Zakład Chemii Biologicznej Wydziału Biotechnologii U. Wr.

zaprasza na seminarium pt.

Responsive probes: powerful tools to address biomedical questions

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The most pertinent questions in human health relate to an understanding of chemical processes and the dynamics of analyte concentration. This can be achieved by using small-molecule probes that report on their chemical environment by generating a detectable signal. Fluorescence spectroscopy and Magnetic Resonance Imaging (MRI) are non-invasive complementary techniques, making them particularly attractive for studying living organisms. While MRI has virtually no penetration limits and enables high resolution whole-body imaging, it suffers from low sensitivity and limited use of responsive probes *in vivo*. In contrast, the rapid increase of fluorescent switches has been fostered by the improvement of fluorescence detection instruments with increased sensitivity and spatio-temporal resolution. Nevertheless, most of these probes have never been reused beyond the proof of principle.

We aim at the design, development and dissemination of new small-molecule responsive tools for fluorescence and MRI which can be further used by a wide range of specialists. Our research focusses on creating probes and methodologies to monitor the real time dynamics of oxidative capacity and labile metal pools in biological systems in the context of increasing evidence supporting their implication in disease pathology and progression, and to investigate the mechanisms and improve the effectiveness of metallodrugs' therapies. This approach has been successfully complemented in collaborations with biomedical investigators, which has prompted us to expand our toolbox of fluorescent probes to organelle-specific sensors to ultimately enable the precise spatio-temporal mapping of labile metal pools and oxidative capacity. Currently, we have also been interested in combining targeting strategies with fluorescent switches for highly selective protein labelling to enable monitoring of their endogenous interactions.