

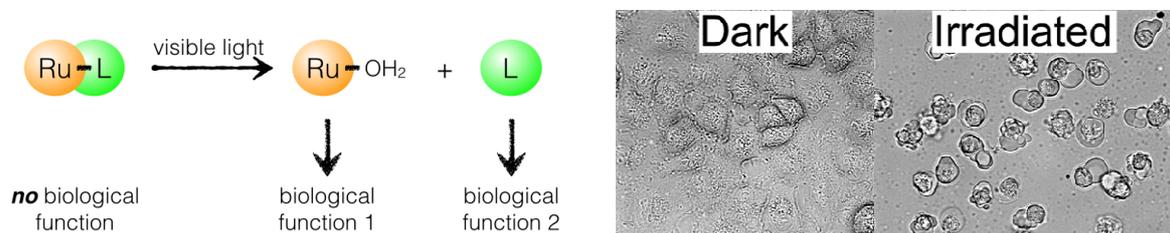
## Visible Light-Induced Cancer Cells Death With Ruthenium Prodrugs: towards phototherapy for hypoxic tumors

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Like PhotoDynamic Therapy (PDT), Photo-Activated Chemotherapy (PACT) aims at activating anticancer prodrugs with visible light to circumvent the toxicity of anticancer compounds to the tumour tissue. Unlike PDT however, PACT agents are activated in an oxygen-independent manner, which may allow for treating hypoxic tumours. In this presentation the activation of ruthenium-based PACT compounds will be presented, that are activated via ligand photosubstitution. Before activation, one of the ligand, which may also have biological activity, coordinates to the metal centre, thereby preventing it to interact with biomolecules. Due to the distortion of the coordination octahedron however, one of these ligands can be photosubstituted by water upon visible light irradiation, thereby re-establishing the ability of the metal centre to interact with biomolecules, and hence to kill the cancer cell. In vitro cytotoxicity data on human cancer cell lines shows 3- to 50-fold increased cytotoxicity upon blue, green, or red light irradiation. We will discuss the dependence of such light-activated compounds on the presence of oxygen, their mechanism of action, and studies dedicated to shifting the wavelength of the light used for activation to the red region of the spectrum via upconversion.



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### References:

- [1] L. N. Lameijer, D. Ernst, S. L. Hopkins, M. S. Meijer, S. H. C. Askes, S. E. Le Dévédec, S. Bonnet, *Angew. Chem. Int. Ed.* **2017**, DOI:10.1002/anie.201703890
- [2] V. H. S. van Rixel, B. Siewert, S. H. C. Askes, M. A. Siegler, S. Bonnet, *Chem. Sci.* **2016**, *7*, 4922
- [3] S. H. C. Askes, A. Bahreman, S. Bonnet, *Angew. Chem. Int. Ed.* **2014**, *53*, 1029-1033
- [4] S. L. Hopkins, B. Siewert, S. H. C. Askes, P. Veldhuizen, R. Zwier, M. Heger, S. Bonnet, *Photochem. Photobiol. Sci.* **2016**, *15*, 644
- [5] R. E. Goldbach, I. Rodriguez-Garcia, J. H. van Lenthe, M. A. Siegler, S. Bonnet *Chem. Eur. J.*, **2011**, *17*, 9924