

GUEST RELEASE FROM LIPOSOMES USING VISIBLE LIGHT

A. Fiorentino¹, T. Lécuyer,² A. Fraix,² S. Silvi¹

¹ Dipartimento di Chimica “G. Ciamician”, Università di Bologna, Bologna, Italy

² Dipartimento di Scienze del Farmaco e della Vita, Università di Catania, Catania, Italy
antonio.fiorentino3@unibo.it

Keywords: Liposomes, photochromic compounds, visible light, drug delivery

Liposomes are artificial vesicles that have emerged in recent years as vehicles to engineer functional membranes and to deliver molecules to cells.[1] In this work, light-responsive Donor-Acceptor Stenhouse Adducts (DASAs, figure 1a) have been incorporated within the bilayer membrane of liposomes.[2] The significant change of the physicochemical properties, including polarity, associated with the photoswitching process of these compounds was exploited to obtain controlled guest release from the membrane to the outside environment upon irradiation (figure 1b). Liposomes were functionalized with different DASAs, and the resulting vesicles were studied by dynamic light scattering and UV-vis spectroscopy, allowing to determine the encapsulation efficacy of each guest and the effect of the intercalation on the properties of the liposomes. In all cases, a spontaneous interconversion of the open form to the cyclized form was observed over time, which could be accelerated by visible light irradiation. The subsequent partitioning of the cyclized species was studied via size-exclusion chromatography, showing it is possible to obtain guest relocation from the membrane of the liposomes to the aqueous environment upon isomerization.

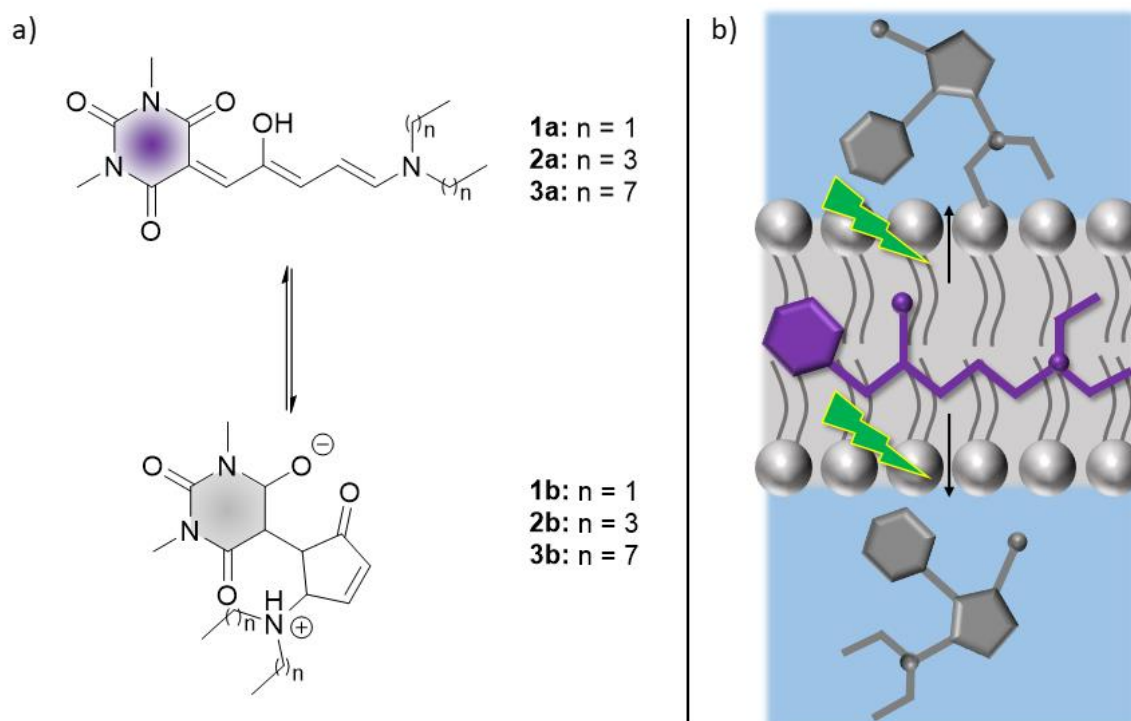


Figure 1. a) structures of the DASAs employed; b) schematics of DASAs relocation upon isomerization..

Financial support from the Italian Ministry of Education, University and Research MIUR (PRIN 201732PY3X) is gratefully acknowledged.

[1] M. J. Langton, *Nat. Rev. Chem.* **2021**, 5, 46-61.

[2] M. M. Lerch, W. Szymanski, B. Feringa, *Chem. Soc. Rev.* **2018**, 47, 1910-1937.