
Dr. Ignacio Alfonso
Institute for Advanced Chemistry of Catalonia, IQAC-CSIC
*ignacio.alfonso@iqac.csic.es*

## *Abstract*

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.[1] 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[2] 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[3] and even at aqueous-lipid interfaces.[4] On the other hand and as a less conventional approach, dynamic covalent/combinatorial chemistry 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[5] to biopolymers,[6] or even live cells.[7] These molecular recognition processes can be traduced into interesting biological activities with potential biomedical uses.[8]

Financial support from the Spanish Ministry of Science and Innovation and the Spanish Research Agency (PID2021-128411NB-I00, MCI/AEI/ 10.13039/501100011033, and FEDER/EU) is gratefully acknowledged.

**References**

[1] J. Solà, C. Jimeno, I. Alfonso, *Chem. Commun.*, **2020**, *56*, 13273–13286.

[2] L. Tapia, I. Alfonso, J. Solà, *Org. Biomol. Chem.*, **2021**, *19*, 9527–9540
[3] L. Tapia, N. Solozabal, J. Solà, Y. Pérez, T. W. Miller, I. Alfonso, *Chem. Eur. J.*, **2021**, *27*, 9542–9549.
[4] L. Tapia, Y. Pérez, M. Bolte, J. Casas, J. Solà, R. Quesada, I. Alfonso, *Angew. Chem. Int. Ed.*, **2019**, *58*, 12465–12468.
[5] M. Lafuente, J. Solà, I. Alfonso, *Angew. Chem. Int. Ed.*, **2018**, *57*, 8421–8424.
[6] M. Corredor, D. Carbajo, C. Domingo, Y. Pérez, J. Bujons, A. Messeguer, I. Alfonso, *Angew. Chem. Int. Ed.*, **2018**, *57*, 11973–11977.
[7] D. Carbajo, Y. Pérez, J. Bujons, I. Alfonso, *Angew. Chem. Int. Ed.*, **2020**, *59*, 17202–17206.
[8] D. Carbajo, Y. Pérez, M. Guerra-Rabollo, E. Prats, J. Bujons, I. Alfonso, *J. Med. Chem.*, **2022**, *65*, 4865–4877.

## *Biosketch*

Ignacio Alfonso leads the Supramolecular Chemistry group at IQAC-CSIC and his research interests are focused on the fields of Systems Chemistry, Dynamic Combinatorial Chemistry and Molecular recognition of biomolecules. Initially trained as Organic Chemist (PhD in 1999, University of Oviedo) he has worked in top-rated institutions in France (University of Strasbourg, with Nobel Laureate J.-M. Lehn) and USA (The Scripps Research Institute, Postdoc with M. R. Ghadiri). Selected for the Ramon y Cajal tenure-track in 2004 (UJI), he permanently joined IQAC-CSIC in 2007 where he created the Supramolecular Chemistry Group, which is devoted to different aspects of molecular recognition of biorelevant species. His scientific trajectory has led to more than 130 scientific documents (including original research top-rated publications, reviews and book chapters) with a high degree of authorship (>60% as corresponding author). Recently, Dr. Alfonso has been recognized as one of the most influential scientists worldwide, being included in the World's top 2% scientists ranking elaborated by Stanford University. Dr. Alfonso has successfully co-directed 10 PhD. He has been also involved in management activities both at IQAC (Head of the Department of Biological Chemistry 2019-2023) and at the Spanish Royal Society of Chemistry (at both Chemical Biology and NMR specialized groups). Dr. Alfonso frequently acts as reviewer for top-rated scientific Journals (JACS, Angew., Nat Commun, Chem. Sci., Chem Commun., etc.) and has served as an expert evaluator for different funding agencies at regional, national and international (Portugal, France, Finland, Belgium, European Union) levels.