SYNTHESIS OF MEMBRANE FLUORESCENT PROBES BASED ON 3-HYDROXYFLAVONES

Andrey S. KLYMCHENKO,1,2 Vasyi G. PIVOVARENKO,2
Turan ÖZTÜRK, Alexander P. DEMCHENKO1

1TUBITAK Marmara Research Center, Gebze-Kocaeli 41470, Turkey
2Kiev Taras Shevchenko University, Department of Chemistry, 252017, Ukraine

3-hydroxyflavones are very promising as candidates for design of fluorescence probes with double-wavelength ratiometric response. They exhibit two bands in fluorescence emission, which are separated by as much as 60-80 nm in a convenient for observation visible range of the spectra. The ratio of intensities between two bands is very sensitive to substituents, polarity and hydrogen bond ability of the solvent, complex-formation with the ions. These properties are due to the occurrence of an excited-state reaction - Intramolecular Excited State Proton Transfer (ESIPT).1

Introduction of proper substituent groups allows to achieve corresponding fixation and orientation of 3-hydroxyflavone chromophore in phospholipid bilayer, and thus to produce influence of the transmembrane electric field on ESIPT resulting in redistribution of intensities between two fluorescence peaks. Different modifications were used, including the introduction of quaternary ammonium group (lipid-soluble cation) and aliphatic hydrocarbon chains.2 The membrane potential effects were detected, and it is expected that they will be more significant for ammonium cations with longer hydrocarbon chains and for zwitter ionic derivatives, which are currently under preparation and testing. Their effects are discussed in comparison with that of commonly applied probes.

REFERENCES