

Supporting information

A novel turn-on fluorescent probe for selective sensing and imaging of glutathione in live cells and organisms

Xiaodong Zhang^{a†}, Ziqian Wang^{b†}, Zongwei Guo^c, Nianzhe He^a, Peng Liu^c, Dasha Xia^d, Xiufen Yan^d and Zhichao Zhang^{a*}

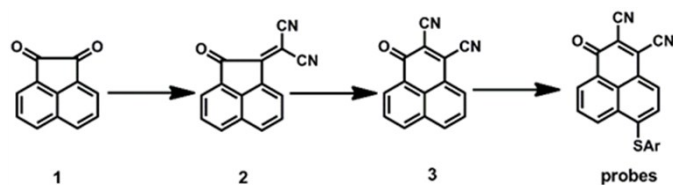
^a State Key Laboratory of Fine Chemicals, School of Chemistry, Dalian University of Technology, Dalian, China.

^b Zhang Dayu School of Chemistry, Dalian University of Technology, Dalian, China.

^c School of Life Science and Technology, Dalian University of Technology, Dalian, China.

^d School of Environmental and Chemical Engineering, Jiangsu University of Science & Technology, Zhenjiang, China.

*Corresponding author: E-mail: zczhang@dlut.edu.cn



Scheme S1. Synthesis of OPD-based probes. Reagents and conditions: (a) acetonitrile, reflux, 5h; (b) acetonitrile, K_2CO_3 , 2h; (c) acetonitrile, rt.

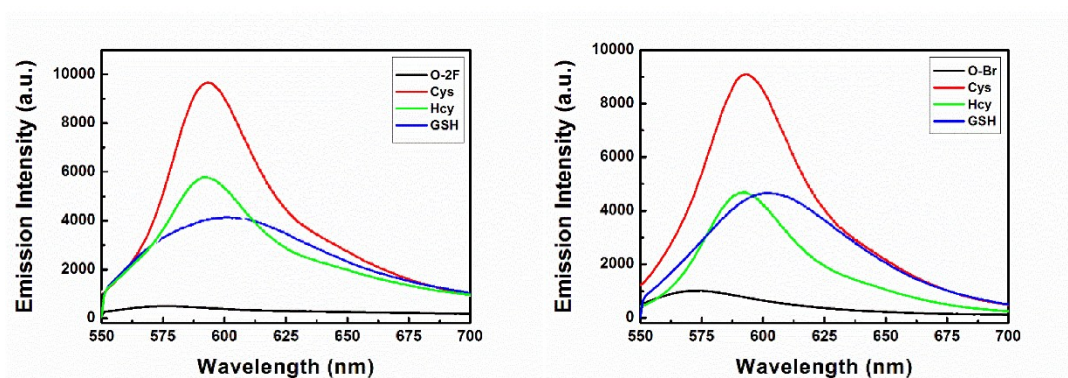
Table S1 Photophysical properties of probes.

probe	$^a\text{Abs}_{\text{max}}/\text{nm}$	$^a\text{Em}_{\text{max}}/\text{nm}$	$\epsilon/10^4 \text{ M}^{-1} \text{ cm}^{-1}$	$^b\Phi_F (\%)$
O-2F	569	579	2.45	-- ^c
O-Br	552	575	2.75	-- ^c
O-H	563	572	2.70	-- ^c
O-CH ₃	553	570	2.65	-- ^c
O-2OCH ₃	564	572	2.55	-- ^c
O-NH ₂	567	568	2.82	0.09
O-NH ₂ -GSH	533	606	2.85	0.42

^aMeasured in 10 μM phosphate buffer (pH 7.4, 1% DMSO).

^b Φ_F is the relative fluorescence quantum yield estimated by using rhodamine B ($\Phi_F=0.89$, ethanol) as a fluorescence standard.

^cundetectable.



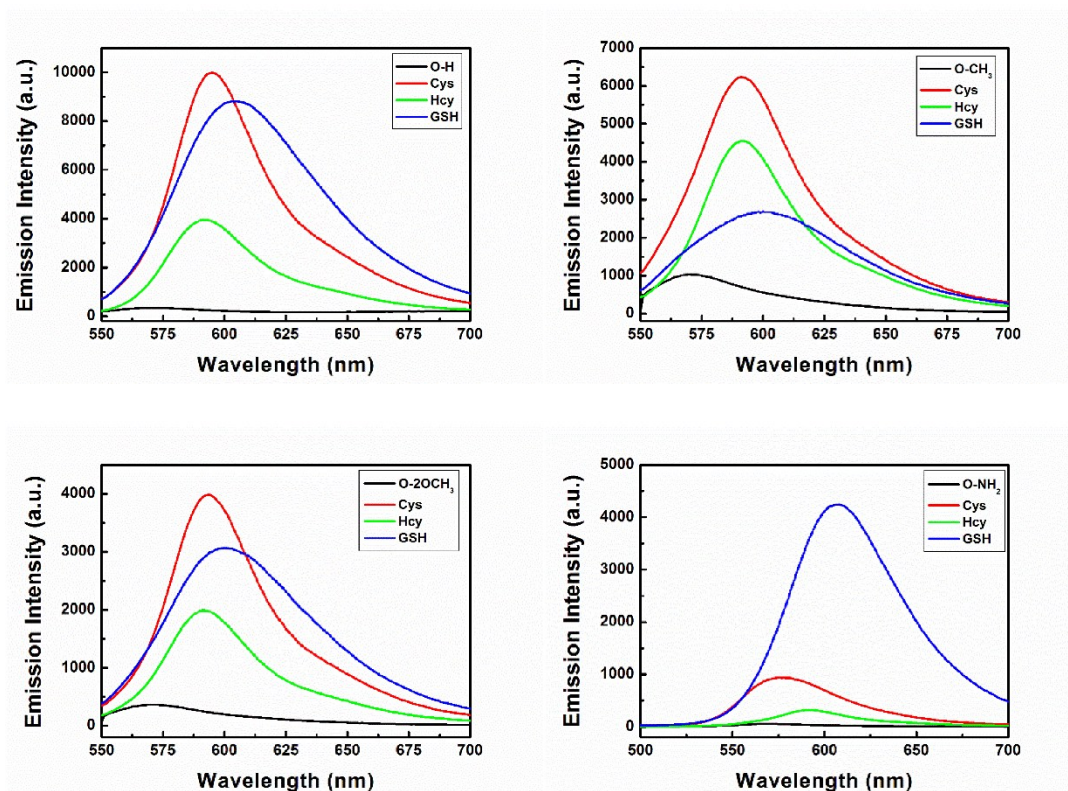


Figure S1 Fluorescence response of OPD-based probes (10 μ M) to GSH, Cys and Hcy (100 μ M, 60 min) in PBS (10 mM, pH 7.4, containing 1% DMSO).

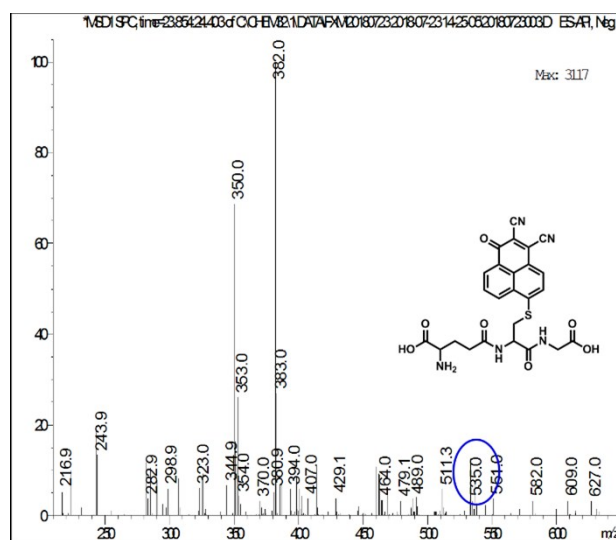


Figure S2 Mass spectrum of probe O-NH₂+GSH

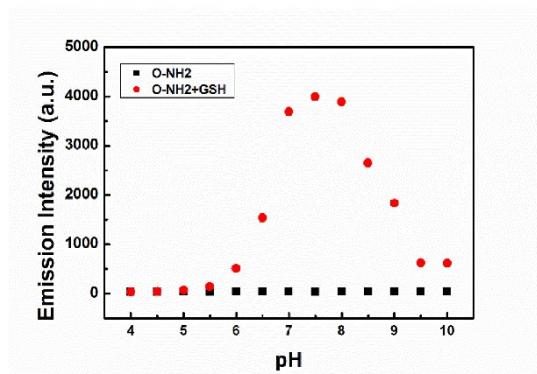


Figure S3. pH influence on the fluorescence intensity ($\lambda_{em} = 606 \text{ nm}$) of the $10 \mu\text{M}$ probe **O-NH₂** in the absence (■) or presence of 10 equiv. of GSH (●).

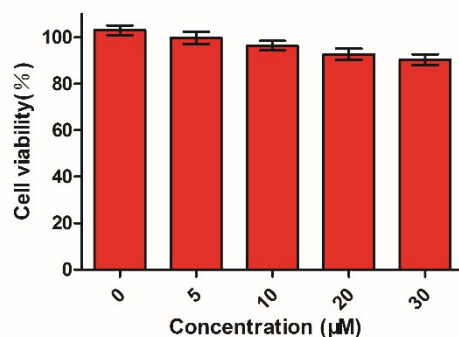
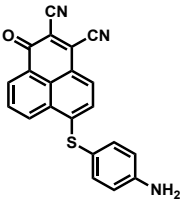
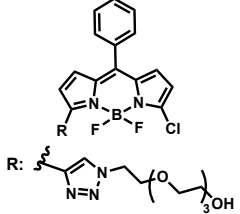


Figure S4. The cell viability of HeLa cells incubated with different concentration of **O-NH₂**, measured by MTT assay. HeLa cells were incubated with 0-30 μM **O-NH₂** at 37°C for 24h.

Table S2 Comparative study of analytical performance of **O-NH₂** with other reported probes.

NO.	Probes	LOD for GSH (mol L^{-1})	Ref.
1		2.3×10^{-8}	This work
2		8.6×10^{-8}	[25]

3		2.6×10^{-8}	[26].
4		5.0×10^{-8}	[31]
5		6.3×10^{-8}	[37]
6		6.6×10^{-8} M (0–6 μ M) 7.6×10^{-9} M (7–15 μ M) 1.3×10^{-8} M (15–100 μ M)	[38]
7		5.0×10^{-9}	[39]
8		NA	[40]

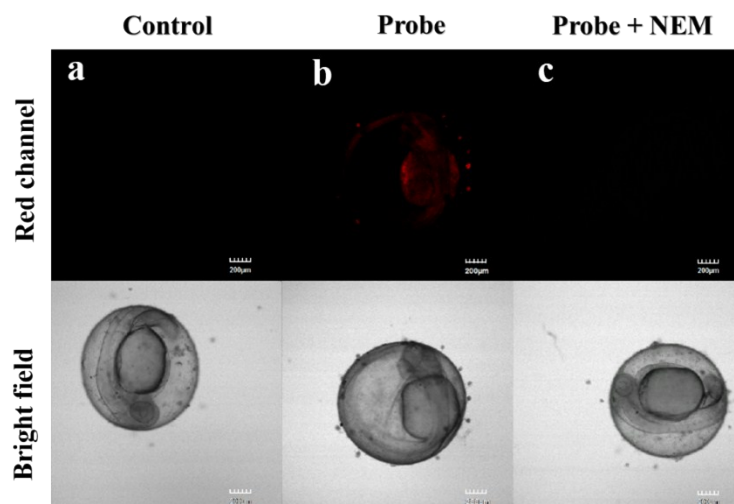


Figure S5. Confocal fluorescence images of Zebrafish embryos. (a) Zebrafish embryos. (b) Zebrafish embryos incubated with probe **O-NH₂** (5 μM) for 1 h. (c) Zebrafish embryos were pretreated with NEM (50 μM) for 1 h and then further incubated with probe **O-NH₂** (5 μM) for 1 h. Emission was collected at 600–650 nm, under excitation with 488 nm laser. Scale bar = 200 μm. All the fluorescence images were taken under the same experimental conditions.