

## **Electronic supplementary information (ESI)**

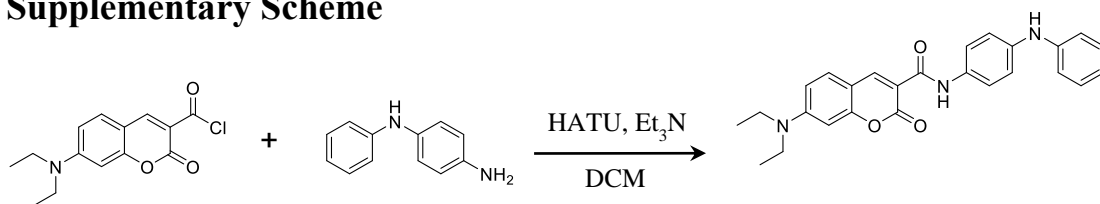
### **Fluorogenic probe for TRPA1 channel imaging based on molecular rotation mechanism**

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### Supplementary Scheme



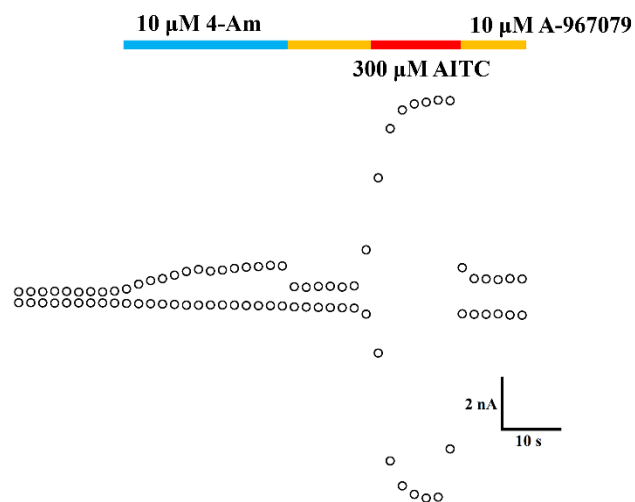
**Scheme S1.** Syntheses of DPCC.

**Supplementary Table****Table S1.** Photophysical Properties of DPCC and Coumarin in DMSO or PBS

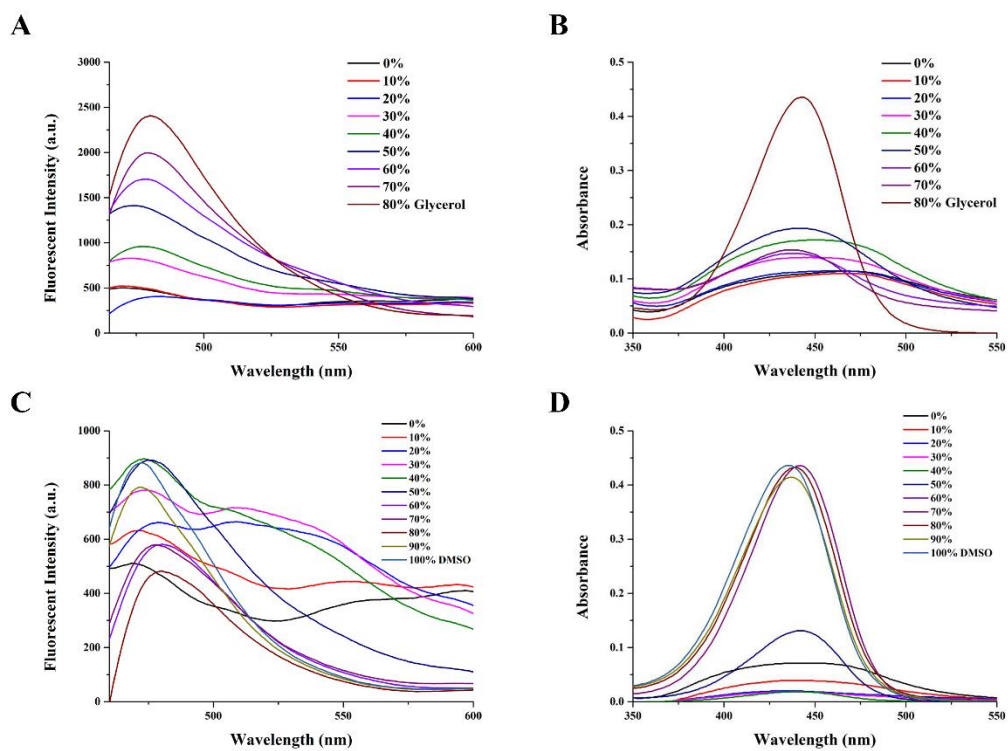
System	Quantum Yield (%)	$\lambda_{\text{ex}}$ (nm)	$\lambda_{\text{em}}$ (nm)
DPCC in DMSO	1.59	430	475
DPCC in PBS	0.2	430	540
Coumarin in DMSO	2.4	412	467
Coumarin in PBS	1.78	404	471

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## Supplementary Figures

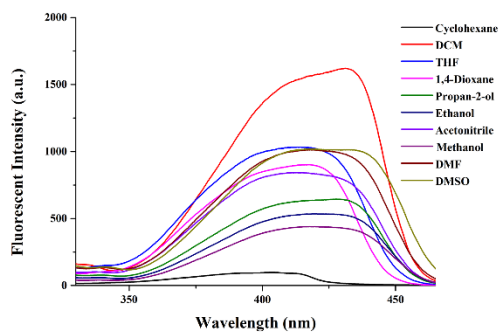


**Fig. S1.** The activated effect of **4-Am** (10  $\mu$ M) on TRPA1 channel in HEK293 cells.

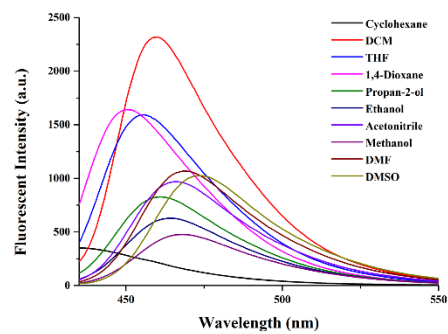


**Fig. S2.** Fluorescent spectra of 10  $\mu\text{M}$  DPCC in different Glycerol/water mixtures (A) and absorption spectra of 10  $\mu\text{M}$  DPCC in different Glycerol/water mixtures (B). Fluorescent spectra of 10  $\mu\text{M}$  DPCC in different DMSO/water mixtures (C) and absorption spectra of 10  $\mu\text{M}$  DPCC in different DMSO/water mixtures (D).

A

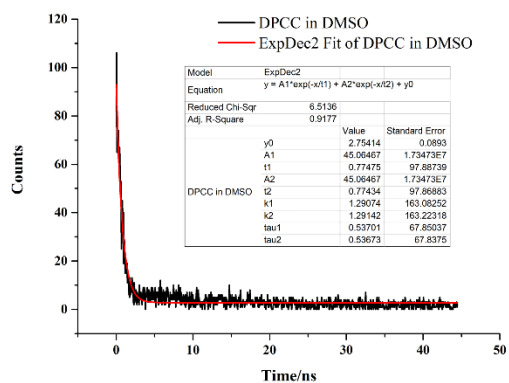


B

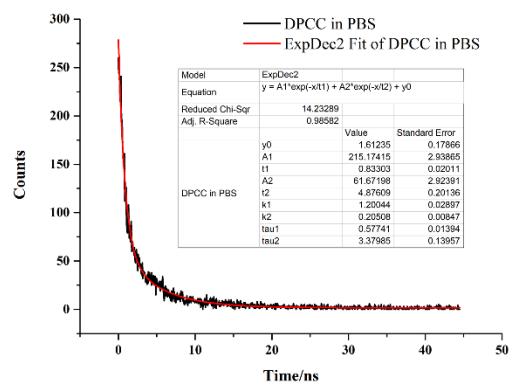


**Fig. S3.** Fluorescent excitation (A) and emission spectra (B) of probe **DPCC** in different solvents having different polarity.

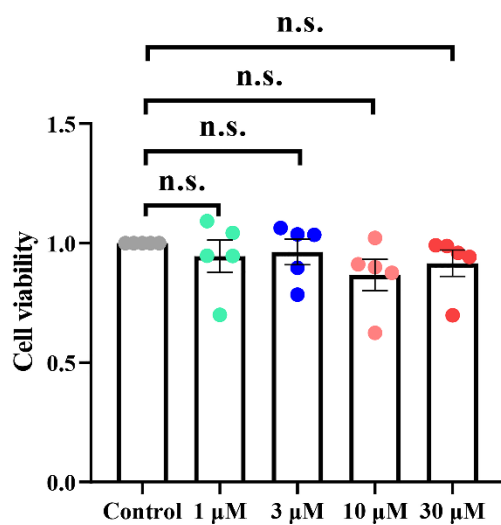
A



B

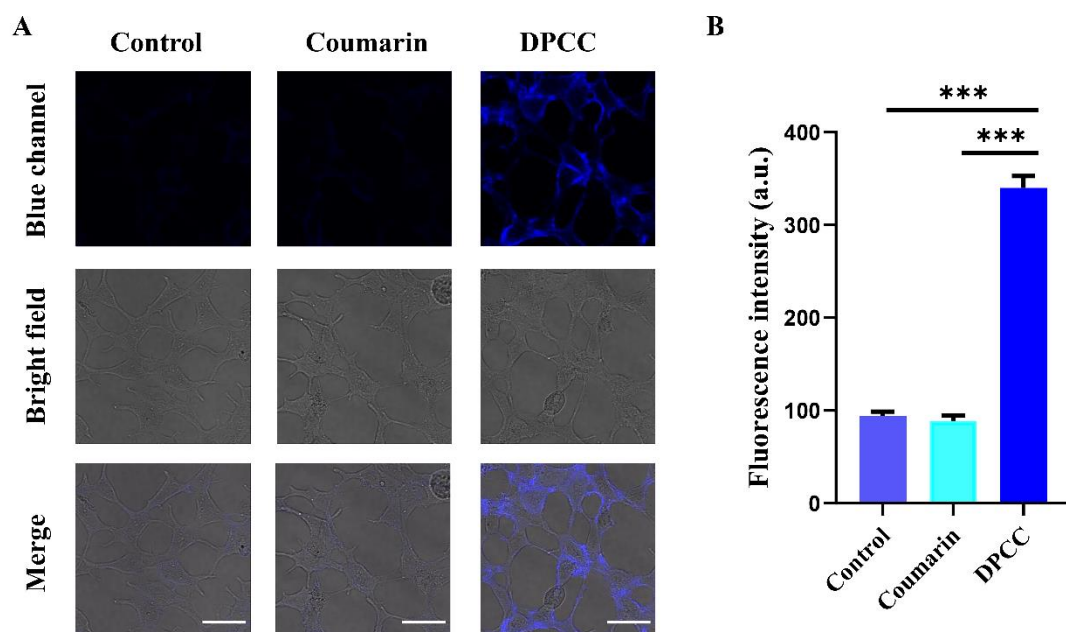


**Fig. S4.** Fluorescence emission decay profile of **DPCC**, (A) in DMSO, (B) in PBS, at  $\lambda_{\text{ex}} = 430$  nm.

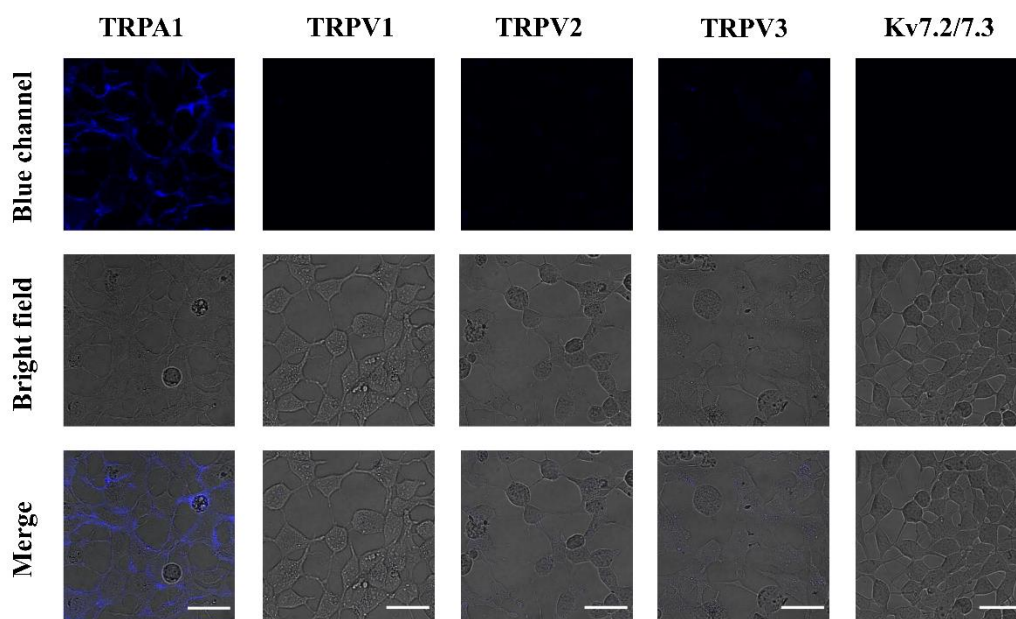


**Fig. S5.** Cell viability of HEK293 cells incubated with different concentrations (0, 1, 3, 10, 30  $\mu\text{M}$ ) of DPCC. The data are presented as the means  $\pm$  SEM from five replicates ( $n = 5$ ).





**Fig. S6.** (A) Confocal imaging of 10  $\mu$ M Coumarin in non-transfected HEK293 cells and TRPA1 overexpressed HEK293 cells. Control: non-transfected HEK293 cells+Coumarin; Coumarin: TRPA1 overexpressed HEK293 cells+Coumarin; DPCC: TRPA1 overexpressed HEK293 cells+DPCC. Scale bars (white): 20  $\mu$ m. (B) The fluorescence intensity of each group. The results are represented as mean  $\pm$  SEM with three replicates ( $n = 3$ ). Significantly different at \*\*\* $p < 0.001$  (one-way ANOVA).



**Fig. S7.** Confocal imaging of 10  $\mu$ M DPCC in TRPA1 and other TRP channels expressed in HEK293 cells, Kv7.2/7.3 stably transfected in HEK293 cells. Scale bars (white): 20  $\mu$ m.

# NMR Data

