May 28th, 2025
14:00

Clara Viñas, PhD

ICMAB-CSIC, Bellaterra, Catalonia, Spain

BACKGROUND

Clara Viñas holds degrees in Chemical Sciences (UAB) and Pharmacy (UB). She began her PhD at the University of Michigan, focusing on boron cluster chemistry, and later earned her PhD in Pharmacy from UB. After directing the Municipal Laboratory of Sabadell city, she earned a CSIC Tenured Scientist position at ICMAB-CSIC in 1991, promoted to Scientific Researcher and, achiving to Research Professor in 2006.

A leading expert in Organometallics and boron clusters, Prof. Viñas conducts interdisciplinary research spanning catalysis, environmental applications, and medicinal chemistry. Prof. Viñas was elected member of the Academia Europaea (nº 5772) in 2021. Prof. Viñas has led 33 national / international projects, inventor in 7 patents, published 406 articles (h index=60, by WoS in May 8th 2025), 24 book chapters, 1 Encyclopedia chapter and supervised 16 doctoral theses.

Prof. Viñas contributed to the nomenclature of boron clusters for the IUPAC. Prof. Viñas received the SCQ-2022 Scientific Excellence Award, and the SEQ-2024 recognition of a distinguished career. She is in the top 2% of the most cited chemists in the Stanford-Elsevier ranking (career and period 2020-2024).

Revolutionizing Nanomedicine: Harnessing Amphiphilic Nanomolecules for Multimodal, Carrier-Free Synergies

Aromatic compounds play vital roles in biochemistry and have applications ranging from drug delivery to nanotechnology and biological markers. We achieved a major milestone by experimentally and theoretically demonstrating that icosahedral boron clusters exhibit global aromaticity. Leveraging the link between stability and aromaticity, we introduced new uses for boron clusters in biological chemistry.

Our research centers on developing nanoparticles and inorganic nanovesicles/micelles as cancer drug carriers or anticancer agents. These systems, showing promising in vitro antitumor activity, could offer dual-action therapies (chemotherapy+BNCT, thermotherapy+BNCT) with potential clinical benefits for glioblastoma and breast cancer.

We studied the interaction of 3D aromatic metallabis(dicarbollides)[1] with biomolecules (proteins, *ds*-DNA) and their translocation through bilayer membranes. Molecular dynamics simulations revealed a flip-flop translocation mechanism involving a transient, elongated membrane structure.

We will also report biodistribution studies of (metalla)carboranes in cancer cells and *in vivo*.[2] Finally, due to their chemical and biological properties and tumor retention, we explored their use in multimodal cancer therapy (BNCT, PBFT, gamma radiation, X-ray, Mössbauer).[3]

Additionally, boron clusters have shown promise as scaffolds for diagnostic and therapeutic labeling, expanding their biomedical applications.

[1] *J. Am. Chem. Soc*. **142**, 9396-9407 (**2020**); [2] *J. Mater. Chem. B* **10**, 9794-9815 (**2022**); *Int. J. Mol. Sci.* **22**, 9937 (**2021**);
[3] *Inorg. Chem. Front*. **9**, *1490* (**2022**); *J. Mater. Chem. B* **12**, 9550 (**2024**); *EJNMMI Res* **15**, 13 (**2025**).

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