Invitation to a John van Geuns Foundation lecture and a HIMS lecture by

Dr. Peter Štacko

Department of Chemistry, University of Zurich.
Zurich, Switzerland

Light in a Heartbeat: A Journey from Synthesis to Controlling Cardiomyocytes

Wednesday 10 April 2024, C0.05, 11:00 am



Photocages enable us to elicit control over the activity of molecules using light as a non-invasive and biocompatible stimulus. Efficient uncaging in the near-infrared (NIR) window required for its translation to photoactivated therapies remains far from being an accomplished task. Here, I will show how the development of a novel synthetic methodology to access cyanine scaffolds fuelled the birth of cyanine photocages.[1,2] These photocages can be functionalized with carboxylate alcohol, phenol, amine, and thiol payloads, including complex drug molecules, which are released in water upon irradiation with NIR light up to 820 nm.[3] Displaying unique chameleon-like behavior, they can operate via two uncaging mechanisms – photooxidation and direct bond scission – the first example of photoheterolysis ever observed in cyanine dyes, or at wavelengths exceeding 800 nm.[4] To highlight their potential in biology and medicine, I will demonstrate that they deliver payloads which are otherwise not uptaken by live human cells, or regulate the beating rates of human cardiomyocytes at nanomolar concentrations and low NIR light doses through uncaging of Effortil®.

If you wish to meet with Dr. Štacko on April 9 or 10, please contact

Tomáš Šolomek, t.solomek@uva.nl

Štacko group page: www.stacko.group

References

[1] L. Štacková, P. Štacko, P. Klán *J. Am. Chem. Soc.* **2019**, *141*, 7155–7162.
[2] L. Štacková, E. Muchová, M. Russo, P. Slavíček, P. Štacko, P. Klán *J. Org. Chem.* **2020**, *85*, 9776–9790.
[3] H. Janeková, M. Russo, U. Ziegler, P. Štacko *Angew. Chem. Int. Ed.* **2022**, e202204391.
[4] M. Russo, H. Janeková, D. Meier, M. Generali, P. Štacko *J. Am. Chem. Soc.* **2024**, *146,* 8417.