Mariapina D'Onofrio

Personal details

Date of birth: 3/11/1975
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Present activity

30 Mar 2022 Permanent position as associate professor of organic chemistry, SSD CHIM06, at the Department of Biotechnology of University of Verona

Career breaks

24 October 2011-23 March 2012 maternity leave
3 July-31 July 2012 maternity leave
15 September 2013-15 February 2014 maternity leave
30 June-15 July 2014 illness leave
21 July-1 August 2014 maternity leave

Education

2000-2003 PhD in Chemistry, University of Modena and Reggio Emilia. Dissertation title: "Spectroscopic studies of the structure and properties of antioxidant metallo-enzymes", Tutor: Prof. Marco Sola.

1993-1999 Master's Degree in Chemistry, University of Modena and Reggio Emilia. Thesis title: "Redox Thermodynamics of Low-Potential Iron-Sulfur Proteins" Supervisor: Prof. Marco Sola. Final grade 110/110.

Professional and research experiences

Jun 2013- Jul 2013 Visiting scientist in the laboratory of Prof. David Fushman, Department of Chemistry and Biochemistry, University of Maryland, USA, with a grant obtained from the University of Verona in the framework of the call Cooperint 2012.

Jun 2011-Mar 2022 Permanent position as assistant professor of organic chemistry, SSD CHIM06, at the Department of Biotechnology of University of Verona

Jan 2007-May 2011 Permanent position at the University of Verona, Department of Biotechnology as expert technician responsible for the management, maintenance, upgrade and methodologies development of the NMR instrument operating at 600 MHz with Cryoprobe.

Mar 2006- Dec 2006 Coordination of the research activity of the biotechnology department of ProtEra s.r.l., a spin-off company of the University of Florence.

Sept 2004- Feb 2006 Marie Curie fellow in the laboratory of Prof. Harald Schwalbe, Johann Wolfgang Goethe Universität, Institut für Organische Chemie und Chemische Biologie, Germany, for the transfer of knowledge from the University to the small enterprise ProtEra, in the framework of EU Marie Curie Host Fellowship for the Transfer of Knowledge (TOK).

Jul 2004- Aug 2004 Coordination of the research activity of the biotechnology department of ProtEra s.r.l., a spin-off company of the University of Florence.

Jun 2003-Jul 2004 Postdoctoral fellow in the laboratory of Prof. David Fushman, Department of Chemistry and Biochemistry, University of Maryland, USA. Project: NMR structural and dynamic investigation of poly-ubiquitin chains in complex with exogenous ligands and physiological partners.

Feb 2000- Feb 2003 Fellowship during the PhD period in the Centro di Risonanze Magnetiche of the University of Florence for research activity on expression and NMR structural studies of copper binding proteins, under the supervision of Porf. Ivano Bertini and Lucia Banci.

Funded Research Projects as Principal Investigator

- Project funded by **Regione del Veneto**, European Social Fund (13/01/2023-12/01/2024) Project title: "Identification of bioactive molecules in nutraceuticals and hive products and study of their potential neuroprotective effect".
- **PRIN 2022** funded by MUR (16/10/2023-15/10/2025) Project title: "PROTAC-based approach to develop broad-spectrum antiviral drugs triggering the proteolysis of the main viral protease". Role: Principal Investigator of the unit in Verona
- Grant of Fondo di beneficenza ed opere di carattere sociale e culturale of bank **Intesa San Paolo** (01/02/2022-31/01/2023) Project title: "Innovative strategy to block coronavirus infections by specific degradation of viral proteins".
- **Alzheimer's Association Research Grant** funded by the American Alzheimer's Association (from 01/11/17 to 31/10/20) Project title: "Role of polyubiquitination in Alzheimer's disease".
- **Progetto Ricerca di Base 2015** funded by University of Verona (from 1/10/16 to 30/09/18) Project title: "Semi-synthesis and structural studies of ubiquitinated Tau".
- **Joint Project 2010** funded by University of Verona, in collaboration with Novartis Vaccines and Diagnostics srl (Siena) (from 1/09/11 to 31/12/14). Project title: "NMR structural studies on the mechanisms of pilus assembly in Gram-positive Streptococcus agalactiae (Group B streptococcus)" Role: PI starting from 1/12/12. Principal Investigator of the Hosting Laboratory of the Umberto Veronesi post-doctoral fellow 2017 Dr. Francesca Munari

Participation in Research Projects

- Prin 2017, national project. Title: "Integrative tools for defining the molecular basis of the diseases: computational and experimental methods for protein variant interpretation", coordinator Prof. Fariselli.
- Firb giovani 2008, national project. Title: "Dalla comprensione dell'attivazione allosterica di fatty acid binding proteins modulata dall'interazione con membrane cellulari e leganti, al disegno di nuovi inibitori della cattura di lipidi", coordinator Dr. Assfalg.
- Prin 2008, national project. Title: "Produttività e meccanismi molecolari di fotoprotezione in organismi fotosintetici ossigenici", coordinator Prof. Bassi.
- Cariverona 2007 e Joint Project 2007, biennial local projects. Title: "Progetto pilota di metabolomica tramite Risonanza Magnetica Nucleare per lo studio del cancro del pancreas", coordinator Dr. Assfalg.
- Cariverona 2007, biennial local project. Title: "Nuove applicazioni della Risonanza Magnetica Nucleare dotata di cryoprobe ad alta sensibilità per lo sviluppo di nano biotecnologie", coordinator Prof. Molinari.

Oral communications in conferences and seminars

- 50th National Congress on Magnetic Resonance, Roma, 6-8 September 2023. Title: "Ubiquitin pathway of tau protein: insights into functional interactions"
- Université de Picardie Jules Verne, Amiens, 28 June 2023. Title: "Molecular assemblies, interactions and coacervation of modified tau protein"
- Université de Lille, Prof. David Devos, E-meeting, 7 July 2022. Title: "Structural properties of ubiquinated tau protein and implications in Alzheimer's disease"
- Université de Picardie Jules Verne, Amiens, 7 July 2022. Title: "Ubiquitination of tau protein: impact on molecular properties and recognition"
- XXVII National Congress of Italian Chemical Society, virtual, 14-23 September 2021 Title: "Chemoselective disulfide-coupling for the semisynthesis of ubiquitinated forms of the Alzheimer's associated protein tau"
- TubInTrain E-meeting, 25 February 2021, invited seminar. Title: "Toward understanding the influence of ubiquitination on tau molecular properties and interactions"
- 2nd Global Virtual Conference on Neurodegenerative Diseases, 28 January 2021 Title: "Impact of ubiquitination of tau on pathological fibrils formation"
- 6th ECBS/LS-EuChemS Meeting, Madrid, 3-5 April 2019 Title: "Introduction of post-translational modifications in vitro modulates Tau protein fibrillation"
- 6th EuChemS Chemistry Congress, Seville, 11-15 September 2016 Title: "Biomolecular recognition by nanoparticles probed by NMR"
- XLIV National Congress on Magnetic Resonance, Roma, 28-30 September 2015 Title: "Ubiquitin-nanoparticle interactions probed by NMR"
- XXXVI Convegno della Divisione di Chimica Organica, Bologna, 13-17 September 2015 Title: "Biomolecular recognition by fullerenol"
- XLI National Congress on Magnetic Resonance, Pisa, 17-19 September 2012 Title: "Exploring the ligand binding capability of human liver fatty acid binding protein"
- National Congress of the Division of Chemistry of Biological Systems of the Italian Chemical Society, San Vito di Cadore (BL), 9-11 September 2010 Title: "An NMR study on human Liver FABP as carrier for MRI contrast agents"
- XXXVIII National Congress on Magnetic Resonance, Bressanone (BZ), 10-13 September 2008 Title: "Lipid Trafficking: Unfolding and Binding features of Liver Intracellular Bile Acid Binding Proteins"
- University of Verona, 22nd July 2006 Title: "From protein structure to function: correlations and ligand binding"
- II giornata della Chimica, University of Parma 4th December 2002 Title: "Struttura NMR in soluzione di rame-proteine"

Institutional duties and scientific associations activity

2015 - present	Member of the "Commissione AQ CdS Bioinformatica"
2013 - present	Member of the "Commissione Pratiche studenti- Collegio didattico Informatica"
2015- 2018	Member elected as representative of Assistant professors of the "Giunta di Dipartimento"
2011- 2019	Member of the "Commissione Strumentazione Comune di Dipartimento"

Summary of the research activity

- Optimization of semi-synthetic and enzymatic methods to introduce post translational modification on proteins involved in neurodegenerative diseases and the influence of the modifications on structure and aggregation properties.
- Synthesis of polyubiquitin chains and their interaction with organic nanoparticles. Optimization of enzymatic and semi-synthetic methods to ubiquitinate different substrates.
- NMR studies on liver Fatty Acid Binding Proteins and liver and ileal Bile Acid Binding Proteins. Characterization of the binding properties with physiological ligands (fatty acids and bile acids) and synthetic molecules (potential contrast agents) both in diluted solution and in crowded environment.
- Characterization of protein-nanoparticle interactions using an integrated approach (NMR, fluorescence spectroscopy, dynamic light scattering, and calorimetry)
- In collaboration with a research group in Novartis Vaccine in Siena, I have characterized by NMR the structure of the wild type and mutant enzymes and substrates involved in the molecular assembly of bacterial pili.

Keywords

- Chemistry, structural and functional properties of biomolecules
- NMR spectroscopy
- Biomacromolecules-ligand interactions
- Nanoparticles: characterization and interactions
- Chemical and biochemical modification of biomacromolecules
- Protein aggregation