

## NEW BODIPY DYADS FOR TWO-PHOTONS FLUORESCENCE IMAGING IN CELLS

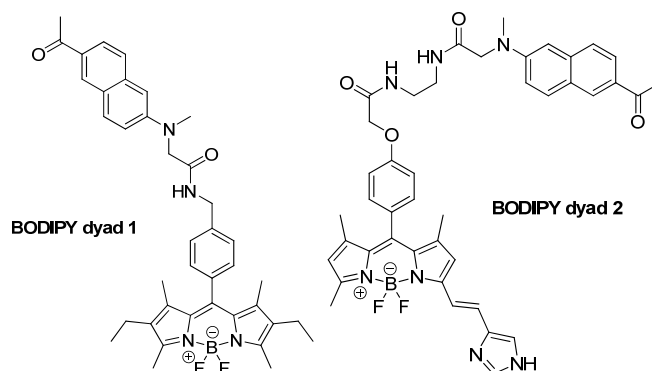
**D. Collado,<sup>1,2</sup> Y. Vida,<sup>1,2</sup> F. Nájera,<sup>1,2</sup> E. Pérez-Inestrosa,<sup>1,2</sup> A. Domínguez,<sup>3</sup>  
V. F. Pais,<sup>3</sup> U. Pischel<sup>3</sup>**

<sup>1</sup> Department of Organic Chemistry, Universidad de Málaga, Spain

<sup>2</sup> Andalusian Centre for Nanomedicine and Biotechnology-BIONAND, Parque Tecnológico de Andalucía, 29590 Málaga, Spain

<sup>3</sup> CIQSO - Center for Research in Sustainable Chemistry and Department of Chemical Engineering, Physical Chemistry, and Organic Chemistry, Universidad de Huelva, Spain  
E-mail: [dcollado@uma.es](mailto:dcollado@uma.es)

Fluorescent probes are essential tools for studying biological systems. The last decade has witnessed particular interest in the development of two-photon excitable probes, due to their advantageous features in tissue imaging compared to the corresponding one-photon probes [1]. Recently, we have designed and synthesized an aminonaphthalimide–BODIPY derivative as energy transfer cassettes and were found to show very fast and efficient BODIPY fluorescence sensitization [2]. This was observed upon one- and two-photon excitation, which extends the application range of the investigated bichromophoric dyads in terms of accessible excitation wavelengths. In order to increase the two-photon absorption of the system aminonaphthalimide fluorophore was replaced with a Prodan analog (BODIPY dyad 1), which presents found a variety of applications as probes and labels in biology [3]. The two-photon absorption cross-section  $\delta$  of the dyads is significantly incremented by the presence of the 6-acetyl-2-naphthylamine donor group.



The emission maximum of a BODIPY fluorophore can significantly be red-shifted in comparison to their precursors by conjugation with aromatic aldehydes. [4] We use a synthetic strategy to obtain BODIPY dyad 2 that incorporates an imidazole ring. This molecule can be used in biological media as a near-neutral pH indicator based on one- and two-photon excitable BODIPY acceptor.

[1] Kim, D.; Ryua, H. G.; Ahn, K. H. *Org. Biomol. Chem.*, **2014**, *12*, 4550-4566.

[2] Collado, D.; Remón, P.; Vida, Y.; Nájera, F.; Sen, P.; Pischel, U.; Perez-Inestrosa, E. *Chem. Asian J.* **2014**, *9*, 797-804.

[3] Kucherak, O. A.; Didier, P.; Mely, Y.; Klymchenko, A. S. *J. Phys. Chem. Lett.* **2010**, *1*, 616-620.

[4] Boens, N.; Qin, W.; Baruah, M.; De Borggraeve, W. M.; Filarowski, A.; Smisdon, N.; Ameloot, M.; Crovetto, L.; Talavera, E. M.; Alvarez-Pez, J. M. *Chem. Eur. J.* **2011**, *17*, 10924-10934.