

Séminaire SOLEIL

From superoxide dismutation to
intracellular detection of metal complexes

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Grand Amphi SOLEIL

Invitée par A. SOMOGYI et J-P. SAMAMA

Inorganic complexes are increasingly used for biological applications, including medicinal chemistry, and nowadays, metallodrug covers a very large area.^[1] The question of their cell-penetration and of their cell-distribution is of importance as the pharmacological activity of a molecule is closely related to its ability to reach its target. However, this topic is yet underexplored and appears today as a contemporary challenge.^[2]

In this talk we will present two independent studies.

(a) The first one concerns Mn-complexes with antisuperoxide activity. We have been developing such compounds for several years and the *in vitro* mechanism has been studied in detail.^[3-6] Recent results on the effect of these complexes on human cells submitted to an oxidative stress have been obtained (human colon adenocarcinoma activated by bacterial lipopolysaccharide) (coll. J. Masliah, hôpital Saint-Antoine, Paris VI). Another cell-model has been used to probe the effect of the complexes. The flow of reactive oxygen and nitrogen species outside macrophages (murine cell lines raw 264.7) has been evaluated on single cells in presence and in absence of the complex with an original detection by amperometry using ultramicroelectrode (coll. F. Lemaître, C. Amatore, UMR PASTEUR).

(b) The second concerns the subcellular IR-mapping of metal-carbonyl derivatives by AFMIR (coll. A. Dazzi, LCP, Paris-Sud 11 and A. Vessières, ENSCP, Lab. Friedel)

The IR-energy range is particularly attractive for chemical-imaging as vibrational excitation in the IR induces no photo-bleaching. However, in classical optical microscopy, sub-cellular resolutions are not attainable in the IR-range, as the diffraction criteria imposes a resolution higher than the μm . To reach sub-micrometric resolution, near-field techniques are mandatory. AFMIR is an emerging and challenging technique using a set-up patented by Dr. A. Dazzi (LCP, Paris-Sud 11) coupling an AFM and a tunable infrared laser to make spatially resolved absorption measurements in the IR-range. We will present the first intracellular mapping of a rhenium-tris-carbonyl inside human cells (MDA-MB231, non-hormono-dependent breast cancer cells) and determination of its nuclear localization using AFMIR.^[7]



[1] P. J. Dyson, G. Sava, *Dalton Trans* **2006**, 1929-1933.

[2] C. A. Puckett, J. K. Barton, *J. Am. Chem. Soc.* **2007**, *129*, 46-47.

[3] S. Durot, F. Lambert, J.-P. Renault, C. Policar, *Eur. J. Inorg. Chem.* **2005**, *14*, 2789-2793.

[4] S. Durot, C. Policar, F. Cisnetti, F. Lambert, J.-P. Renault, G. Pelosi, G. Blain, H. Korri-Youssef, J. P. Mahy, *Eur. J. Inorg. Chem.* **2005**, *14*, 3513-3523.

[5] F. Cisnetti, A.-S. Lefèvre, R. Guillot, F. Lambert, G. Blain, E. Anxolabéhère-Mallart, C. Policar, *Eur. J. Inorg. Chem.* **2007**, 4472-4480.

[6] S. Grony, G. Blain, R. Guillot, C. Policar, E. Anxolabéhère-Mallart, *Inorg. Chem.* **2007**, *46*, 1951-1953.

[7] C. Policar, J. B. Waern, M. A. Plamont, S. Clède, C. Mayet, R. Prazeres, J.-M. Ortega, A. Vessières, A. Dazzi, *Angew. Chem. Int. Ed.* **ASAP**.



Ce séminaire sera suivi d'une pause-Café



Formalités d'entrée : accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).

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