Heparin is a polysaccharide of animal origin, mainly used as an anticoagulant in the prevention and treatment of deep vein thrombosis. Recent pre-clinical studies have also shown a potent anti-inflammatory effect of this glycosaminoglycan. For example, several works indicate the presence in marine invertebrates of heparin-like glycans containing potent anti-inflammatory effect and no bleeding tendency. It has been shown recently that nanoparticles increase the oral bioavailability of macromolecular drugs, including heparin. The present work describes the effect of nanoparticles of heparin analogues from marine invertebrates in an experimental model of inflammatory bowel disease (IBD) in rats. Preliminary results showed efficient formation of nanoparticles of heparin, with a good range of distribution and size. Performance and efficiency assays of encapsulated heparin, as well as releasing tests in different pH ranges were satisfactory. In IBD, increased production of TNF-α, TGF-β and IL-1 is associated with tissue damage mediated by immune response of the cellular infiltrate. Rectal administration of TNBS induced significant increase of leukocytes rolling and TNF-α, TGF-β and IL-1 levels in inflamed colon. The evaluation of the anti-inflammatory action of the heparin nanoparticles in animals revealed a great reduction in leukocytes rolling, cellular infiltrate and other pro-inflammatory parameters, in addition to a drastic reduction in the levels of TNF-α, TGF-β and IL-1. These results indicate that heparin nanoparticles possess anti-inflammatory effect in an animal model of IBD.

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