

PERSONAL INFORMATION

Alessio Peracchi

 alessio.peracchi@unipr.it

Sex M | Date of birth | Nationality Italian

WORK EXPERIENCE

From 11/2000 – to present

Associate Professor of Biochemistry

University of Parma, Italy

Place of work: Department of Chemistry, Life Sciences and Environmental Sustainability, Parco Area delle Scienze, 23/a 43124 Parma, Italy

Activities and responsibilities: teaching and research in Biochemistry

Sector: Academia

From 09/2014 – to 08/2016

Visiting Scientist

UCLouvain, Belgium

Place of work: De Duve Institute, Université Catholique de Louvain, Avenue Hippocrate 75, 1200 Woluwe-Saint-Lambert, Belgium

Activities and responsibilities: research in Biochemistry

Sector: Academia

From 07/1998 – to 10/2000

Assistant Professor (Researcher) in Biochemistry

University of Parma, Italy

Place of work: Department of Chemistry, Life Sciences and Environmental Sustainability, Parco Area delle Scienze, 23/a 43124 Parma, Italy

Activities and responsibilities: teaching and research in Biochemistry

Sector: Academia

From 09/1994 – to 06/1997

Post-doctoral Fellow

Stanford University, USA

Place of work: Department of Biochemistry, Beckman Center, Stanford, California 94305-5307, USA

Activities and responsibilities: research in Biochemistry

Sector: Academia

From 11/1993 – to 08/1994

CNR Fellow

University of Parma, Italy

Place of work: Department of Chemistry, Life Sciences and Environmental Sustainability, Parco Area delle Scienze, 23/a 43124 Parma, Italy

Activities and responsibilities: research in Biochemistry

Sector: Academia

From 07/1989 – to 12/1989

Research Assistant

University of California at Riverside, USA

Place of work: Department of Biochemistry, University of California at Riverside, Riverside, California 92521-0129, USA

Activities and responsibilities: research in Biochemistry

Sector: Academia

EDUCATION AND TRAINING

From 11/1990 – to 10/1993

PhD in Molecular Biotechnology

Catholic University of the Sacred Heart, Piacenza (Italy)

Subjects: Biotechnology, Biochemistry, Molecular Biology, Microbiology

From 11/1983 – to 05/1989

Laurea in Veterinary Medicine (cum laude)

University of Parma, Italy

Subjects: Veterinary Medicine, Farming, Animal diseases

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

| | UNDERSTANDING | | SPEAKING | | WRITING |
|---------|---------------|---------|--------------------|-------------------|---------|
| | Listening | Reading | Spoken interaction | Spoken production | |
| English | C1 | C2 | C1 | C1 | C2 |
| French | B1 | B1 | A2 | A2 | B1 |

Levels: A1/2: Basic user - B1/2: Independent user - C1/2 Proficient user
Common European Framework of Reference for Languages

Communication skills

- Excellent communication skills gained through my experience as a teacher and as a speaker at national and international scientific conferences.

Organisational / managerial skills

- Leadership: I managed groups of up to five research students
- Organization: I managed several externally funded research grants

Computer skills

Good command of Microsoft Word/ Excel/ Powerpoint

Driving licence

- B

ADDITIONAL INFORMATION

Research Funding (as principal investigator)

| | |
|-----------|---|
| 2019-2020 | Fondazione Cariparma Grant (n. 0370/2018) "Identification and characterization of new enzymes for the biocompatible degradation of phosphonates" |
| 2012-2013 | 2012-2013 Spinner Program (financed by the Emilia Romagna Region) Project "PHEADETECT", for the enzymatic detection of analytes in the blood. |
| 2006-2009 | Telethon Fondazione Onlus GGP06183 "Biochemical characterization of human enzymes involved in the metabolism of glyoxylate: implications for the treatment of primary hyperoxaluria type I" |
| 2002-2005 | European Molecular Biology Organization - EMBO Young Investigator Project 460/2001 "Mechanism of action of catalytic DNA" |
| 1999-2001 | National Research Council (CNR) contributo di ricerca n. 99.02562.CT04/115.34732 "Functional characterization of deoxyribozymes of potential therapeutic utility" |

Honours, awards and
Memberships

2006-2009
2001-2004
1995-1997
1993-1994
1992-present

Telethon Fondazione Onlus Principal Investigator
EMBO Young Investigator
Human Frontiers Science Program Organization Fellowship
National Research Council (C.N.R.) Fellowship
Member of the Italian Society of Biochemistry & Molecular biology

Publications

- 1 Kentache, T, Thabault, L, Deumer, G, Haufroid, V, Frédérick, R, Linster, C, Peracchi, A, Veiga-da-Cunha, M, Bommer, GT, Van Schaftingen, E (2021). The metalloprotein Yhch is an anomerase providing N-acetylneuraminic acidolase with the open form of its substrate. *J Biol Chem* 296 100699. [doi:10.1016/j.jbc.2021.100699]
- 2 Zangelmi, E, Stanković, T, Malatesta, M, Acquotti, D, Pallitsch, K, Peracchi, A (2021). Discovery of a New, Recurrent Enzyme in Bacterial Phosphonate Degradation: (R)-1-Hydroxy-2-aminoethylphosphonate Ammonia-lyase. *Biochemistry* 60(15) 1214-1225. [doi:10.1021/acs.biochem.1c00092]
- 3 Marchesani, F, Zangelmi, E, Bruno, S, Bettati, S, Peracchi, A, Campanini, B (2021). A Novel Assay for Phosphoserine Phosphatase Exploiting Serine Acetyltransferase as the Coupling Enzyme. *Life* 11(6) 485. [doi:10.3390/life11060485]
- 4 Murtas G, Marcone GL, Peracchi A, Zangelmi E, Pollegioni L (2021). Biochemical and Biophysical Characterization of Recombinant Human 3-Phosphoglycerate Dehydrogenase. *Int J Mol Sci* 22(8) 4231. [doi:10.3390/ijms22084231]
- 5 Malatesta, M, Mori, G, Acquotti, D, Campanini, B, Peracchi, A, Antin, PB, Percudani, R (2020). Birth of a pathway for sulfur metabolism in early amniote evolution. *Nature Ecol Evol* 4 (9), 1239-1246 [doi:10.1038/s41559-020-1232-4]
- 6 Kentache, T, Thabault, L, Peracchi, A, Frédérick, R, Bommer, GT, Van Schaftingen, E (2020). The putative *Escherichia coli* dehydrogenase YjhC metabolises two dehydrated forms of N-acetylneuraminic acid produced by some sialidases. *Bioscience Reports* 40 (6): BSR20200927 [doi:10.1042/BSR20200927]
- 7 Cepeda-Plaza M, Peracchi A (2020). Insights into DNA catalysis from structural and functional studies of the 8-17 DNAzyme. *Org. Biomol. Chem.* 18(9) 1697-1709. [doi:10.1039/c9ob02453k]
- 8 Vettraino, C, Peracchi, A, Donini, S, Parisini, E (2020). Structural characterization of human O-phospho-ethanolamine phospho-lyase. *Acta Crystallogr F Struct Biol Commun* 76(4) 160-167. [doi:10.1107/S2053230X20002988]
- 9 Zangelmi E, Ronda L, Castagna C, Campanini B, Veiga-da-Cunha M, Van Schaftingen E, Peracchi A (2020). Off to a slow start: Analyzing lag phases and accelerating rates in steady-state enzyme kinetics. *Analytical Biochemistry* 593 113595. [doi:10.1016/j.ab.2020.113595]
- 10 Peracchi A. (2018). The limits of enzyme specificity and the evolution of metabolism. *Trends Biochem. Sci.* 43(12) 984-996. [doi:10.1016/j.tibs.2018.09.015]
- 11 Peracchi A, Bonaccio M, Credali A (2017). Local conformational changes in the 8-17 deoxyribozyme core induced by activating and inactivating divalent metal ions. *Org. Biomol. Chem.* 15(41) 8802-8809. [doi:10.1039/c7ob02001e]
- 12 Peracchi A, Veiga-da-Cunha M, Kuhara T, Ellens KW, Paczia N, Stroobant V, Seliga AK, Marlaire S, Jaisson S, Bommer GT, Sun J, Huebner K, Linster CL, Cooper AJL, Van Schaftingen E (2017). Nit1 is a metabolite repair enzyme that hydrolyzes deaminated glutathione. *Proc. Natl. Acad. Sci. U.S.A.* 114(16) E3233-E3242. [doi:10.1073/pnas.1613736114]
- 13 Peracchi A (2016). Dissecting the hybridization of oligonucleotides to structured complementary sequences. *Biochimica et Biophysica Acta* 1860(6) 1107-1117. [doi:10.1016/j.bbagen.2016.02.006]
- 14 Marchetti M, Bruno S, Campanini B, Bettati S, Peracchi A, Mozzarelli A. (2015). Regulation of human serine racemase activity and dynamics by halides, ATP and malonate. *Amino Acids* 47 163-173. [doi:10.1007/s00726-014-1856-2]
- 15 Schirolli D, Peracchi A (2015). A subfamily of PLP-dependent enzymes specialized in handling terminal amines. *Biochim Biophys Acta* 1854(9) 1200-1211. [doi:10.1016/j.bbapap.2015.02.023]
- 16 Schirolli D, Ronda L, Peracchi A. (2015). Kinetic characterization of the human O-phosphoethanolamine phospho-lyase reveals unconventional features of this specialized pyridoxal phosphate-dependent lyase. *FEBS J.* 282(1) 183-199. [doi:10.1111/febs.13122]
- 17 Campanini B, Spyraakis F, Peracchi A, Mozzarelli A. (2013). Serine racemase: a key player in neuron activity and in neuropathologies. *Frontiers in Bioscience* 18 1112-1128. [doi:10.2741/4167]
- 18 Magnani, G, Lomazzi, M., Peracchi, A. (2013). Completing the folate biosynthesis pathway in *Plasmodium falciparum*: p-aminobenzoate is produced by a highly divergent promiscuous aminodeoxychorismate lyase. *Biochemical Journal* 455 149-55. [doi:10.1042/BJ20130896]
- 19 Marchetti M, Bruno S, Campanini B, Peracchi A, Mai N, Mozzarelli A. (2013). ATP binding to human serine racemase is cooperative and modulated by glycine. *FEBS Journal* 280 5853-5863. [doi:10.1111/febs.12510]
- 20 Schirolli D, Cirrincione S, Donini S, Peracchi A. (2013). Strict reaction and substrate specificity of AGXT2L1, the human O-phosphoethanolamine phospho-lyase. *IUBMB Life* 65 645-50. [doi:10.1002/iub.1178]
- 21 Peracchi A, Mozzarelli A (2011). Exploring and exploiting allostery: Models, evolution, and drug targeting. *Biochim. Biophys. Acta* 1814 922-933. [doi:10.1016/j.bbapap.2010.10.008]
- 22 Raboni S, Contestabile R, Spyraakis F, Campanini B, Amadasi A, Bettati S, Peracchi A, Mozzarelli A. (2010). Pyridoxal 5'-Phosphate-Dependent Enzymes: Catalysis, Conformation and Genomics. *Comprehensive Natural Products II Chemistry and Biology*, Mander, L., Lui, H.-W, Eds. Elsevier: Oxford 7 253-350. [doi:10.1016/B978-008045382-8.00140-4]
- 23 Ramazzina I, Costa R, Cendron L, Berni R, Peracchi A, Zanotti G, Percudani R. (2010). An aminotransferase branch point connects purine catabolism to amino acid recycling. *Nat Chem Biol* 6(11) 801-806. [doi:10.1038/nchembio.445]

Publications (continued)

- 24 Donini S, Ferrari M, Fedeli C, Faini M, Lamberto I, Marletta AS, Mellini L, Panini M, Percudani R, Pollegioni L, Caldinelli L, Petrucco S, Peracchi A. (2009). Recombinant production of eight human cytosolic aminotransferases and assessment of their potential involvement in glyoxylate metabolism. *Biochem J* 422(2) 265-272. [doi:10.1042/BJ20090748]
- 25 Percudani R, Peracchi A (2009). The B6 database: a tool for the description and classification of vitamin B6-dependent enzymatic activities and of the corresponding protein families. *BMC Bioinformatics* 10(1) 273. [doi:10.1186/1471-2105-10-273]
- 26 Peracchi A (2008). How (and why) to revive a dead enzyme: the power of chemical rescue. *Curr. Chem. Biol.* 2(1) 32-49. [doi:10.2174/187231308783334162]
- 27 Cacciapaglia R, Casnati A, Mandolini L, Peracchi A, Reinhoudt DN, Salvio R, Sartori A, Ungaro R (2007). Efficient and selective cleavage of RNA oligonucleotides by calix[4]arene-based synthetic metallonucleases. *J. Am. Chem. Soc.* 129(41) 12512-12520. [doi:10.1021/ja0737366]
- 28 Donini S, Clerici M, Wengel J, Vester B, Peracchi A. (2007). The advantages of being locked: assessing the cleavage of short and long RNAs by locked nucleic acid-containing 8-17 deoxyribozymes. *J. Biol. Chem.* 282(49) 35510-35518. [doi:10.1074/jbc.M706993200]
- 29 Donini S, Percudani R, Credali A, Montanini B, Sartori A, Peracchi A (2006). A threonine synthase homolog from a mammalian genome. *Biochem. Biophys. Res. Commun.* 350(4) 922-928. [doi:10.1016/j.bbrc.2006.09.112]
- 30 Peracchi A (2005). DNA catalysis: potential, limitations, open questions. *Chembiochem* 6(8) 316-22. [doi:10.1002/cbic.200500098]
- 31 Peracchi A, Bonaccio M, Clerici M (2005). A mutational analysis of the 8-17 deoxyribozyme core. *J. Mol. Biol.* 352(4) 783-794. [doi:10.1016/j.jmb.2005.07.059]
- 32 Bonaccio M, Credali A, Peracchi A (2004). Kinetic and thermodynamic characterization of the RNA-cleaving 8-17 deoxyribozyme. *Nucleic Acids Res.* 32(3) 916-925. [doi:10.1093/nar/gkh250]
- 33 Peracchi A (2004). Prospects for antiviral ribozymes and deoxyribozymes. *Rev. Med. Virol.* 14(1) 47-64. [doi:10.1002/rmv.415]
- 34 Ruotolo R, Peracchi A, Bolchi A, Infusini G, Amoresano A, Ottonello S (2004). Domain organization of phytochelatin synthase: Functional properties of truncated enzyme species identified by limited proteolysis. *J. Biol. Chem.* 279(15) 14686-93. [doi:10.1074/jbc.M314325200]
- 35 Ferrari D, Merli A, Peracchi A, Di Valentin M, Carbonera D, Rossi GL (2003). Catalysis and electron transfer in protein crystals: the binary and ternary complexes of methylamine dehydrogenase with electron acceptors. *Biochim. Biophys. Acta* 1647(1-2) 337-342. [doi:10.1016/S1570-9639(03)00092-X]
- 36 Percudani R, Peracchi A (2003). A genomic overview of pyridoxal phosphate-dependent enzymes. *EMBO Rep.* 4(9) 850-854. [doi:10.1038/sj.embor.embor914]
- 37 Ferrari D, Peracchi A (2002). A continuous kinetic assay for RNA-cleaving deoxyribozymes, exploiting ethidium bromide as an extrinsic fluorescent probe. *Nucleic Acids Res.* 30(20) e112. [doi:10.1093/nar/gnf111]
- 38 Peracchi A (2001). Enzyme catalysis: removing chemically 'essential' residues by site-directed mutagenesis. *Trends Biochem. Sci.* 26(8) 497-503. [doi:10.1016/S0968-0004(01)01911-9]
- 39 Mozzarelli A, Campanini B, Bettati S, Peracchi A (2000). Functional properties of immobilized pyridoxal 5'-phosphate-dependent enzymes probed by absorption microspectrophotometry. 10th International Symposium on vitamin B6 and carbonyl catalysis and 4th meeting on PQQ and quinoproteins. Editor Martinez-Carrion, M., Birkhauser Verlag AG. 349-354.
- 40 Mozzarelli A, Peracchi A, Rovegno B, Dalé G, Rossi GL, Dunn MF (2000). Effect of pH and monovalent cations on the formation of quinonoid intermediates of the tryptophan synthase alpha2beta2 complex in solution and in the crystal. *J. Biol. Chem.* 275 6956-6962. [doi:10.1074/jbc.275.10.6956]
- 41 Peracchi A (2000). Preferential activation of the 8-17 deoxyribozyme by Ca²⁺ ions. Evidence for the identity of 8-17 with the catalytic domain of the Mg5 deoxyribozyme. *J. Biol. Chem.* 275 11693-11697. [doi:10.1074/jbc.275.16.11693]
- 42 Peracchi A (1999). Origins of the temperature dependence of hammerhead ribozyme catalysis. *Nucleic Acids Res.* 27 2875-2882. [doi:10.1093/nar/27.14.2875]
- 43 Wang S, Karbstein K, Peracchi A, Beigelman L, Herschlag D (1999). Identification of the hammerhead ribozyme metal ion binding site responsible for rescue of the deleterious effect of a cleavage site phosphorothioate. *Biochemistry* 38(43) 14363-14378. [doi:10.1021/bi9913202]
- 44 Peracchi A, Beigelman L, Karpeisky A, Maloney L, Herschlag D (1998). A core folding model for catalysis by the hammerhead ribozyme accounts for its extraordinary sensitivity to abasic mutations. *Biochemistry* 37 14765-14775. [doi:10.1021/bi980867y]
- 45 Peracchi A, Beigelman L, Matulic-Adamic J, Wang S, Herschlag D (1998). Structure-function relationships in the hammerhead ribozyme probed by base rescue. *RNA* 4 1332-1346. [doi:10.1017/S1355838298980979]
- 46 Hertel KJ, Peracchi A, Uhlenbeck OC, Herschlag D (1997). Use of intrinsic binding energy for catalysis by an RNA enzyme. *Proc. Natl. Acad. Sci. U.S.A.* 94 8497-8502. [doi:10.1073/pnas.94.16.8497]
- 47 Peracchi A, Beigelman L, Scott EC, Uhlenbeck OC, Herschlag D (1997). Involvement of a specific metal ion in the transition of the hammerhead ribozyme to its catalytic conformation. *J. Biol. Chem.* 272 26822-26826. [doi:10.1074/jbc.272.43.26822]

Publications (continued)

- 48 Vaccari S, Benci S, Peracchi A, Mozzarelli A (1997). Time-resolved fluorescence of pyridoxal 5'-phosphate-containing enzymes: tryptophan synthase and O-acetylserine sulfhydrylase. *J. Fluoresc.* 7 135S-137S.
- 49 Peracchi A, Beigelman L, Usman N, Herschlag D (1996). Rescue of abasic hammerhead ribozymes by exogenous addition of specific bases. *Proc. Natl. Acad. Sci. U.S.A.* 93 11522-11527. [doi:10.1073/pnas.93.21.11522]
- 50 Peracchi A, Bettati S, Mozzarelli A, Rossi GL, Miles EW, Dunn MF (1996). Allosteric Regulation of Tryptophan Synthase: Effects of pH, Temperature and alpha-Subunit Ligands on the Equilibrium Distribution of Pyridoxal 5'-Phosphate L-Serine Intermediates. *Biochemistry* 35 1872-1880. [doi:10.1021/bi951889c]
- 51 Vaccari S, Benci S, Peracchi A, Mozzarelli A (1996). Time-resolved fluorescence of tryptophan synthase. *Biophys. Chem.* 61 9-22. [doi:10.1016/0301-4622(96)00020-8]
- 52 Peracchi A, Mozzarelli A, Rossi GL (1995). Monovalent Cations Affect Dynamic and Functional Properties of the Tryptophan Synthase alpha2beta2 Complex. *Biochemistry* 34 9459-9465. [doi:10.1021/bi00029a022]
- 53 Peracchi A, Mozzarelli A, Rossi GL (1994). Effects of Monovalent Cations on Functional Properties of the Tryptophan Synthase $\alpha_2\beta_2$ Complex in Solution and in the Crystal. *Biochemistry of Vitamin B6 and PQQ* (G. Marino, G. Sannia and F. Bossa, Eds.), Birkhauser Verlag Basel, Switzerland 125-129.
- 54 Peracchi A, Mozzarelli A, Rossi GL, Dominici P, Borri Voltattorni C (1994). Single Crystal Polarized Absorption Microspectrophotometry of Aromatic L-Aminoacid Decarboxylase. *Protein Pept. Lett.* 1 98-105.
- 55 Rossi GL, Mozzarelli A, Peracchi A, Rivetti C (1992). Time Course of Chemical and Structural Events in Protein Crystals Measured by Microspectrophotometry. *Phil. Trans. Royal Soc. Lond.* 340(1657) 191-207. [doi:10.1098/rsta.1992.0060]
- 56 Strambini GB, Cioni P, Peracchi A, Mozzarelli A (1992). Characterization of Tryptophan and Coenzyme Luminiscence in Tryptophan Synthase from *Salmonella typhimurium*. *Biochemistry* 31 7527-7534. [doi:10.1021/bi00148a013]
- 57 Strambini GB, Cioni P, Peracchi A, Mozzarelli A (1992). Conformational Changes and Subunit Communication in Tryptophan Synthase: Effect of Substrates and Substrate Analogs. *Biochemistry* 31 7535-7542. [doi:10.1021/bi00148a014]
- 57 Mozzarelli A, Peracchi A, Bettati S, Rossi GL (1991). Allosteric Regulation of Tryptophan Synthase: a pKa Change at β -Active Site Induced by α -Subunit Ligands. *Enzymes Dependent on Pyridoxal Phosphate and other Carbonyl Compounds as Cofactors* (Fukui, T. Kagamiyama, H. Soda, K. Wada, H. eds.) Pergamon Press, Oxford 273-275.
- 58 Mozzarelli A, Peracchi A, Rossi GL, Ahmed A, Miles E (1989). Microspectrophotometric Studies on Single Crystals of the Tryptophan Synthase $\alpha_2\beta_2$ Complex Demonstrate Formation of Enzyme-Substrate Intermediates. *J. Biol. Chem.* 264 15774-15780.