Supporting Information

Materials and instruments

Table S1: Some already reported fluorescent probes for detecting hydrazine.

Figure S1: ¹H MNR and ¹³C MNR of *Co-Hy*.

Figure S2: The HR-MS of *Co-Hy*.

Figure S3: Fluorescence spectra of Co-Hy in different pH aqueous solutions.

Figure S4: UV–Vis absorption spectra of *Co-Hy* (10.0 µM) in various solvents.

Figure S5: The fluorescence spectra of *Co-Hy* in various solvents.

Figure S6: Toxicity experiment.

General information and methods.

All chemical reagents and solvents are from commercial suppliers and used without further purification, such as Aladdin Industrial Corporation (Shanghai, China), Shanghai Experiment Reagent Co., Ltd (Shanghai, China), Beyotime Co., Ltd (Shanghai, China). MTT and cell culture reagents were obtained from Beyotime Co., Ltd (Shanghai, China). HITACHI F-7000 fluorescence spectrophotometer was used to measure fluorescence spectra. The UV-vis spectra was monitored by Hitachi U-3900 UV-vis spectrophotometer. ¹H NMR and ¹³C NMR data were carried out respectively with a BRUKER AVANCE III HD 600 MHz and 151 MHz NMR spectrometer (Bruker, Billerica, MA). HR-MS determinations were operated on an AB SCIEX Tripple TOF5600 Instruments. The response capability of the *Co-Hy* in living cells was evaluated by ZEISS LSM880 Confocal Laser Scanning Microscope.

Reference	Probe structure	Solution / pH range	Detection limit /
			Response time
	N	PBS/DMSO ($v/v = 2/1$);	Not given;
[1]	HOLOCN	рН 2.0-9.5	240 min
	o=	PBS buffer;	1.72 ppb;
[2]		Not given	Not given
[3]		PBS buffer -DMSO (4:1,	50 nM;
		v/v);	10 min
	N C C C	рН 3-12	
[4]		$V_{\text{HEPES}}/V_{\text{DMSO}} = 5/5;$	560 nM;
		рН 6-10	Not given
		100: 1 (v/v) water/	2.1 μM;
[5]		DMSO;	4 min
		рН 5-10	
		$V_{\text{Water}} / V_{\text{DMSO}} = 1/9;$	8.0 μM;
[6]		Not given	190 min
		Tris buffer solution;	31nM;
[7]		рН 7.5-8.0	6 h
	i i i i		
[0]		DMF-Tris•HCl buffer	12 nM;
[8]		(7/3, volume ratio);	Not given
		рН 2-12	
[0]	O O O O O O	$H_2O/CH_3CN = v/v, 1:9;$	3.2 ppb;
[9]	N CF3	рН 2-12	60 min
[10]		PBS buffer (10 mM,	2.36 ppb;
		containing 90% DMSO);	30 min
		рН 7-10	
1			1

Table S1: Some already reported fluorescent probes for detecting thiophenols.

[11]		HEPES buffer (10 mM, containing 20% DMSO); pH 4-8	0.17 μM (5.4 ppb); 15 min
[12]		DMSO-H ₂ O (1:4, v/v, PBS, 20 mM); pH 5-8	0.38 ppb; 17 min
[13]		10 mM PBS; pH 4-8	0.38 uM; 1 hour
[14]		Aqueous EtOH solution (1:1 v/v, 10 mM HEPES buffer, pH 7.4); pH<10	26 nM (0.83 ppb).; Not given
[15]	(I) = (I)	water/DMSO(1:9,v/v); pH 3-10	0.18 uM; 20 min
This work		PBS; pH 4-11	69 nM (2.2ppb); Less than 5 min



Figure S1: ¹H MNR (600 MHz) spectrum and ¹³C MNR (151 MHz) spectrum of Co-Hy in DMSO- d_6 .

Figure S1: ¹H NMR (600 MHz, DMSO- d_6) δ 13.07 (s, 1H), 8.45 (s, 1H), 7.73 (d, J = 9.2 Hz, 1H), 6.88 (dd, J = 9.2, 2.0 Hz, 1H), 6.67 (d, J = 2.0 Hz, 1H), 3.52 (q, J = 6.9 Hz, 4H), 1.16 (t, J = 7.0 Hz, 6H). ¹³C NMR (151 MHz, DMSO) δ 165.06 (s), 164.06 (s), 159.27 (s), 157.40 (s), 155.61 (s), 153.93 (s), 147.36 (s), 125.87 (s), 111.05 (d, J = 15.5 Hz), 100.21 (s), 98.46 (s), 97.40 (s), 44.99 (s), 12.79 (s). The HR-MS spectrum of **Co-Hy**: Calc. for [C₁₇H₁₅NO₆ + H]⁺, 330.09721, found 330.09721.

Figure S2: The HR-MS of **Co-Hy**. HR-MS m/z: calc for $[C_{17}H_{15}NO_6 + H]^+$, 330.09721, found 330.09721.



Figure S3: Fluorescence spectra of *Co-Hy* in different pH aqueous solutions (pH 1-13, three parallel determinations at each pH).





Figure S4: UV–Vis absorption spectra of *Co-Hy* (10.0 µM) in various solvents.

Figure S5: The fluorescence spectroscopy of *Co-Hy* in various solvents (These excitation wavelengths are based on the maximum absorption wavelength of S4).



Figure S6: Cell viability estimated by MTT assay with PC 12 cells, which were cultured in the presence of 0-25 μ M Co-Hy for 24 h.



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