# Responsive Probes for Background-Free Luminescence Bioassay and Imaging

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Rapid advances in chemical and biomedical studies stimulate the design of new bioanalytical probes for precise and accurate sensing and bioimaging of specific disease biomarkers [1]. These analytical probes enable detection and visualization of the physiological and pathological functions of key biomarkers in living cells and organisms, thus contributing to early diagnosis of diseases and monitoring of their treatments. Of various approaches, luminescent molecular-/nano-probes that can specifically detect and visualize biomolecules have been recognized as one of the most promising technologies due to their high sensitivity and selectivity in sensing and high spatiotemporal resolution in bioimaging. Nevertheless, conventional molecule and nanoparticle-based probes for biomarker detection are readily interfered with autofluorescence from complicated biological environments, leading to false positive/negative signals. The high reactivities of disease's reactive biomarkers (such as reactive oxygen/nitrogen species with less than one second lifetime) necessitates the development of new bioanalytical probes for background-free detection these unstable and highly reactive biomarkers in situ. In our research, we found that the optical output signals can be easily modulated to eliminate the autofluorescence signals via three strategies, including anti-Stokes upconversion luminescence [2], time-gated luminescence (Figure 1) [3], and photoswitchable "double-checked" luminescence [4]. In this presentation, I will discuss with you our responsive bioanalytical probes for accurate and background-free luminescence detection and imaging of reactive biomarkers in vitro and in vivo.

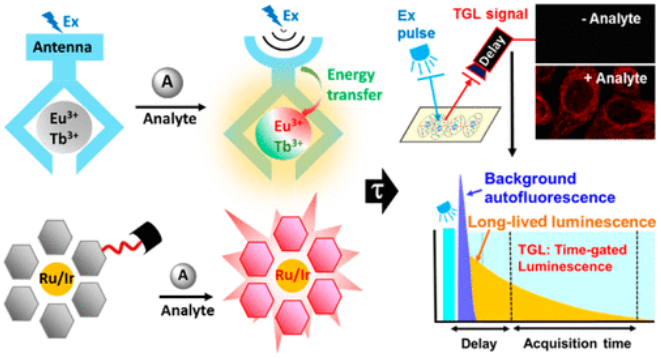


***Figure 1:*** *Responsive Metal Complex Probes for Time-Gated Luminescence Biosensing and Imaging*

**References:**

[1] R. Zhang, J. Yong, J. Yuan, Z. P. Xu, *Coordination Chemistry Reviews*, **2020**, *408*, 213182.
[2] R. Zhang, L. Liang, Q. Meng, et al., *Small*, **2019**, *15*, 1803712.
[3] R. Zhang, J. Yuan, *Account of Chemical Research*, **2020**, *53*, 1316-1329.
[4] X. Zhang, Y. Fu, J. Liu, G. Qian, J. Zhang, R. Zhang, Z. P. Xu, *Nanoscale*, **2020**, *12*, 22527-22533.