

CURRICULUM VITAE of ENRICO MONZANI

Prof. Dr. **Enrico Monzani**

Full professor of General and Inorganic Chemistry

Department of Chemistry, University of Pavia, Via Taramelli 12, 27100 Pavia, Italy.

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EDUCATION

July 1984 – high school degree (60/60)

January 1991 - degree in Industrial Chemistry (110/110 cum Laude) from the University of Milano (Italy)

Title of the thesis: Biomimetic oxidations catalyzed by iron porphyrins modified with peptide chains.

POST-UNIVERSITY TRAINING

March 1991- August 1992. Research fellowship at the enzymology laboratory of the “Istituto di Ricerche Farmacologiche Mario Negri”, Milan, Italy.

PhD – CHEMISTRY - OCTOBER 1994

Department of Chemistry, University of Pavia, Italy and “Istituto di Ricerche Farmacologiche Mario Negri”, Milan

Title of the thesis: Studies on metalloproteins containing iron and copper as cofactor and on their models

POST-DOCTORATE TRAINING

April 1995 - December 1995

Scientific collaboration inside the Human Capital and Mobility CEE project: “Dinuclear and polynuclear metal centres in biology: enzymes and synthetic analogues”

Bioinorganic Chemistry laboratory of the Department of Chemistry, University of Pavia, Italy.

July 1996

Scientific collaboration inside the CEE COST D7 project: MOLECULAR RECOGNITION CHEMISTRY.

Bioinorganic Chemistry laboratory (prof. Jose Moura), Departamento de Química, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa. Portugal

April 1996 - April 1997

Post-Doctoral fellowship from the University of Pavia, Italy.

Bioinorganic Chemistry laboratory of the Department of Chemistry, University of Pavia, Italy.

ACADEMIC ACTIVITY

May 1997 – December 2010: Assistant professor in General and Inorganic Chemistry.

December 2010 – February 2020: Associate professor in General and Inorganic Chemistry.

Since March 2020: Full professor in General and Inorganic Chemistry.

Department of Chemistry, University of Pavia, Italy

ACADEMIC SPIN-OFF

Since 2010 - Co-founder and R&D responsible of Noxamet Ltd, an academic spin-off that develops new classes of metal-based nitric oxide donor molecules. The spin-off won a specific call (art. 11, D.M. 8/08/2000) of the Italian Ministry of Education, University and Research for the creation of academic spin-offs.

TEACHING

Teacher of plenty of courses in Bachelor and Master's degree curricula in Chemistry, Biotechnology, Bioengineering, and Biology. The courses deal with General and Inorganic Chemistry, first level, as well as advanced courses of Physical Methods in Chemistry, Inorganic Chemistry and NMR Spectroscopy.

TUTORING ACTIVITY

Supervisor of about twenty-five experimental research theses for the degree in Biotechnology (three-year), Industrial Biotechnology (master degree) and Chemistry (master degree).

Supervisor of four PhD theses in Chemical Sciences and supervisor of three IUSS PhD theses in Biomolecular Sciences and Biotechnology of the University of Pavia.

PARTECIPATION TO FUNDED PROJECTS:

-1993-1997: Human Capital and Mobility: "Dinuclear and polynuclear metal centres in biology: enzymes and synthetic analogues.

-2001: Italian CNR project: "Metabolismo e targets di NO (NO metabolism and targets)".

-2000-2002: INTAS "The basic chemistry of peroxynitrite and related species: reactions with antioxidants, metalloproteins and their models.

-2001-2006: Marie Curie Training site "Metals in biological systems"; COST Chemistry D21 dal titolo: "Metalloenzymes and chemical biomimetics".

-2003: FIRB project, Italian Ministry of Education, University and Research "Folding e aggregazione di proteine: Metalli e biomolecole nelle malattie conformazionali".

-2004: PI of the Italian CNR project: "Complessi peptide-microperossidasi come modelli di perossidasi (Microperoxidases-Peptide Complexes as Models for Peroxidases)".

-2005-2007: PRIN project, Italian Ministry of Education, University and Research "Processi chimici e modificazioni strutturali nella neurodegenerazione".

-2008-2010: PRIN project, Italian Ministry of Education, University and Research "Ioni metallici, neuromelanina e stress ossidativo nella malattia di Parkinson".

-2012: PRIN project, Italian Ministry of Education, University and Research "Ioni metallici nelle patologie da invecchiamento: interplay tra metallostasi e proteostasi nella neurodegenerazione".

-2012-2013: Lombardia Sardegna project "Utilizzo di donatori di ossido di azoto nel miglioramento della resistenza ai patogeni in piante di interesse industriale". I have been involved in the project both through the Department of Chemistry and as scientific coordinator of the spin-off Noxamet Ltd

-2015: PRIN project, Italian Ministry of Education, University and Research "Metal ions, dopamine, and oxidative stress in Parkinson's disease"

SCIENTIFIC ACTIVITY

The research activity (updated in March 2024) has been the subject of 155 publications in peer-reviewed international journals (total number of citations = 7600, h-index = 41 Scopus/ ISI WoS), 3 chapters of book, more than 100 communications to Italian and international congresses and has been published in several conference proceedings.

The research interest of prof. Enrico Monzani is mainly within the chemical disciplinary sector CHIM/03. Most of the research lines are in the field of coordination and bioinorganic chemistry; they concerns the study of the properties/activities of metalloproteins, in particular heme and multicopper proteins and enzymes. The research is carried out not only with the natural macromolecules but also through the synthesis and characterization of low molecular weight models. Of particular interest is the clarification of the redox activities of these substances in both catalytic and stoichiometric reactions. The analysis makes extensive use of various spectroscopic and spectrometric techniques for the structural determination of the

active sites, for the obtainment of information on highly reactive transient species and for the clarification of the mechanisms of action.

A further research line carried out is in the field of supramolecular chemistry, where the main activity is the spectroscopic/kinetic characterization of the compounds of interest.

In the field of metallodrugs development, a new class of compounds, named metalloNONOates and capable to release NO in a controlled way, has been developed. The efficiency of the metalloNONOates as vasorelaxing agents (of blood vessels) and as anticancer drugs has been assessed. This research line is being carried out in both the Bioinorganic Chemistry laboratory of the University of Pavia and in the spin-off Noxamet.

More recently, the research has focused on the involvement of iron and copper ions in neurodegenerative processes through the study of the interaction of these metal ions with peptides and proteins involved in the neurodegeneration processes. The binding and reactivity studies on the model systems allowed to clarify, from a chemical point of view, the mechanisms leading the formation or quenching of toxic species.

Neurodegeneration has also been studied by analysing the composition, structural features and reactivity (as a scavenger or in the ROS generation activity) of human neuromelanin, a pigment found in the brain and associated with Parkinson's disease. The study has taken advantage by the preparation of synthetic models of neuromelanin which have been synthesized changing the metal composition, the melanic structure, the protein part, the solubility and the size.

These synthetic neuromelanin models are able to reproduce the spectroscopic features and many properties of the human pigment; to date, they are the best neuromelanin models available.