CICLO JORNADAS CIENTÍFICAS
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AMINO-NANOZIMES

Biomedical Applications

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Salón de Actos de la Biblioteca de Ciencias (Campus Burjassot)

Organizado por:

SUPRAMOL-UV
a supramolecular chemistry group

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Laura Rodríguez Raurell *(Universitat de Barcelona)*

Au(I) and Pt(II) complexes as promising supramolecular tools

Au(I) and Pt(II) compounds are of great relevance from different points of view. They present, in general, linear geometries in the case of Au(I) and square planar for Pt(II) derivatives. Their properties are driven by the organic ligands coordinated to the metal and by the possible establishment of weak intra- or intermolecular contacts. Having this in mind, in our research group we are focused on the design and synthesis of the suitable organic ligands that can be monodentate (in the case of Au(I) derivatives) or monodentate + tridentate (in the case of Pt(II) complexes) and their coordination to the corresponding metal atom. We analyze the resulting luminescent properties and their applications in the fields of supramolecular chemistry, luminescent materials, singlet oxygen production, sensing or biological activity among others. These properties can be modulated and affected by the formation of supramolecular interactions. Interestingly, we can modulate the possible assemblies to obtain structures with different sizes and shapes, what is a challenge for the supramolecular chemistry community and even more, trying to have a control on it. On the other hand, when our molecules present a chromophore, we can also tune the resulting colors and emission intensities that come from the aggregation.
In the last years, we are also focused on the development of phosphorescence emitters that emit this type of emission at room temperature. This is an important challenge from different type of applications such as in OLED devices.

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Crossing the Bridge between Supramolecular Chemistry and Chemical Biology

The study of biological processes from the chemical perspective leads to a better understanding of life at the molecular level, also allowing the specific intervention in both normal and pathological stages. However, biomolecules are not isolated entities as their function rely on their mutual interactions, thus playing their specific role within complex molecular systems. The study of the interaction and communication between molecules represents the core of the so-called Supramolecular Chemistry, thus being key to tackle biological process at both fundamental molecular level and for tailored applications. In this lecture, I will discuss the close relationship between Supramolecular Chemistry and Chemical Biology, illustrating the concept with key recent results from our own research group. Accordingly, I will present selected examples of selective and efficient receptors able to recognize molecules or ions in very competitive biomimetic media. These are based on organic pseudopeptides macrobicycles or cages with interesting physico-chemical properties. Thus, acid-base properties, structural, geometrical and polarity features define a binding pocket able to selectively recognize species in aqueous media and even at aqueous-lipid interfaces. On the other hand, the dynamic covalent/combinatorial chemistry approach will be also explained with recent studies from our research group, which have led to the discovery of new receptors and ligands for relevant entities from simple amino acids to biopolymers, or even live cells. These molecular recognition processes can be traduced into interesting biological activities with potential biomedical uses.