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Molecular design of a novel thiophene-derived o-nitrobenzyl photolabile protecting group with visible light-absorption for the synthesis of hydroxamic acids

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Chemoselectivity is a significant barrier that synthetic chemists face while synthe sizing organic mols. As a remedy, protective groups (P Gs) are used during chem. reactions to prevent highly reactive functional groups from interf ering with other functional groups within the same mol. However, as the number of comparable PGs within a mol. increases, it becomes more difficult to remove individual P Gs using typical methods such as acidic and basic conditions. PGs have also been used in the synthesis of hydroxamic acids (H As), a class of organic compounds known for their potential use as precursors for anticancer drugs such as Trichostatin A, a powerful tumor cell inhibitor. Despite their widespread use, HAs are challenging to synthesize and purify due to their high reactivity and the formation of numerous polysubstituted byproducts during the synthetic process. In this study, we use ortho- nitrobenzyl (o-NB) photolabile protecting groups (PPGs) derived from thiophene to solve the problem of H A synthesis and purifi cation This is a preferable method because it requires only visible light to deprotect these PPGs. However, most o-NB PPGs absorb in the UV region of the electromagnetic spectrum, making them unsuitable for use in biol. systems. Herein, we designed and synthesized a visible light-absorbing thiophene-based o-NB PPG that absorbs in the visible region of the spectrum while avoiding the challenges associated with H A synthesis and purification To demonstrate the stability of our o-NB PPG, we will selectively deprotect classic P Gs using traditional methods without cleaving the HA moiety. With this method, visible light will be used to cleave and generate H A in high yields, with a diagnostic fluore scent byproduct used to quantify the amount of H A formed.

Conference

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