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11:00 AM



Prof. Erika Ferrari

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BACKGROUND

Erika Ferrari (PhD) is Associate Professor of Inorganic Chemistry at the University of Modena and Reggio Emilia (I), where she obtained her PhD in Chemistry in 2003. At present, she is the head of the Research Group of Medicinal Inorganic Chemistry at the University of Modena and Reggio Emilia (MIC-MORE). She leads teaching activities for the Bachelor and Master Degree in Chemistry. She is a faculty member of the PhD course "Models and Methods for Material and Environmental Sciences". Since 2021, she is responsible for the Quality Assurance of the Department of Chemical and Geological Sciences.

Her research lies at the intersection of coordination chemistry, bioinorganic chemistry, and inorganic medicinal chemistry, with a strong interdisciplinary approach anchored in inorganic chemistry. Her expertise spans the design, synthesis, and characterization of metal-ligand systems of both natural and synthetic origin, with a focus on therapeutic and diagnostic applications. She has collaborations with clinical institutions.

She is a co-author of more than 70 scientific publications on peer-reviewed journals, 2 patents and more than 100 contributions to international conferences.

To Each Metal, Its Chelator: Inorganic Chemistry at the Service of Nuclear Medicine



Abstract

The successful development of radiometal-based radiopharmaceuticals depends on the precise matching of metal ion properties with chelator architecture. In this seminar, I will present recent results from my research illustrating how rational chelator design, grounded in coordination chemistry, enables optimized performance across different diagnostic and therapeutic radionuclides.

For gallium-68, a rigidified hexadentate acyclic ligand based on a cyclohexanediamine scaffold was developed to overcome the isomerization issues observed with flexible HBED derivatives. The resulting chelator forms a single, hexacoordinated Ga³⁺ complex, combining excellent radiolabeling efficiency at low concentrations with outstanding stability in biological media. For copper radioisotopes, a sulfonated TACN-based ligand was designed to achieve high aqueous solubility, neutral complex charge, and exceptional Cu²⁺ affinity. Detailed thermodynamic, spectroscopic, electrochemical, and radiolabeling studies demonstrate superior stability and kinetic robustness compared to current clinical benchmarks.

These principles were further translated into a chimeric bioconjugate incorporating an MCT1-targeting moiety, yielding a dual-function system that couples selective biological recognition with reliable copper chelation. Together, these case studies highlight how metal-specific coordination strategies underpin the development of next-generation radiopharmaceuticals, reinforcing the concept that to each metal corresponds its optimal chelating system.

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