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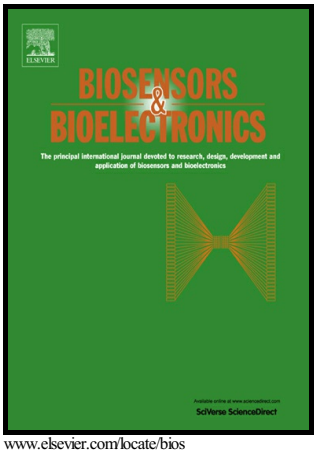

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A fluorescent probe for the efficient discrimination of Cys, Hcy and GSH based on different cascade reactions

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ABSTRACT

A fluorescent probe (1) for distinguishing amongst biothiols, including cysteine (Cys), homocysteine (Hcy) and glutathione (GSH), is developed based on different cascade reactions. The key design feature of fluorescent probe 1 is the integration of two potential reaction groups for the thiol and amino groups of biothiols in one molecule. By reacting with the halogen atom and α, β-unsaturated malonitrile in probe 1, Cys, Hcy and GSH can generate a total of three main products with distinct photophysical properties. Probe 1 shows a strong fluorescence turn-on response to Cys with blue–green emission by using an excitation wavelength of 390 nm. At an excitation wavelength of 500 nm, probe 1 responds to GSH over Cys and Hcy and emits strong orange fluorescence. The discrimination of biothiols can be demonstrated by cell imaging experiments, indicating that probe 1 can be a useful tool for the selective imaging of Cys and GSH in living cells.