

Curriculum Vitae Marco Mangiagalli

Personal Data

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Research ID: Q-9988-2018

Present Position

Post-doctoral fellow since 1 April 2019. Laboratory of protein engineering and industrial enzymology (Scientific Responsible: Prof. M. Lotti), Department of Biotechnology and Biosciences, University of Milano-Bicocca, Italy.

Research Topics: Studies on ice binding proteins and cold active enzymes through biochemical and biophysical analysis.

Education and Academic degrees

2010: Secondary school diploma, ITSOS Marie Curie, Cernusco S.N. (Italy)

2013: Bachelor's Degree in Biotechnology. Department of Biotechnology and Biosciences, University of Milano-Bicocca, Italy.

Thesis title: Inhibition mechanisms of amyloid Aggregation by aromatic molecules (original language: Italian)

Final mark: 110/110 cum laude

2015: Master's degree in Industrial Biotechnology, Department of Biotechnology and Biosciences, University of Milano-Bicocca, Italy.

Thesis title: Identification and functional analysis of antifreeze proteins from Antarctic organisms (original language: Italian)

Final mark: 110/110 cum laude

2019: Ph.D in Biology and Biotechnology. Department of Biotechnology and Biosciences, University of Milano-Bicocca, Italy.

Thesis title: Structural and functional analyses of an ice-binding protein from an Antarctic bacterium (Supervisor: Prof. M. Lotti).

Final mark: Excellent cum laude

Additional Specialization courses

2014: 1st European Summer School on Industrial Biotechnology; Stability, folding and misfolding of recombinant proteins. University of Milano-Bicocca, Milano (Italy) 6-10 October 2014.

2015: Course of molecular enzymology. Department of Biotechnology and Biosciences, University of Milano-Bicocca, Milano (Italy) 9 April – 5 May 2015.

2015: Enzyme discovery Summer School. Società italiana di Biochimica e Biologia Molecolare – SIB, Como (Italy) 22-26 June 2015.

2015: 2nd European Summer School on Industrial Biotechnology; Design of biocatalyst: concepts, methods and applications. University of Stuttgart, Stuttgart (Germany) 31 august- 4 September 2015.

2016: 1st SYSBIO.IT School on Computational Systems Biology: An introduction to dynamic modeling, simulation and analysis of biological systems. University of Milano-Bicocca, Milano (Italy) 7-9 June 2016

2017: Course of Scanning and Transmission Electron Microscopy Principles and Applications. University of Milano-Bicocca, Milano (Italy) 22 May – 1 June 2017.

2017: Towards a Bio-based economy: science, innovation, economics, education; Summer School. Department of Biotechnology and Biosciences, University of Milano-Bicocca, Milano (Italy) 4 September – 8 September 2017

Other research experiences

5 November – 7 December 2016: Visiting students in Protein Folding and Conformational Diseases Lab, Institute of Biotechnology and Biomedicine, Universitat Autònoma de Barcelona. PI: Prof. Salvador Ventura.

1 November 2018- 31 March 2019: Research fellow at the Department of Biotechnology and Biosciences of the University of Milano-Bicocca. PI: Prof. Stefania Brocca.

Scientific interests

Scientific interests of M. Mangiagalli are focused on understanding function-structure relationships of ice binding proteins and cold active enzymes identified in psychrophilic organisms. These topics are investigated combining biochemical and biophysical approaches with rational design mutagenesis. The main research activity regards the characterization of new ice binding proteins and cold active enzymes, and to new insights into the molecular mechanisms of cold-adaptation. The research activity of M. Mangiagalli is documented by **12** publications on peer-reviewed international journals, **2** protein structures deposited in PDB database (PDB code: 6EY8; 6Y2K), **2** oral communications, **1** invited lecture, **11** poster communications at national and international meetings and **1** cover page on The FEBS Journal.

Google scholar h-index: 7, total citations 123 (November 2020)

Scopus h-index: 6, total citations: 94 (November 2020)

WOS h-index: 6, total citations 87 (November 2020)

Skills and expertise

- DNA cloning and plasmid DNA isolation
- Rational design mutagenesis
- *Escherichia coli* transformation (various strains)
- Expression of recombinant protein in *Escherichia coli*
- Recombinant protein extraction and purification
- Biophysical analyses (e.g. circular dichroism, fluorescence Fourier transform infrared spectroscopies)

- Enzymatic assays (various techniques, direct and indirect assays)
- Protein structure and stability

Teaching activity

- Teacher of Biochemistry exercise class; Bachelor's Degree in industrial biotechnology; AY 2019-2020.
- Expert in the field of Protein Biochemistry (Cultore della materia); Master's degree in biology; AY 2019-2020.
- Teacher of Biochemistry exercise class; Bachelor's Degree in industrial biotechnology; AY 2020-2021
- Teacher of Laboratory of general and inorganic chemistry. Bachelor's Degree in Biology; AY 2020-2021

Tutoring activity

1. Student: Riccardo Vercesi, Bachelor Degree in Industrial Biotechnology; AY 2014-2015; Title of the Thesis: "Studi strutturali e funzionali di proteine antigelo di origine vegetale". Supervisor: Prof. Stefania Brocca.
2. Student: Alessandro Pischedda; Master Degree in Industrial Biotechnology; AY 2015/2016; Title of the Thesis: "Superossido dismutasi del ciliato antartico *Euplotes focardii*". Supervisor Prof. Marina Lotti.
3. Student: Serena Maione; Master Degree in Industrial Biotechnology; AY 2016/2017; Title of the Thesis: "Attività a bassa temperatura e stabilità di una β -galattosidasi isolata da un batterio antartico". Supervisor Prof. Marina Lotti.
4. Student: Roberto Valtorta; Master Degree in Industrial Biotechnology; AY 2017/2018; Title of the Thesis: "Effetti di solventi organici su struttura e attività di una lipasi industriale immobilizzata". Supervisor Prof. Marina Lotti.
5. Student: Danilo Mondo; Master Degree in Industrial Biotechnology; AY 2017/2018; Title of the Thesis: "Analisi bioinformatica ed espressione eterologa di una ice-binding protein a due domini". Supervisor Prof. Marina Lotti.
6. Student: Alessandro Marchetti; Bachelor Degree in Industrial Biotechnology; AY 2018/2019; Title of the Thesis: "Produzione e caratterizzazione biochimica di una xilanasi dal fungo *Thielaviopsis basicola*". Supervisor Prof. Stefania Brocca.
7. Student: Beatrice Sciandra; Master Degree in Industrial Biotechnology; AY 2018/2019; Title of the Thesis: "Specificità e oligomerizzazione di una glicosil-idrolasi antartica". Supervisor Prof. Marina Lotti.
8. Student: Simone Menegon; Master Degree in Industrial Biotechnology; AY 2019/2020; Title of the Thesis: "Attività e specificità di una β -glucosidasi isolata da un batterio antartico". Supervisor Prof. Marina Lotti.
9. Student: Mara Lumia; Master Degree in Industrial Biotechnology; AY 2019/2020; Title of the Thesis: "Specificità di substrato ed effetto degli ioni metallici su specificità, attività e struttura di un'esterasi antartica". Supervisor Prof. Marina Lotti.
10. Student: Matteo Turati; Bachelor Degree in Industrial Biotechnology; AY 2019/2020; Title of the Thesis: "Purificazione e caratterizzazione di una nuova xilanasi per la valorizzazione di scarti agricoli lignocellulosici. Supervisor Prof. Stefania Brocca.

Editorial activity

- Guest editor: Marine Drugs (Impact factor: 4.073). Special Issue: "Enzymes and Ice Binding Proteins from Marine Cold-Adapted Organisms".
https://www.mdpi.com/journal/marinedrugs/special_issues/coldadapted

Publications

1. **Mangiagalli, M.**, Bar-Dolev, M., Tedesco, P., Natalello, A., Kaleda, A., Brocca, S., de Pascale, D., Pucciarelli, S., Miceli, C., Bravslavsky, I. and Lotti, M. (2017), Cryo-protective effect of an ice-binding protein derived from Antarctic bacteria. *The FEBS Journal*, 284(1), 163-177. doi:10.1111/febs.13965.
2. Tedeschi, G., **Mangiagalli, M.**, Chmielewska, S., Lotti, M., Natalello, A., and Brocca, S. (2017). Aggregation properties of a disordered protein are tunable by pH and depend on its net charge per residue. *Biochimica et Biophysica Acta (BBA)-General Subjects*, 1861, 2543-2550. doi.org/10.1016/j.bbagen.2017.09.002.
3. Kryshchak, A., Albrecht, R., Baslé, A., ..., **Mangiagalli, M.**, and Fredslund, F. (2017). Target highlights from the first post-PSI CASP experiment (CASP12, May-August 2016). *Proteins: Structure, Function, and Bioinformatics*, 86, 27-50. doi.org/10.1002/prot.25392
4. **Mangiagalli, M.**, Sarusi, G., Kaleda, A., Dolev, M. B., Nardone, V., Vena, V. F., ... and Nardini, M. (2018). Structure of a bacterial ice binding protein with two faces of interaction with ice. *The FEBS journal*, 285(9), 1653-1666. doi.org/10.1111/febs.14434
5. Pischedda A., Priyan K., **Mangiagalli M.**, Chiappori F., Milanese L., Miceli C., Pucciarelli S., Lotti M. (2018). Antarctic marine ciliates under stress: superoxide dismutases from the psychrophilic *Euplotes focardii* are cold-active yet heat tolerant enzymes. *Scientific Reports*. 8(1), 14721. doi:10.1038/s41598-018-33127-1.
6. Kaleda A., Haleva L., Sarusi G., Pinsky T., **Mangiagalli M.**, Bar-Dolev M., Lotti M., Nardini M, Braslavsky I. (2018). Saturn-shaped ice burst pattern and fast basal binding of an ice-binding protein from an Antarctic bacterial consortium. *Langmuir*, 35(23), 7337-7346. doi/10.1021/acs.langmuir.8b01914
7. Vance, T. D., Bayer-Giraldi, M., Davies, P. L., and **Mangiagalli, M.*** (2019). Ice-binding proteins and the ‘domain of unknown function’3494 family. *The FEBS journal*, 286(5), 855-873. <https://doi.org/10.1111/febs.14764>.
8. **Mangiagalli, M.**, Brocca, S., Orlando, M. and Lotti M. The “cold revolution”. Present and future applications of cold-active enzymes and ice-binding proteins (2020). *New Biotechnology Journal*, 55, 5-11. <https://doi.org/10.1016/j.nbt.2019.09.003>.
9. Santos, J., Iglesias, V., Santos-Suárez, J., **Mangiagalli, M.**, Brocca, S., Pallarès, I., & Ventura, S. (2020). pH-Dependent Aggregation in Intrinsically Disordered Proteins Is Determined by Charge and Lipophilicity. *Cells*, 9(1), 145. doi:10.3390/cells9010145.
10. **Mangiagalli, M.**, Carvalho, H., Natalello, A., Ferrario, V., Pennati, M. L., Barbiroli, A., Lotti, M., Pleiss, J. & Brocca, S. (2020). Diverse effects of aqueous polar co-solvents on *Candida antarctica* lipase B. *International Journal of Biological Macromolecules* 150, 930-940. doi:10.1016/j.ijbiomac.2020.02.145.
11. Mangiagalli, M., Lapi, M., Maione, S., Orlando, M., Brocca, S., Pesce, A., Barbiroli, A., Camilloni, C., Lotti, M. & Nardini, M. (2020). The co-existence of cold activity and thermal stability in an Antarctic GH42 β -galactosidase relies on its hexameric quaternary arrangement. *The FEBS Journal*. doi:10.1111/febs.15354.

12. Vallesi, A., Pucciarelli, S., Buonanno S., Fontana, A., & **Mangiagalli, M.** (2020). Bioactive molecules from protists: perspectives in biotechnology. *European Journal of Protistology*. doi:10.1016/j.ejop.2020.125720.

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Oral presentations

1. **Mangiagalli M.**, Bar-Dolev M., Haleva L., Sarusi G., Kaleda A., Vena V.F., Nardone V., Nardini M., Braslavsky I., Lotti M. Relationship between function and structure of an ice binding protein from Antarctic bacteria. 3rd Ice Binding Protein conference. Rehovot, Israel 14-17 August 2017.
2. **Mangiagalli M.**, Pucciarelli S., Mondo D., Kaleda A., Sarusi G., Braslavsky I., Lotti M. Life at sub-zero temperatures: two ice binding proteins from an Antarctic ciliate. 12th International Congress of Extremophiles, Ischia, Italy 16-20 September 2018.

Invited lecture

1. **Mangiagalli M.**, Pucciarelli S., Kaleda A., Sarusi G., Chiappori F., Braslavsky I., and Lotti M. Life under stress: ice binding proteins and superoxide dismutases from an Antarctic ciliate. VIII European Congress of Protistology (ECOP), Rome, Italy 28 July-2 August 2019. (Invited speaker in the session Bioactive molecules from protists: perspectives in Biotechnology).

Contributions to Meetings and Symposia

1. Martani F., Sasso F., **Mangiagalli M.**, Branduardi P., Brocca S., Porro D., Lotti M. Ligninolytic enzyme from white-rot fungi. 12th Biotrans, Vienna, Austria 26–30 July 2015 (Poster)
2. Pucciarelli S., Priyan K., Miceli C., Pischedda A., **Mangiagalli M.**, Ferrari C., Lotti M., Sezerman U. O. Cold-active enzymes from the marine Antarctic ciliate *Euplotes focardii*. Exploitation and Legal Aspects on Marine Genetic and Chemical Resources. Napoli, Italy 04-05 April 2016. (Poster)
3. **Mangiagalli M.**, Bar-Dolev M., Kaleda A., Natalello A., Brocca S., De Pascale D., Pucciarelli S., Braslavsky I., Lotti M. Identification and functional analysis of a novel Antarctic ice binding protein (DOI: 10.1016/j.nbt.2016.06.1452) 17th European congress on biotechnology. Krakow, Poland 03-06 July 2016 (Poster)
4. Lotti M., Brocca S., **Mangiagalli M.**, Pischedda A., Orlando M., Maione S., De Pascale D., Pucciarelli S., Nardini M., Braslavsky I. “Cold Biotechnology”: enzymes and antifreeze proteins from Antarctic organisms. 59th Congress Italian Society of Biochemistry and Molecular Biology. Caserta, Italy 20-22 September 2017. (Oral communication)
5. **Mangiagalli M.**, Sarusi G., Kaleda A., Bar Dolev M., Vena V.F., Nardini M., Braslavsky I., Lotti M. How do proteins interact with ice? The case of *EfcIBP*. *Proteine* 2018, Verona, Italy, 28-30 May 2018. (Poster)
6. Tedeschi G., **Mangiagalli M.**, Lotti M., Natalello A., Brocca S. How to design an (in)soluble protein tag: some insights from synthetic intrinsically disordered proteins. *Proteine* 2018, Verona, Italy, 28-30 May 2018. (Oral communication)
7. Pischedda A., **Mangiagalli M.**, Chiappori F., Pucciarelli S., Lotti M. Superoxide dismutases from the Antarctic psychrophilic marine ciliate *Euplotes focardii*. *Proteine* 2018, Verona, Italy, 28-30 May 2018. (Poster)

8. Orlando M., Maione S., **Mangiagalli M.**, Pischedda A., Valtorta R., Mondo D., Pennati M., Brocca S., Pucciarelli S., Lotti M. Biochemical and structural features of enzymes from an Antarctic metagenome. Proteine 2018, Verona, Italy, 28-30 May 2018. (Poster)
9. Lotti M., Brocca S., **Mangiagalli M.**, Pischedda A., Orlando M., Maione S., De Pascale D., Pucciarelli S., Nardini M., Braslavsky I. Enzymes and ice binding proteins from Antarctic organisms. 18th European congress on biotechnology. Geneva, Switzerland, 01-04 July 2018. (Oral communication)
10. Pinsky T., Kaleda A., Lotem H., Sarusi G., **Mangiagalli M.**, Bar Dolev M., Lotti M., Nardini M., Braslavsky I. Saturn-shaped ice-plane binding and binding kinetics of *EfcIBP*. CRYO2019: 56th Annual Meeting of the Society for Cryobiology. San Diego, US, 22-25 July 2019. (Poster)
11. Cipolla L., **Mangiagalli M.**, Sciandra B., Brocca S., Di Foggia G., Beccarello M., Lotti M. Enzymatic lactose hydrolysis to fosters the transition of cheese whey from waste to resource. Chemistry meets Industry and Society. Salerno, Italy, 28-30 August 2019. (Poster)

Referee activity for international journal

M. Mangiagalli is a member of Early Career Reviewer (ECR) board of The Journal of Biological Chemistry (JBC) and he was referee of the follow International Journals:

- Critical reviews in biotechnology
- Extremophiles
- Frontiers in Bioengineering and Biotechnology
- Archives of Biochemistry and Biophysics
- Scientific Reports
- Biomolecules
- International Journal of Molecular Sciences

Autorizzo il trattamento dei dati personali contenuti nel mio curriculum vitae in base all'art. 13 del D. Lgs. 196/2003 e all'art. 13 GDPR 679/16.