

BIOGRAPHICAL SKETCH

NAME: Riccardo Montioli

POSITION TITLE: Associate Professor of Biochemistry

EDUCATION/TRAINING (*Scientific High School Diploma, Master's degree in Agro-industrial Biotechnologies, Ph.D. in Biosciences (curriculum biochemistry).*)

INSTITUTION AND LOCATION	DEGREE	Completion Date MM/YYYY	FIELD OF STUDY
University of Verona	Dr.	05/2003	Biotechnology
University of Verona	Ph.D.	05/2009	Biochemistry
University of Verona	Postdoctoral	10/2021	Biochemistry

A. Personal Statement

I am an Associate Professor of Biochemistry, and my research is focused on enzymes involved in rare human disorders. Specifically, I work on PLP-dependent enzymes, a large family of proteins using the pyridoxal-5'-phosphate as cofactor. I have a consolidated background in proteins biochemistry and enzymology with large expertise in molecular techniques of production and study of recombinant human enzymes of medical interest, such as alanine glyoxylate aminotransferase (AGT), dopa decarboxylase (AADC), ornithine aminotransferase (OAT) and others (see following citations). As co-Investigator on several university and privately founded grants, I carried out the experimental work, acquired independence in elaborating the experimental strategies and supervising PhD students and young researchers. As a result of these previous experiences, at present I produced 58 peer-reviewed publications. On oct 2021 I obtained a RTDb senior researcher contract and I assumed the role of head of an independent research group. My research involved collaborators from other departments and universities. Then on oct 2024 I obtained the role of associate professor in biochemistry.

B. Positions, Scientific Appointments

2024-Present	Associate Professor, Department of Neurosciences, University of Verona, VR, Italy
2021-2024	RTDb, senior researcher, Department of Neurosciences, University of Verona, VR, Italy
2018-2021	RTDa, junior researcher Department of Neurosciences, University of Verona, VR, Italy
2019-Present	Board member of the Ph.D course in Biomolecular medicine of University of Verona
2009-2018	Assistant Professor at the Biological chemistry section of University of Verona, VR, Italy

C. Contributions to Science

1. My first research projects were aimed to investigate the role of the coenzyme in the structural stability and oligomerization of a PLP-dependent enzyme. Such studies revealed that apo and holo forms are structurally different and the coenzyme is not only responsible for the catalytic activity but is involved in the oligomerization, structural stability and in the proper folding process of the protein.

- a. Cellini, **R. Montioli**, A. Bossi, M. Bertoldi, D. V. Laurents, C. Borri Voltattorni "Holo- and apocystalysin from *Treponema denticola*: two different conformations" *Arch. Biochem. Biophys.* (2006) 455(1):31-9

- b. Cellini, M. Bertoldi, **R. Montioli**, D. V. Laurents, A. Paiardini, C. Borri Voltattorni “ Dimerization and folding processes of *Treponema denticola* cystalysin: the role of pyridoxal 5'-phosphate” *Biochemistry* (2006) 45(47):14140-54.
- c. **Montioli R.**, B. Cellini, M. Bertoldi, A. Paiardini, C. Borri Voltattorni “ An engineered folded PLP-bound monomer of *Treponema denticola* cystalysin reveals the effect of the dimeric structure on the catalytic properties of the enzyme” *Proteins*. 2009 Feb 1;74(2):304-17

2. A great part of my research activity was focused to the investigation of PLP-enzymes involved in rare genetic disorders and to the molecular effects of pathogenic mutations responsible for the enzyme deficit. Main subjects of my research were (i) human dopa decarboxylase, the enzyme responsible for the production of the neurotransmitters dopamine and serotonin in the brain whose deficit is associated to AADC deficiency and Parkinson's disease; (ii) human ornithine aminotransferase, the enzyme responsible of the ornithine degradation and associated to the rare genetic disorder Gyrate atrophy of choroid and retina; (iii) Human GABA transaminase, the enzyme responsible of the degradation of the GABA neurotransmitter in the brain and associated to the genetic disorder GABA-AT deficiency. My studies contributed to (i) gain insight into the structural and functional properties of the analyzed enzymes in wild type and variant forms, (ii) clarify the molecular defects caused by dozens of pathogenic mutations ad associate to the genotype of patients specific enzymatic phenotypes; (iii) deepen the molecular basis of the variability of response to the therapies.

- a) **Montioli R**, Cellini B, Borri Voltattorni C. “Molecular insights into the pathogenicity of variants associated with the aromatic amino acid decarboxylase deficiency.” *J Inherit Metab Dis*. 2011 May 4.
- b) **Montioli R**, Oppici E, Cellini B, Roncador A, Dindo M, Voltattorni CB. “S250F variant associated with aromatic amino acid decarboxylase deficiency: molecular defects and intracellular rescue by pyridoxine.” *Hum Mol Genet*. 2013 Apr 15;22(8):1615-24.
- c) **Montioli R**, Dindo M, Giorgetti A, Piccoli S, Cellini B, Voltattorni CB. “A comprehensive picture of the mutations associated with aromatic amino acid decarboxylase deficiency: from molecular mechanisms to therapy implications”. *Hum Mol Genet*. 2014 23(20) 5429–5440
- d) **Montioli R**, Roncador A, Oppici E, Mandrile G, Giachino DF, Cellini B, Voltattorni CB. S81L and G170R mutations causing Primary Hyperoxaluria type I in homozygosis and heterozygosis: an example of positive interallelic complementation *Hum Mol Genet*. 2014, 23(22) 5998–6007
- e) **Montioli R***, Zamparelli C, Borri Voltattorni C, Cellini B. Oligomeric State and Thermal Stability of Apo- and Holo- Human Ornithine δ -Aminotransferase. *Protein J*. 2017 Jun;36(3):174-185. *Corresponding Author
- f) **Montioli R**, Desbats MA, Grottelli S, Doimo M, Bellezza I, Borri Voltattorni C, Salviati L, Cellini B. Molecular and cellular basis of ornithine δ -aminotransferase deficiency caused by the V332M mutation associated with gyrate atrophy of the choroid and retina. *Biochim Biophys Acta Mol Basis Dis*. 2018 Nov;1864(11):3629-3638.
- g) **Montioli R**, Paiardini A, Giardina G, Zanzoni S, Cutruzzola F, Cellini B, Borri Voltattorni C. R180T variant of δ -ornithine aminotransferase associated with gyrate atrophy: biochemical, computational, X-ray and NMR studies provide insight into its catalytic features. *FEBS J* 2019 Jul;286(14):2787-2798
- h) Floriani F, Borri Voltattorni C, Cellini B, **Montioli R**. Biochemical and Bioinformatic Studies of Mutations of Residues at the Monomer-Monomer Interface of Human Ornithine Aminotransferase Leading to Gyrate Atrophy of Choroid and Retina. *Int J Mol Sci*. 2023 Feb 8;24(4):3369..

- i) Ambrosini G, Floriani F, Manni V, Dando I, **Montioli R**. Biochemical investigation of pathogenic missense mutations of human 4-amino butyrate aminotransferase towards the understanding of the molecular pathogenesis of GABA transaminase deficiency Mol Genet Metab. 2025 Jul;145(3):109149

In total I'm author of 58 peer-reviewed publications available on PubMed server