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pH-Sensitive Prodrug Conjugated Polydopamine for NIR-Triggered Synergistic Chemo-Photothermal Therapy

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Abstract: Combination of chemotherapy with photothermal therapy (PTT) demonstrate highly desirable for efficient medical treatment of tumor. At present works, camptothecin (CPT)-containing polymeric prodrug (PCPT) were fabricated by polymerization of a pH-sensitive camptothecin (CPT) prodrug monomer and MPC using reversible addition-fragmentation transfer (RAFT) strategy. The pH-sensitive polymeric prodrug was tethered onto surface of polydopamine (PDA) nanoparticles by amidation chemistry for combination of chemotherapy with photothermal therapy. Specifically, the active CPT quickly released from the multifunctional nanoparticles in acidic microenvironment ascribe to the cleavage of bifunctional silyl ether linkage. Meanwhile, the PDA could convert the near infrared (NIR) light energy into heat with high efficiency, which makes the resulted nanoparticles an effective platform for photothermal therapy. In vitro analysis confirmed that the PDA@PCPT nanoparticles could be efficiently uptaked by HeLa cells and deliver CPT into the nuclei of