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An Activatable Theranostic for Targeted Cancer Therapy and Imaging

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Abstract : A new theranostic strategy is described. It is based on the use of an “all in one” prodrug, namely the biotinylated piperazine-rhodol conjugate 4a. This conjugate, which incorporates the anticancer drug SN-38, undergoes self-immolative cleavage when exposed to biological thiols. This leads to the tumor-targeted release of the active SN-38 payload along with fluorophore 1a. This release is made selective as the result of the biotin functionality. Fluorophore 1a is 32-fold more fluorescent than prodrug 4a. It permits the delivery and release of the SN-38 payload to be monitored easily in vitro and in vivo, as inferred from cell studies and ex vivo analyses of mice xenografts derived HeLa cells, respectively. Prodrug 4a also displays anticancer activity in the HeLa cell murine xenograft tumor model. On the basis of these findings we suggest that the present strategy, which combines within a single agent the key functions of targeting, release, imaging, and treatment, may have a role to play in cancer diagnosis and therapy.

Keywords : theranostic, prodrug, cancer therapy, fluorescence
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