

Electronic Supplementary Material (ESI) for

# Resorufin-based responsive probes for fluorescent and colorimetric analysis

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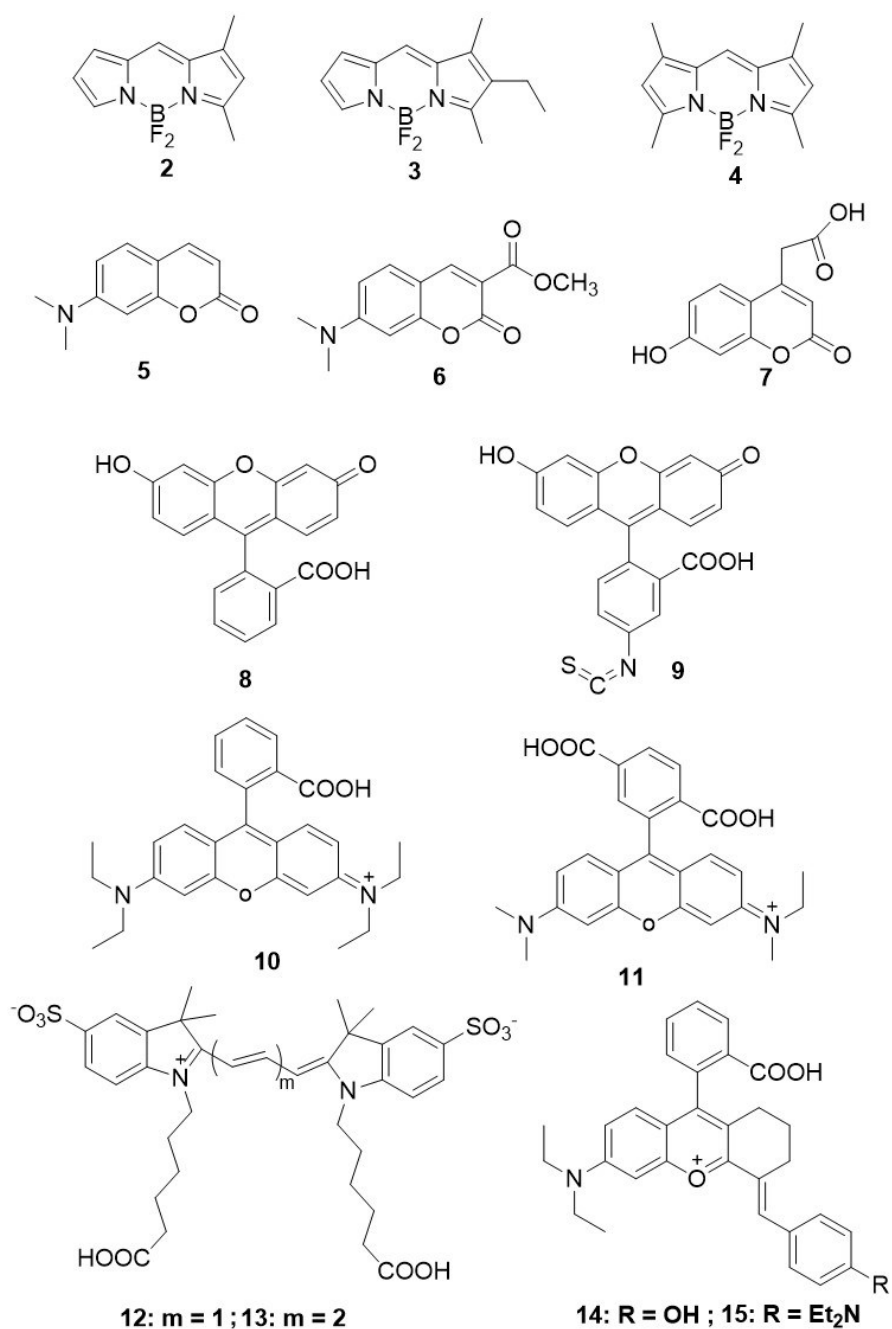
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**Table S1.** Spectroscopic properties of resorufin and some common organic dyes.

Dye	Number	$\lambda_{\text{ex}}/\lambda_{\text{em}}$ (nm)	Molar absorptivity ( $\text{M}^{-1} \text{cm}^{-1}$ )	$\phi$ (solvent)	Aqueous solubility	Ref.
Resorufin	1	572/585	$5.6 \times 10^4$	0.74 (water)	hydrophilic	1
BODIPY	2	499/509	$5.4 \times 10^4$	0.70 (ethanol)	hydrophobic	2
	3	510/520	$3.4 \times 10^4$	0.40 (ethanol)		
	4	505/516	$8.3 \times 10^4$	0.80 (ethanol)		
Coumarin	5	373/440	-	0.73 ( $\text{CH}_3\text{CN}$ )	hydrophobic	3
	6	412/529	-	0.81 ( $\text{CH}_3\text{CN}$ )		3
	7	326/392	$1.2 \times 10^4$	0.21 (methanol)		4
Fluorescein	8	491/519	$8.79 \times 10^4$	0.93 (0.01 M NaOH)	hydrophilic	5
	9	494/520	-	0.93 (basic solution)		6
Rhodamine	10	555/580	-	0.31 (water)	hydrophilic	7
	11	542(548)/568(552)	-	0.28 (PBS buffer)		8
Cyanine	12	560/575	$15 \times 10^4$	0.09 (ethanol)	hydrophilic	9
	13	658/677	$25 \times 10^4$	0.4 (ethanol)		
Changsha dye	14	570/654	$2.5 \times 10^4$	0.12 (methanol)	hydrophobic	10

	15	663/747	$5.9 \times 10^4$	0.07 (methanol)		
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**Fig. S1.** Chemical structures of some organic fluorescence dyes.

## Reference

- Bueno, C.; Villegas, M.; Bertolotti, S.; Previtali, C.; Neumann, M.; Encinas, M. V., The excited-state interaction of resazurin and resorufin with amines in aqueous solutions. *Photophysics*

- and photochemical reaction. *Photochem. Photobiol.* **2002**, *76* (4), 385-390.
2. De Wael, E. V.; Pardoën, J.; Van Koeveringe, J.; Lugtenburg, J., Pyrromethene-BF<sub>2</sub> complexes (4, 4'-difluoro-4-bora-3a, 4a-diaza-s-indacenes). Synthesis and luminescence properties. *Recueil des Travaux Chimiques des Pays-Bas* **1977**, *96* (12), 306-309.
  3. Jung, Y.; Jung, J.; Huh, Y.; Kim, D., Benzo[g]coumarin-Based Fluorescent Probes for Bioimaging Applications. *J. Anal. Methods Chem.* **2018**, *2018*, 1-11.
  4. Gonçalves, M. S. T., Fluorescent labeling of biomolecules with organic probes. *Chem. rev.* **2009**, *109* (1), 190-212.
  5. Seybold, P. G.; Gouterman, M.; Callis, J., Calorimetric, photometric and lifetime determinations of fluorescence yields of fluorescein dyes. *Photochem. Photobiol.* **1969**, *9* (3), 229-242.
  6. Cheng, D.; Xu, Q.-H., Separation distance dependent fluorescence enhancement of fluorescein isothiocyanate by silver nanoparticles. *Chem. Commun.* **2007**, (3), 248-250.
  7. Magde, D.; Rojas, G. E.; Seybold, P. G., Solvent dependence of the fluorescence lifetimes of xanthene dyes. *Photochem. Photobiol.* **1999**, *70* (5), 737-744.
  8. Selvin, P. R.; Hearst, J. E., Luminescence energy transfer using a terbium chelate: improvements on fluorescence energy transfer. *Proc. Natl. Acad. Sci. U. S. A.* **1994**, *91* (21), 10024-10028.
  9. Mujumdar, R. B.; Ernst, L. A.; Mujumdar, S. R.; Lewis, C. J.; Waggoner, A. S., Cyanine dye labeling reagents: sulfoindocyanine succinimidyl esters. *Bioconjugate chem.* **1993**, *4* (2), 105-111.
  10. Yuan, L.; Lin, W.; Chen, H., Analogs of Changsha near-infrared dyes with large Stokes Shifts for bioimaging. *Biomaterials* **2013**, *34* (37), 9566-9571.