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A dual-targeting DNA tetrahedron nanocarrier for breast cancer cell imaging and drug delivery

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Abstract

To enhance efficacy of chemotherapy and achieve real-time imaging of cancer cells, it is crucial to develop nanocarriers with targeted drug delivery capacity and fluorescence property for cancer theranostics. Herein, a dual-targeting DNA tetrahedron nanocarrier (MUC1-Td-AS1411) was constructed for breast cancer cell imaging and targeted drug delivery. This nanocarrier consisted of three components: (i) DNA tetrahedron core for multivalent conjugation of function ligands and loading doxorubicin (Dox); (ii) activatable MUC1 aptamer probe (MUC1-probe), formed by the hybridization of MUC1 aptamer sequence with fluorophore extended from one vertex and complementary sequence with quencher, for targeting and imaging MUC1 protein on cytomembrane; (iii) AS1411 aptamer, which was hybridized to the overhang on three vertexes via prolonged sequence, for binding to nucleolin. Firstly, MUC1-probe of this nanocarrier targeted MUC1 protein of MUC1-positive cells,

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