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Co-delivery of erlotinib and doxorubicin by pH-sensitive charge conversion nanocarrier for synergistic therapy

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Abstract

Pretreatment of lung cancer cells with epidermal growth factor receptor (EGFR) inhibitor erlotinib has been recently reported that could dramatically synergize their apoptotic response to DNA damage agent doxorubicin (DOX). To translate this synergistic therapy into in vivo anticancer therapy and clinical practice, we designed a novel pH-sensitive charge conversion nanocarrier (M-HHG_2C_{18}-L) that contained erlotinib/DOX combination and produced a sequential staggered drug release for synergistic lung cancer therapy. In this study, a synthetic zwitterionic oligopeptide lipid (1,5-dioctadecyl-L-glutamyl2-histidyl-hexahydrobenzoic acid, HHG_2C_{18}) was used to construct a pH-sensitive lipid bilayer (HHG_2C_{18}-L), which was subsequently applied to coat amino-functionalized mesoporous silica nanoparticles (MSN-NH_2). Erlotinib and DOX were separately incorporated into HHG_2C_{18}-L and MSN-NH_2 respectively to obtain pH-sensitive charge conversion erlotinib/DOX co-delivery nanoparticles

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