

Subcellular Imaging of an Estrogen Derivative Using a Single Core Multimodal Probe (SCoMPI) by Luminescence Technique and AFMIR.

Sylvain Clède^{1,2,3}, François Lambert^{1,2,3}, Marie-Aude Plamont⁴,
Rénette Saint-Fort⁴, Ariane Deniset-Besseau⁵, Zoher Gueroui^{1,2},
Alexandre Dazzi⁵, Anne Vessières⁴ and Clotilde Policar^{1,2,3}

¹ Ecole Normale Supérieure, Département de chimie, 24, rue Lhomond, 75005 Paris, France.

² UPMC, 4, Place Jussieu, 75005 Paris, France

³ Laboratoire des Biomolécules, CNRS, UMR7203, France

⁴ Laboratoire Friedel, Chimie ParisTech, CNRS, UMR7223, 11, rue Pierre et Marie Curie, 75231 Paris, France

⁵ Laboratoire de Chimie Physique, UMR-CNRS 8000, Université Paris-Sud 11, 91405 Orsay, France

There are nowadays many non-invasive techniques for cellular detection of tagged molecules and fluorescent tags are widely developed. Vibrational spectroscopies are attractive for bio-imaging in the case of vibrational excitations in the IR, where no photo-bleaching is induced. IR-probes or tags have been reported in the literature and they are mostly metal-carbonyl units that show many advantages (stability in the biological environment, intense absorption in the 1800–2200 cm⁻¹ range which is the transparent IR window of biological media)¹. The smaller the probe, the less modified the physico-chemical properties of the molecule and its location in biological tissues will be. This is why small IR-tags are attractive. Interestingly metal-carbonyl bearing specific ancillary ligands are known to be luminescent. Coupling IR and luminescence detection using metal-carbonyl can then be envisioned. Indeed, the team of our coworker C. Policar and al. has recently developed the concept of single core multimodal probe for imaging² – SCoMPI – which corresponds to a unique organo-metallic complex showing complementary spectroscopic properties to achieve multimodal imaging in cells.

Here we will describe the investigation of the cellular location of an estrogen derivative conjugated with a metal-CO SCoMPI using correlative spectro-imaging and show the relevance of this multimodal probe to explore the cellular distribution of mestranol in MCF-7 and MDA-MB-231 breast cancer cells through a correlative imaging approach.

Luminescence studies were performed using wide field and confocal fluorescent microscopies. Vibrational imaging was performed using cutting-edge near-field technique AFMIR^{3,4}. These techniques were applied to track the complex mestranol+SCoMPI in fixed MCF-7 and/or MDA-MB-231 cells. All the mappings were consistent with one another and in agreement with colocalization of the complex mestranol+SCoMPI with the Golgi apparatus.

References:

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