

"Seminars in Biomedical Engineering"

Programa de Pós-Graduação em Engenharia Biomédica

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<u>Google Meet Link</u>: <u>http://meet.google.com/rne-orip-hfp</u>

ORGANIC NANOPARTICLES FOR DRUG DELIVERY

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<u>Abstract</u>



Giant organic macromolecules, such as polymers and dendrimers, can easily reach the nanometric scale while several smaller amphiphilic organic molecules can spontaneously self-assemble in water to form nanoparticles. Both structures have been used to encapsulate drugs and transport them to their future site of action. Thus, numerous organic nanostructures

have been tuned and modified in order to improve the pharmacokinetics of a large variety of drugs improving their bioavailability, bloodstream time circulation, and specifically targeting the diseased organs. In particular, dendrimers and dendritic hybrids display highly interesting characteristics that turn them into idoneous organic nanoparticles to deliver drugs. They are perfectly defined hyperbranched macromolecules with a high number of functional moieties on their periphery. During this talk, we will first see how self-assembling dendrimers have been used to transport and deliver camptothecin as an anti-hepatitis C drug¹ and chloroquine as anti-tumoral drug² improving their bioavailability and activity. In the second part, we will see how giant dendritic molecules have been used to improve the targeting of three antimalarial drug toward infected red blood cells.³

Speaker's Bio

After obtaining its Master of Science in France in 2010, Alexandre Lancelot moved to Spain to join a R&D project in a pharmaceutical company, named Pharma Mar, within the frame of a Marie Curie Sklodowska international training network. In 2017, he received its PhD in Chemistry, entitled "new dendritic derivatives for applications in nanomedicine: drug delivery and gene transfection" at the University of



Zaragoza. This work was multidisciplinary, encompassing organic synthesis and biological studies. Later, he worked for Henkel, a chemical company, as a postdoctoral researcher for 3 years. Since 2020, he is working as a postdoctoral research scholar at Purdue University in the United States. All along these two postdoctoral experiences, he acquired new competences in polymer chemistry for adhesives & coatings as well as in biomimetic and biosourced polymers. To date, its research work has been gathered in 11 articles, 2 review papers and 1 patent and it received 229 citations. He also mentored 7 students, from undergraduates to PhDs and he is a board member of the Purdue Postdoctoral Association.

¹ A. Lancelot, R. Clavería-Gimeno, A. Velázquez-Campoy, O. Abian, J.L. Serrano, T. Sierra, *European Polymer Journal*, **2017**, *90*, 136-149.

² R. González-Pastor, A. Lancelot, V. Morcuende-Ventura, M. San Anselmo, T. Sierra, J.L. Serrano, P. Martín-Duque, *International Journal of Molecular Sciences*, **2021**, 22, Article number 5223.

³ E. Martí Coma-Cros1, A. Lancelot1, M. San Anselmo, J. Valle-Delgado, J.L. Serrano, X. Fernàndez-Busquets, T. Sierra. *Biomaterials Science*, **2019**, 7, 1661-1674.