SEMINARIOS JÓVENES INVESTIGADORES

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Sala de conferencias, Edificio de I+D, Campus Río Ebro

Miriam Abad

PREPARATION OF HYBRID PALLADIUM-POLYMERIC NANOPARTICLES BY MICROFLUIDICS FOR BIOMEDICAL APPLICATIONS

Block copolymers (BCs) are able to self-organize at the nanoscale either in bulk or water, which is the origin of nanotechnological applications described for these materials, highlighted among them drug delivery. Moreover, when stimuli responsive moieties are introduced in BCs, such as temperature, pH or light-sensitive units, a controlled release of encapsulated cargoes can be achieved. Near-infrared (NIR) radiation is a stimulus of great interest in the biomedical field because NIR responsive nanoparticles can act as antennas for photothermal therapy and also as triggers for on-demand drug delivery, minimizing systemic adverse effects by taking control of where and when the therapeutic intervention takes place.

In previous work, nano-objects from BCs were prepared using a co-solvent method, but this method is time-demanding. So in this work, microfluidics has been employed in an attempt to prepare polymeric nanoparticles in an easy, fast and reproducible manner.

Elena Atrián-Blasco

USE OF POLYOXOMETALATES AS BIOINORGANIC TOOLS: FROM ALZHEIMER'S DISEASE TO BIOFILM DISRUPTION

Polyoxometalates are oxoclusters of early transition metals which have found applications in various fields from catalysis to material science or biomedicine. Among the vastly proposed biochemical applications of polyoxometalates, their interactions with peptides and proteins as well as their antibacterial activity have been gaining interest in the few years. Recently, polyoxometales (POMs) have been described as inhibitors of the Amyloid-β peptide aggregation, a peptide involved in the development of Alzheimer's disease (AD).[1]
Metal-mediated Amyloid-β peptide aggregation and ROS production, are well known to play an important role in the development of Alzheimer's disease. For this reason, one of the proposed therapies is based on the chelation of implicated metal ions such as Cu, Zn and Fe. Such chelators could remove the metal ions from the amyloid aggregates and recover the normal metal homeostasis.[2] We have studied the interaction of different Keggin-structure POMs with Cu, and how, through their interaction, they can modulate the metal-mediated aggregation of amyloid- β peptides. A current project which uses POM-hybrids as antimicrobial agents will also be presented.

References

[1] N. Gao, H. Sun, K. Dong, J. Ren, T. Duan, C. Xu, X. Qu. *Nature communications*, **2014**, *5*, 3422
[2] C. Esmieu, D. Guettas, A. Conte-Daban, L. Sabater, P. Faller, C. Hureau. *Inorg. Chem*, **2019**, DOI: 10.1021/acs.inorgchem.9b00995.