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Anti-*Helicobacter pylori* effectiveness and targeted delivery performance of amoxicillin-UCCs-2/TPP nanoparticles based on ureido-modified chitosan derivative

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Abstract

The amoxicillin-UCCs-2/TPP nanoparticles constructed with ureido-modified chitosan derivative UCCs-2 and sodium tripolyphosphate (TPP) played an important role to deliver drug to achieve more efficacious and specific eradication of *Helicobacter pylori* (*H. pylori*) *in vitro*. In this study, the anti-*H. pylori* effectiveness *in vivo* and uptake mechanism was investigated in details, including the effect of temperature, pH values and the addition of competitive substrate urea on uptake. Compared with unmodified nanoparticles, a more efficacious and specific anti-*H. pylori* activities were obtained *in vivo* by using this biological chitosan derivative UCCs-2. Histological staining and immunological analysis verified that the amoxicillin-UCCs-2/TPP nanoparticles could diminish the proinflammatory cytokines levels and alleviate the inflammatory damages caused by *H. pylori* infection. The uredio-modified nanoparticles also have favorable gastric retention property, which is beneficial for the oral drug delivery to targeted eradicate *H. pylori* infection in stomach. These findings suggest that this targeted drug delivery system may serve for specific treatment of *H. pylori* infection both *in vitro* and *in vivo*, which can also be used as promising nanocarriers for other therapeutic reagents to target *H. pylori*.

Keywords: Helicobacter pylori; Chitosan derivative; Uptake mechanism; Orally targeted drug delivery system; Gastric retention

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