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IMCN SEMINAR

***« Silica-based nanotherapeutic vectors :
Synthesis challenges and dissolution
control »***

**Tuesday 10 September 2019 – 10:45 am
Auditorium LAVO 51 (Lavoisier building)
Place L. Pasteur, 1, 1348 Louvain-La-Neuve**

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Dr. Cédric BOISSIERE**Sorbonne University – LCMCP, CNRS, Collège de France****ABSTRACT**

Nano-vectors are fairly recent nanomaterials aiming at helping diagnosis and treatment of heavy diseases such as cancer. The huge research effort produced in the last fifteen years achieved an impressive number of different organic or hybrid organic/inorganic nanomaterials integrating one or several functionalities ranging from contrasting agent (helping at imaging diagnosis) or therapy (drug release, hyperthermia, radio-sensitising agent, *etc.*). Yet, so far, commercialized nanovectors are fairly simple and mostly organic-based nanomaterials. The reason of this discrepancy comes from the fact that multifunctional platforms (either organic or hybrid) require expensive and delicate synthesis pathways, and/or use complex chemical compositions, and/or makes difficult their dissolution and excretion control.

In this presentation will be shown past and recent synthesis strategies of silica-based nanovectors developed at LCMCP. The adequate coupling of soft-chemistry and processing allows developing in very simple ways multifunctional platforms with a constrained number of constituents that offer a very good functionality/synthesis_complexity compromise. A dissolution kinetic study will be presented. It will show that their use is realistic from pharmaceutical development point of view.

KEYWORDS : nano-vector, mesoporous, silica, Sol-Gel, hybrid

BIOGRAPHY**CAREER HISTORY :**

Dr C. Boissiere was born in France 1974. He was appointed as Fellow Researcher CNRS in 2002 and is now Research Director, head of the Processing and Hybrid Materials' group at LCMCP (Sorbonne Université). He works on the synthesis of functional hierarchical nano-materials by coupling of evaporation processing and bottom-up soft-chemistry. Most of his achievements concern nanostructured thin films, nanoparticles and aerosol materials for optics, heterogeneous catalysis and nano-medicine. He is co-authors of more than 160 articles and 32 patents. His work was awarded by the European Membrane Society (EMS) in 2006, the Jean RIST medal of the French Society of Materials and Metallurgy (SF2M)) in 2007, and French Chemical Society in Solid Chemistry (2014).

MAJOR PUBLICATIONS :

- Advanced drug delivery vectors with tailored surface properties made of mesoporous binary oxides submicronic spheres. M. Colilla, M. Manzano, M. Vallet-Regi, C. Boissière, C. Sanchez, *Chemistry of Materials* 2010, 22(5), 1821-1830
- Chemical Modification As a Versatile Tool for Tuning Stability of Silica Based Mesoporous Carriers in Biologically Relevant Conditions, T. Fontecave, C. Sanchez, T. Azaïs, and C. Boissiere *Chemistry of Materials* (2012) 24 4226-4236
- Using EISA for the direct drug templating of therapeutic vectors with high loading fractions, tunable drug release, and controlled degradation, T. Fontecave, C. Boissiere, N. Baccile, FJ Plou, C. Sanchez *Chemistry of Materials*, (2013) 25 (23) 4671-4678
- Gold-silica quantum rattles for multimodal imaging and therapy, M. Hembury, C. Chiappini, et al., *PNAS* (2015) 112 (7) 1959-1964

