

Development of Multifunction Nanoparticles for Oral Drug Delivery and Wound Healing

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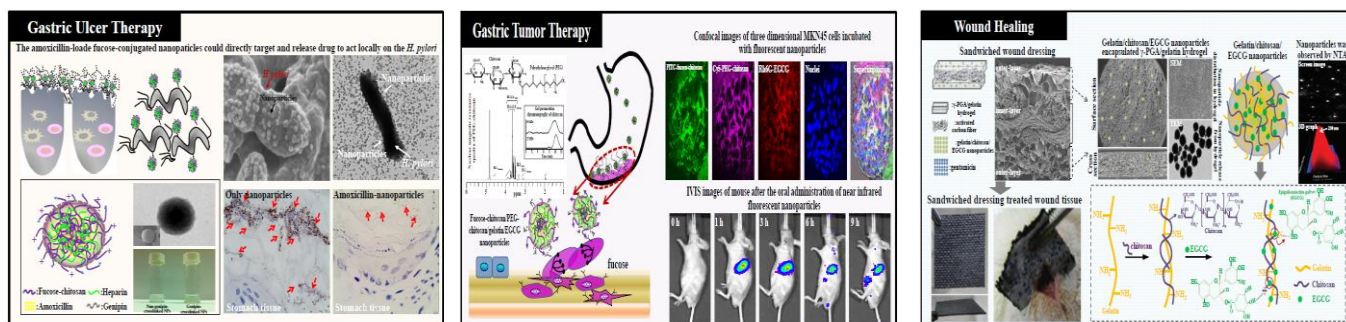
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My research interest concentrates on various multifunction nanoparticles for oral drug delivery and tissue engineering system. We used some polymers and chemical modification method to establish nanotechnology platform for nanomedicine (gastric ulcer and gastric cancer therapy) or regenerative medicine application (skin wound healing). In our laboratory, we have designed three kinds of nanoparticles studies for different translational medicine to clinical requirements:

- 1) **Gastric ulcer therapy:** We developed fucose-conjugated chitosan mixed with heparin nanoparticle system for carrying antibiotic (amoxicillin) drug to treat and inhibit *Helicobacter pylori* growth. The *in vivo* analysis of amoxicillin-loaded nanoparticles, a more complete *H. pylori* clearance effect was observed, and *H. pylori*-associated gastric inflammation in an infected animal model was effectively reduced.
- 2) **Gastric tumor therapy:** We prepared fucose-conjugated chitosan/gelatin nanoparticle-encapsulated epigallocatechin-3-gallate (EGCG) could reduced vascular endothelial growth factor protein expression, followed by apoptosis and effectively inhibited the growth of gastric tumor cells *in vivo* orthotopic gastric tumor mouse model.
- 3) **Wound healing study:** We successfully produced a chitosan/gelatin/epigallocatechin gallate (EGCG) nanoparticle incorporated in a poly(γ -glutamic acid) (γ -PGA)/gelatin hydrogel, which comprised activated carbon fibers with gentamicin, to fabricate a sandwiched dressing to enhance wound regeneration. *In vivo* study reported that the sandwiched dressing, comprising the poly(γ -glutamic acid)/gelatin hydrogel, was easy to remove from the wound and facilitated wound tissue regeneration and accelerated healing process.

We have published 13 SCI papers, got 4 and filed 1 patents related to nanoparticles technology. The selected research achievement is listed in the references.



References

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