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A turn-on fluorescent probe for simultaneous sensing of cysteine/homocysteine and hydrogen sulfide and its bioimaging applications

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ABSTRACT

Hydrogen sulfide and biothiol molecules such as Cys, Hcy, and GSH play important roles in biological systems. Exploiting a probe to simultaneously detect and distinguish them is quite important. In this work, a versatile fluorescent probe that can simultaneously detect and discriminate Cys/Hcy and H₂S is reported. The probe easily prepared by the Knoevenagel condensation of cyanoacetylindole with chlorinated phenyl-propenal possessed three potential sites that could react with biothiols and H₂S. This probe also exhibited rapidity, high selectivity, and sensitivity for Cys/Hcy and H₂S with distinct optical signal changes. The probe was able to display obvious fluorescence enhancement at 480 nm for Cys/Hcy and unique absorbance enhancement at 500 nm for H₂S. We also demonstrated that the probe can be successfully applied to image Cys in MCF-7 cells using a confocal fluorescence microscope.

Graphical Abstract

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