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Review

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Construction of nanomaterials with targeting phototherapy properties to inhibit resistant bacteria and biofilm infections

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Abstract

The spread of resistant bacteria and the development bacterial biofilm have been two major challenges in the application of biomaterials, causing device failure as well as tissue infections. The overuse of antibiotics has become a common cause of the emergence of multiple antibiotics-resistant bacteria. Besides, biofilm infections are notoriously difficult to treat, as the biofilm matrix provides physical protection from antibiotic treatment. Recently, nanomaterials with high drug loading capacity, various types of stimuli responsiveness, smart targeting and small-size are able to increase local drug concentration and to escape the capture of macrophages. Especially, the loading of drugs to the nanomaterials enhances chances for macrophage capture which is a serious problem related to interaction with immune system. Phototherapy including photothermal therapy and photodynamic therapy has attracted wide attentions in treating infectious diseases as the development of drug-resistant bacteria and bacterial biofilms. In addition, based on the special microenvironment of bacterial infections, various construction and modification methods of nanomaterials showed high efficient

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