DOI 10.18699/SBB-2022-458

N-Nitroso-BODIPY derivatives as effective light activated NO donors

Karogodina T.Yu.[1]*, Panfilov M.A.[2], Tretyakova I.S.[3, 4], Vorob'ev A.Yu.[2], Moskalensky A.E.[1]

[1] *Novosibirsk State University, Novosibirsk, Russia*

[2] *N.N. Vorozhtsov Novosibirsk Institute of Organic Chemistry, SB RAS, Novosibirsk, Russia*

[3] *Voevodsky Institute of Chemical Kinetics and Combustion, SB RAS, Novosibirsk, Russia*

[4] *Institute of Solid State Chemistry and Mechanochemistry, SB RAS, Novosibirsk, Russia*

** karogodina@gmail.com*

Key words: nitric oxide, light-controllable NO releasers, light removal group

Motivation and Aim: Nitric oxide (NO) is a unique biochemical mediator involved in the regulation of a huge number of vital processes. NO level is critical for the regulation of vascular and muscle tone. Lack of nitric oxide can cause serious disorders. Compensation for the lack of NO by taking medications has several disadvantages. A promising alternative to this approach would be to use medications that can release nitric oxide directly in the area needed. Such technique can be based on the photolabile compounds that release NO under illumination by light. Such molecules usually consist of a light-absorbing antenna (a chromophore) attached to an NO-carrying group. The purpose of this work is the design, synthesis, and study of such compounds.
Methods and Algorithms: In this work we present a family of novel green-light-controllable NO releasers. We designed and synthesized several compounds using BODIPY dye as a light-harvesting antenna linked to an N-Nitroso NO-carrying group.
Results: The compounds was shown to be light sensitive. We have studied the photoproducts which were formed under green light irradiation. Using the DAR-2 fluorescent NO probe, we observed the photoinduced formation of NO. We also studied the generation of singlet oxygen which can be useful for photodynamic therapy.
Conclusion: The presented N-Nitroso-BODIPY derivatives are promising as green-light-controllable NO releasers. These compounds could serve as the basis for the development of more advanced photodonors and their use on test biochemical objects.
Acknowledgements: The study was supported by the Russian Science Foundation (grant No. 18-15-00049).