

CBC SEMINAR ANNOUNCEMENT



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Photosensitized Lanthanide Doped Nanoparticles for Bio-analytical Applications

The fast advances in medical research lead to a need for a constant improvement of the diagnostic and imaging analytical tools. User friendly methods with increasing sensitivity and specificity are mandatory for the detection and quantification of biomarkers present at very low concentrations in complex matrices. In this field, lanthanide-based luminescent compounds are promising probes as their spectroscopic properties give rise to a long excited state lifetime and very high brightness.¹

We have recently developed lanthanide nanoparticles exhibiting exceptional brightness after photosensitization by an appropriate antenna ligand² and characterized by a very high photostability and low cytotoxicity.³ We now aim at using these ultrabright nanoparticles (UNPs) as luminescent probes for specific detection and quantification of a targeted biomolecule by time-resolved luminescence. A proof-of-concept has been illustrated on two biomarker-target systems, through the bio-functionalization of UNPs by the biomarker. First, UNPs functionalization by streptavidin and specific biotin recognition⁴ of this luminescent system have been verified by energy transfer experiments with a biotinylated dye. Then, immunostaining of epidermal growth factor receptor (EGFR) overexpressed on cell membrane of epidermoid A-431 cell lines has been realized with UNPs labeled with antibody Matuzumab.

References

1. Sy, M., Nonat, A., Hildebrandt, N. & Charbonnière, L. J. Lanthanide-based luminescence biolabelling. *Chemical Communications* **52**, 5080–5095 (2016).
2. Goetz, J. *et al.* Ultrabright Lanthanide Nanoparticles. *ChemPlusChem* **81**, 526–534 (2016).
3. Cardoso Dos Santos, M. *et al.* Autofluorescence-Free Live-Cell Imaging Using Terbium Nanoparticles. *Bioconjugate Chemistry* **29**, 1327–1334 (2018).
4. Green, N. Avidin. 3. the Nature of the Biotin-Binding Site. *Biochemical Journal* **89**, 599–609 (1963).

Date: 4th December 2019 (Wednesday)
Time: 11.00am to 12.30pm
Venue: SPMS Graduate and Research
Conference Room
Host: Professor Xing Bengang