

DETECTING HYDROXYL RADICAL WITH A NEW TWO-PHOTON FLUORESCENT PROBE IN LIVING CELLS

Francisco Nájera,^{*a,b} Carlos Benitez-Martin,^{a,b} Juan Antonio Guadix,^{a,c} Jose María Pérez-Pomares,^{a,c} Ezequiel Pérez-Inestrosa,^{*a,b}

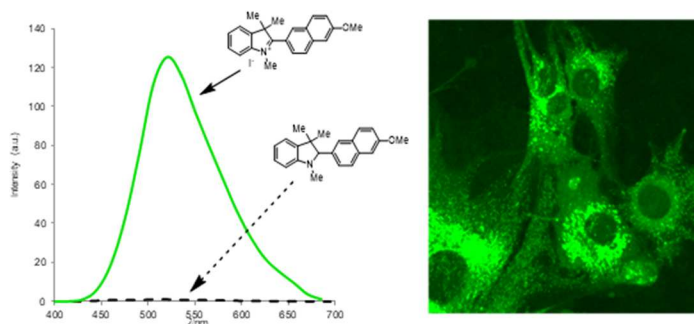
- ^a Andalusian Centre for Nanomedicine and Biotechnology-BIONAND, Parque Tecnológico de Andalucía, E-29590 Málaga, Spain
^b Department of Organic Chemistry, Faculty of Sciences, University of Málaga, IBIMA, Campus de Teatinos, E-29071 Málaga, Spain
^c Department of Animal Biology, Faculty of Sciences, University of Málaga, IBIMA, Campus de Teatinos s/n, 29071 Málaga, Spain

najera@uma.es

Keywords: two photon, fluorescent probe, reactive oxygen species, hydroxyl radical

Reactive oxygen species (ROS) are known to be involved in the onset and development of multiple diseases, including cancer,^[1] cardiovascular diseases,^[2] neurodegenerative diseases^[3] and diabetes^[4] among others. Generation of ROS is a phenomenon that results from normal cell metabolism as well as from the response to certain pathologic stimuli like certain cytokines, xenobiotics and bacterial infection.^[5] These ROS are highly reactive, short-lived molecules that play critical roles in the living cell and it is well accepted that cellular oxidative stress results from the imbalance between generation and elimination of ROS in cells.^[6]

In this work, we describe the design and synthesis of a two photon (TP) organelle-targeting activatable fluorescent probe. This probe is a naphthalene-indoline compound that targets specifically lysosomes, reaching these organelles in the fluorescence “off” state and minimizing background reactions. Upon arrival at the lysosomes, the probe is triggered and a fluorescence “on” signal is observed that can be combined with TP microscopy to image the lysosomal •OH in living cells.



References

- [1] H. Kim, J. Yang, M. J. Kim, S. Choi, J. R. Chung, J. M. Kim, Y. H. Yoo, J. Chung, H. Koh, *J. Biol. Chem.* **2016**, *291*, 1841–1853.
[2] M. N. Sack, F. Y. Fyhrquist, O. J. Saijonmaa, V. Fuster, J. C. Kovacic, *J. Am. Coll. Cardiol.* **2017**, *70*, 196–211.
[3] G. H. Kim, J. E. Kim, S. J. Rhie, S. Yoon, *Exp. Neurobiol.* **2015**, *24*, 325.
[4] B. Niemann, S. Rohrbach, M. R. Miller, D. E. Newby, V. Fuster, J. C. Kovacic, *J. Am. Coll. Cardiol.* **2017**, *70*, 230–251.
[5] I. Martínez-Reyes, J. M. Cuezva, *Biochim. Biophys. Acta - Bioenerg.* **2014**, *1837*, 1099–1112.
[6] S. V. Avery, *Biochem. J.* **2011**, *434*, 201–210.