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Photouncaging of Carboxylic Acids from Cyanine Dyes with Near-Infrared Light

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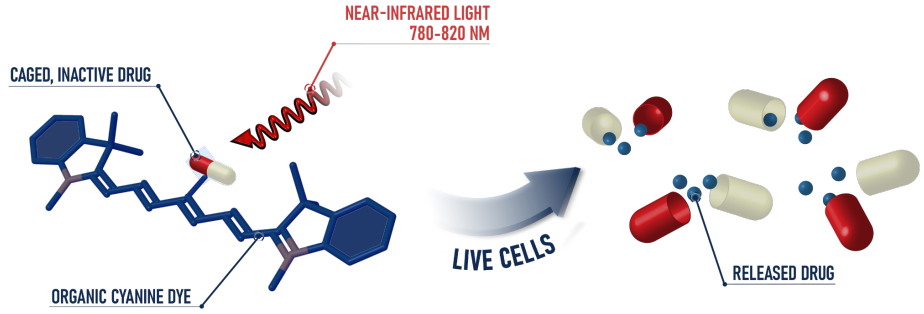
Near-infrared light (NIR; 650–900 nm) offers unparalleled advantages as a biocompatible stimulus. The development of photocages that operate in this region represents a fundamental challenge due to the low energy of the excitation light. Herein, we repurpose cyanine dyes into photocages that are available on a multigram scale in three steps and efficiently release carboxylic acids in aqueous media upon irradiation with NIR light up to 820 nm. The photouncaging process is examined using several techniques (NMR, UV-vis, HPLC), providing evidence that it proceeds *via* photooxidative pathway. We demonstrate the practical utility in live HeLa cells by delivery and release of the carboxylic acid cargo, that was otherwise not up-taken by cells in its free form, using fluorescence microscopy.



In combination with modularity of the cyanine scaffold, the realization of these accessible photocages fully unleashes the potential of the emerging field of NIR-photoactivation and can facilitate its widespread adoption outside the photochemistry community.

[1] P. Klán, T. Šolomek, C. G. Bochet, A. Blanc, R. Givens, M. Rubina, V. Popik, A. Kostikov, J. Wirz, *Chem. Rev.* **2013**, *113*, 119–191.
[2] A. P. Gorka, R. R. Nani, J. Zhu, S. Mackem, M. J. Schnermann, *J. Am. Chem. Soc.* **2014**, *136*, 14153–14159.
[3] J. A. Peterson, C. Wijesooriya, E. J. Gehrmann, K. M. Mahoney, P. P. Goswami, T. R. Albright, A. Syed, A. S. Dutton, E. A. Smith, A. H. Winter, *J. Am. Chem. Soc.* **2018**, *140*, 7343–7346.
[4] L. Štacková, P. Štacko, P. Klán, *J. Am. Chem. Soc.* **2019**, *141*, 7155–7162.
[5] P. Štacko, L. Muchová, L. Vítek, P. Klán, *Org. Lett.* **2018**, *20*, 4907–4911.
[6] H. Janeková, M. Russo, U. Ziegler, P. Štacko, *Angew. Chem.Int. Ed.* **2022**, e202204391.