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Multiplexed imaging diagnosis and chemo-photothermal therapy of cancers based on a novel aptamer-conjugated pegylated-MoS2/Cu1.8 S theranostic nanoplatform

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Fabricating theranostic nanoparticles combining multimode disease diagnosis and therapeutic has become an emerging approach for the personal nanomedicine. However, the diagnostic capability, biocompatibility, and therapeutic efficiency of theranostic nanoplatforms limit their clinic widespread applications. Targeting to the theme of accurate diagnosis and effective therapy of cancer cells, a multifunctional nanoplatform of aptamer and polyethylene glycol conjugated MoS2 nanosheets with Cu1.8 S nanoparticles (ATPMC) is developed. The ATPMC nanoplatform accomplishes photoluminescence imaging, photoacoustic imaging and photothermal imaging for in vitro and in vivo tumor cells imaging diagnosis. Meanwhile, the ATMPC nanoplatform facilitates selective delivery of gene probe to detect intracellular microRNA aberrantly expressed in cancer cells and anticancer drug doxorubicin (DOX) for chemotherapy. Moreover, the synergistic interaction of MoS2 and Cu1.8 S renders the ATPMX nanoplatform with superb photothermal cervoersion efficiency. The ATPMC nanoplatform load with DOX displays near-infrared laser-induced programmed chemotherapy and advanced photothermal therapy. And the targeted chemo-photothermal therapy presents excellent antitumor efficiency.

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