

NEW DISSYMMETRIC Ru(II) COMPLEXES FOR THE PHOTODETECTION OF DNA MISMATCHES

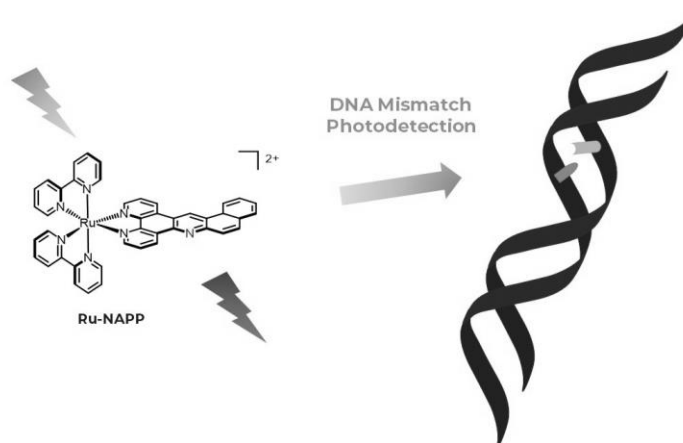
GILLARD, Martin

ELIAS, Benjamin

UCLouvain – IMCN - MOST

UCLouvain, Place Louis Pasteur 1, bte L4.01.02 – 1348 Louvain la Neuve, Belgium

The early detection of DNA mutations such as **DNA mismatches** is of major interest. Indeed, accumulation of mismatches in the genome often arises from deficiencies of the cellular mismatch repair machinery, which is associated with several types of cancers that proved to be often resistant to classic chemotherapeutics.^[1] In this context, ruthenium(II) compounds bearing a planar extended ligand appear to be excellent candidates as **DNA photoprobes** since they exhibit avid binding to DNA and strongly tuneable luminescence properties.^[2] Recently in the Elias group, we have been focusing our interest on designing new Ru(II) complexes bearing a dissymmetric acridine based ligand to selectively target specific sites in DNA such as mismatches or G-quadruplexes.^[3] Herein, we report the synthesis of **Ru-NAPP**, which exhibits an enhanced luminescence in the presence of mismatched compared to well-matched DNA. The origin of the promising mismatch differentiation of the complex has been investigated and seems to mainly lie on its high sensitivity to the microenvironment when intercalated into the double-helix.



Favoured radiative deactivation processes in dissymmetric Ru(II) complexes enables photodetection of DNA mismatches.

References :

- [1] P. Boland, M. Yurgelun, R. Boland, *CA Cancer J. Clin.* **2018**, 68, 217-231; J. M. Helder-Woolderink, E. A. Blok, H. F. A. Vasen, H. Hollema, M. J. Mourits, G. H. De Bock, *Eur. J. Cancer* **2016**, 55, 65-73.
- [2] C. Mari, V. Pierroz, S. Ferrari, G. Gasser, *Chem. Sci.* **2015**, 6, 2660-2686; F. E. Poynton, S. A. Bright, S. Blasco, D. C. Williams, J. M. Kelly, T. Gunnlaugsson, *Chem. Soc. Rev.* **2017**, 46, 7706-7756.
- [3] A. E. Friedman, J. C. Chambron, J. P. Sauvage, N. J. Turro, J. K. Barton, *JACS* **1990**, 112, 4960-4962.
- [4] Q. Deraedt, L. Marcelis, F. Loiseau, B. Elias, *Inorg. Chem. Front.* **2017**, 4, 91-103; G. Piraux, L. Bar, M. Abraham, T. Lavergne, H. Jamet, J. Dejeu, L. Marcélis, E. Defrancq, B. Elias, *Chem. Eur. J.* **2017**, 23, 11872-11880; J. Weynand, A. Diman, M. Abraham, L. Marcelis, H. Jamet, A. Decottignies, J. Dejeu, E. Defrancq, B. Elias, *Chem. Eur. J.* **2018**, 24, 19216-19227.