

# Squaraine NIR dyes: a structure to function study for novel bilayer membrane probes

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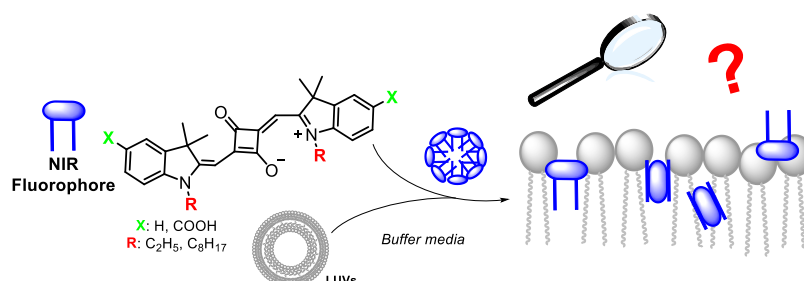
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In the last decade, Near infra-red (NIR) fluorophores have been largely tested for bioimaging applications.<sup>1</sup> They typically show red-shifted absorption and emission, outstanding brightness and low photodegradation along with deep tissue penetration, small biological photodamage and negligible autofluorescence.<sup>2</sup> Several families of NIR dyes have been designed, synthesized and proposed to the market for selective staining of a plethora of biological structures, but a proper modernisation in the study of cutting edge probes specific for the complex and dynamic assemblies of the bilayer membrane, is still necessary.<sup>3</sup> Squaraines have been already introduced to visualize and deeply study biological membranes highlighting their relevance due to singular lightness and specificity.<sup>4</sup>

In this work, we have proposed symmetric and asymmetric squaraine dyes, decorated with carboxylic groups on the chromophoric core and different lengths aliphatic chains on the quaternary nitrogen positions of the scaffold itself. The formers facilitate the solubilization in biological media and lock the probes on the outer side of the amphiphilic bilayer, while the latter have been varied to investigate the respective interactions with the hydrophobic portion of the membranes. The photophysical properties, the kinetic of the insertion into large unilamellar vesicles (LUVs) bilayer membranes beside with the emission signal fluctuations related to the membrane phases properties have been analysed in relation to the probe molecular structures to provide key data to optimize the design of new NIR probes for bioimaging purposes.

## References:

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**Figure.** Schematic representation of the dyes within lipid bilayer membranes

**Keywords:** NIR dyes-squaraines-probes-bioimaging

## Short Biography

Currently Postdoctoral Fellow at the University of Milan working at the synthesis and investigations of novel chiral sensors for chem-bio applications. First one year of Postdoc dedicated to the synthesis, photophysical assays and studies in lipid models of Fluorophores and NIR dyes. PhD in Science and Technology of Chemistry and Materials (Curriculum: Drug Discovery and Nanobiotechnologies) conducted in Italy and US focused on the synthesis, and investigation of photochromic molecular switches to obtain probes through fluorophore conjugation, light controlled drug delivery systems and switchable polymers. Medicinal Chemistry and Pharmaceutical Technologies MSc background (experimental thesis synthesis of Kinases' inhibitors).

