# Bilirubin-based nanomedicine for anticancer and anti-inflammation therapy

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Despite the high potency of bilirubin (BR) as an endogenous anti-inflammatory compound, its clinical translation has been hampered because of its insolubility in water and potential toxicity on erythrocytes and immune cells. To overcome the critical issues, we attached polyethylene glycol (PEG) to BR, yielding PEGylated bilirubin (PEG-BR). The PEG-BR self-assembled into nanoscale particles with a size of approximately 110 nm, termed bilirubin nanoparticles (BRNPs). Unlike free BR, BRNPs are fairly water-dispersible and circulate much longer in blood, thus overcoming a critical issue associated with the clinical use of BR. Recently, we demonstrated that BRNPs had potent therapeutic efficacy in animal models of several inflammatory diseases, including inflammatory bowel disease, acute asthma and hepatic ischemic reperfusion injury. We also demonstrated that BRNPs can be used as a dual-stimulus (light and ROS)-responsive drug-delivery carrier, reflecting the fact that BR in NPs undergoes a switch in water solubility and degradation in response to these stimuli. In this talk I will present various metals-chelated BR-based nanoparticle for use as a new theranostic nanomedicine for combined cancer imaging and photothermal therapy.

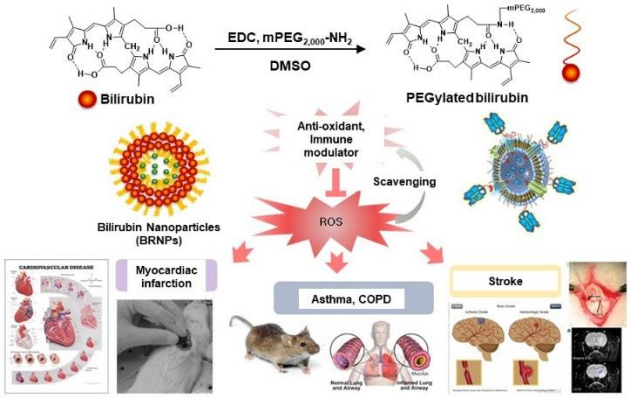


**Figure 1.** Bilirubin-derived nanomedicine used for treatments of various inflammatory diseases.

**References**

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