

## Curriculum vitae - Lidia Muscariello

### Current position:

1 October 2008 to date: Permanent researcher in General Microbiology, SSD BIO/19, at the Department of Environmental, Biological and Pharmaceutical Science and Technology, Università della Campania "Luigi Vanvitelli", Caserta, Italy.

### Education:

October 1998: Master Degree in Biology, University Federico II, Naples, Italy, Summa cum Laude. Thesis: "Expression of the *Lactobacillus plantarum bglH* gene is controlled by carbon catabolite repression", under the supervision of Prof. Maurilio De Felice.  
December 2001: PhD in Microbiology, Second University of Naples, Italy. Thesis: "The functional *ccpA* gene is required for carbon catabolite repression in *Lactobacillus plantarum*", under the supervision of Prof. Margherita Sacco.

### Previous position:

1997-1998: Undergraduate student at the International Institute of Genetics and Biophysics, Consiglio Nazionale delle Ricerche (CNR), Naples, Italy, working on the cloning and characterization of *bglH* gene of *Lactobacillus plantarum*.

1999-2001: PhD student at the Department of Environmental Sciences, Second University of Naples, Caserta, Italy, working on the research project "Role of transcriptional regulator CcpA in the carbon metabolism in *Lactobacillus plantarum*", financed by the Italian Government (Research Project of Relevant National Interest, PRIN 2000).

2002: Post-doctoral fellow at the Wageningen Centre for Food Sciences, NIZO food research, Ede, The Netherlands, under the supervision of Prof. Michiel Kleerebezem, studying the transcriptome of *Lactobacillus plantarum* LM3-2 (*ccpA1*) by DNA-microarray.

2003-2004: Post-doctoral fellow at the Department of Environmental Sciences, Second University of Naples, Caserta, Italy, under the supervision of Prof. Margherita Sacco, working on "Transcriptional analysis of *pox* genes in *Lactobacillus plantarum*", and on the research project "Adaptation to environmental fluctuation in lactic acid bacteria involved in fermented-food technology" financed by Italian Government (PRIN 2002)

2005-2008: Post-doctoral fellow at the Department of Environmental Sciences, Second University of Naples, Caserta, Italy, under the supervision of Prof. Margherita Sacco, working on "*Lactobacillus plantarum* as model system for biofilm development" and on "*Lactobacillus plantarum* adhesins involved in the interaction with human epithelial cells", financed by Giunta Regionale della Campania, Assessorato alla Ricerca Scientifica (L.R. N.5 del 28.03.2002) (2007).

### Main research fields and skills

- Food microbiology: construction and characterization of a lactic acid bacteria (LAB) collection for the production of functional foods; meta-analysis of the microbiota of different dairy products of Campania region; isolation and identification of LAB using molecular approaches; evaluation of probiotic and technological features of LAB.
- Biofilm development: transcriptional analysis of capsular polysaccharides biosynthesis gene clusters (*cps*) by RTqPCR in the probiotic strain *Lactobacillus plantarum* WCFS1; genetic studies of biofilm formation through isolation and characterization of *L. plantarum* biofilm defective mutants; identification of gene regulators involved in biofilm development.
- Stress response: environmental adaptation in *Lactobacillus plantarum* - isolation and characterization of mutant strains to study osmotic and heat shock response.

- Antibiotic resistance: regulation of efflux pumps in *Mycobacteria* – isolation of mutant strains defective in the expression of efflux pump proteins. Comparative transcriptome analysis for the characterization of a *Mycobacterium smegmatis* TetR regulon.

She has proven skills in: isolation of mutant strains by one-step homologous recombination using suicide vectors or by in-frame deletions using two-step homologous recombination; analysis of DNA-protein interactions by site-directed mutagenesis, *in vivo* footprinting and EMSA analysis; study of gene expression by GFP-reporter assays, DNA microarray, RT-qPCR; protein analysis and identification (western blot, immunoblot overlay assays); taxonomic identification of lactic acid bacteria by molecular approaches (16S rRNA sequence analysis, specie-specific PCR, RAPD-PCR, rep-PCR). Moreover, she has experience in protein and nucleotide sequence analysis using bioinformatics tools (Blast, Clastal Omega, MEME).

### **Environmental monitoring**

She was involved in environmental monitoring analysis for the assessment of the microbiological quality of air and groundwater, as part of the agreement between the Department of Environmental, Biological and Pharmaceutical Sciences and Technologies, Università della Campania "Luigi Vanvitelli, Caserta, Italy, and the Municipality of Gricignano di Aversa (CE). Convention title: Environmental monitoring process in the A.S.I. area falling within the municipal territory. Client: Municipality of Gricignano di Aversa. Beginning: 19/03/2014, End: 18/03/2017.

### **Scientific production**

She is co-author of 19 papers published on international journals with impact factor, of many proceedings of national and international meetings and of two chapters in books for national distribution. She was speaker at some national scientific conference. Bibliometric indicators: 19 document, 453 citations, 12 H-index (Scopus database; March 14, 2018; ORCID ID [orcid.org/0000-0003-1343-9314](https://orcid.org/0000-0003-1343-9314)).

She was involved in several projects of national (PRIN 2000, PRIN 2002, PRIN 2008, Project PON03PE\_00060\_2, 2013) and regional (L.R. N.5 del 28.03.2002, 2007) relevance, and she had and has collaborations with national and international research groups, documented by papers published in international peer-reviewed journals, and/or by posters at national and international scientific conferences.

### **National and international collaborations**

Some research projects carried out at the Department of Environmental, Biological and Pharmaceutical Science and Technology, Università della Campania "Luigi Vanvitelli", were developed in collaboration with: research groups of Prof. Giuseppe Spano and Dr. Daniela Fiocco, Department of Food Science, Foggia University, Foggia, Italy; research group of Prof. Eugenio Parente, Department of Sciences, University of Basilicata, Potenza, Italy; Dr. Teresa Zotta, Institute of Food Sciences-CNR, Avellino, Italy; research group of Prof Pascal Hols, Unité de Génétique, Institut des Sciences de la Vie, Université Catholique de Louvain, Louvain-La-Neuve, Belgium; research group of Prof. Michiel Kleerebezem, Wageningen Centre for Food Sciences, NIZO Food Research, Ede, The Netherlands; research group of Prof. Sharon Kendall, Department of Pathology and Infectious Diseases, The Royal Veterinary College, Royal College Street, London NW1 0TU, UK; Prof. Simon Waddell, Wellcome Trust Brighton and Sussex Centre for Global Health Research, Brighton and Sussex Medical School, University of Sussex, Brighton, BN1 9PX, UK.

### **Teaching activity**

From 2004 to 2007: Assistant Professor at Faculty of Sciences MM FF NN, University of Sannio, for the courses of "Molecular microbiology" and "General microbiology" (from A.A. 2004/2005 to A.A. 2006/2007); "Applied microbiology" (A.A. 2004/2005). "Microbiology laboratory" (Scuola Interuniversitaria Campana di Specializzazione all'Insegnamento, S.I.C.S.I., A.A. 2005/2006).

From 2005 to 2010: Assistant Professor at Faculty of Environmental Sciences, Second University of Naples, for the courses of "Environmental microbiology" and "Bioremediation" (A.A. 2005/2006, 2006/2007); "Methods in Microbiology" (A.A. 2006/2007); "Bioremediation" (from A.A. 2005/2006 to A.A. 2009/2010).

From 2015 to 2017: Assistant Professor at the Department of Environmental, Biological and Pharmaceutical Science and Technology, Università della Campania "Luigi Vanvitelli", for the courses: "Microbial processes in dairy production. Microbiological and molecular methods for the isolation and characterization of lactic acid bacteria" (First level Master in: Experts in the traceability of dairy products: chemical, genetic and microbiological analysis), A.A. 2015/2016 and A.A. 2016/2017.

**Courses in assignment:** "General and environmental microbiology", A.A. 2008/2009 to date and "Methods in Microbiology", A.A. 2013/2014 to date, at the Dept. of Environmental, Biological and Pharmaceutical Science and Technology, Università della Campania "Luigi Vanvitelli, Caserta, Italy.

### **Supervisor of undergraduate and PhD students**

From 2003 - present: she was and is active in tutoring and co-tutoring of several thesis for graduate in Medical, Veterinary and Pharmaceutical Biotechnologies (LM-9), in Sciences of Food and Human Nutrition (LM-61), in Biology (LM-6) and in Environmental Science (L-32), Dept. of Environmental, Biological and Pharmaceutical Science and Technology (DiSTABiF), Università della Campania "Luigi Vanvitelli"

From 2009 - present: she was and is active in tutoring and co-tutoring of several thesis for PhD students in "Molecular and cellular biotechnology" (2009-2012) and in "Biomolecular Science" (2013-to date), DiSTABiF, Università della Campania "Luigi Vanvitelli".

From 2009 - present: Member of the committee for the PhD program "Biomolecular Science", DiSTABiF, Università della Campania "Luigi Vanvitelli".

From 2011 - present: Member of the committee for the postgraduate medical school in "Microbiology and Virology", Department of Experimental Medicine, Università della Campania "Luigi Vanvitelli"

### **Reviewer activity:**

Reviewer for the international scientific peer-review journals "International Journal of Food Microbiology" and "Indian Journal of Medical Research".

### **National and international acknowledgments**

6 April 2017 – 6 April 2023: National scientific qualification (unanimity of the commission) to Associate Professor in the scientific disciplinary sector 05/I2 "Microbiology".

From 1999 - present: She is member of the Italian Society of General Microbiology and Microbial Biotechnology (SIMGBM)

## Scientific Publications

1. Marasco R, **Muscariello, L.**, Varcamonti, M., De Felice, M., and M. Sacco "Expression of the *bglH* gene of *Lactobacillus plantarum* is controlled by carbon catabolite repression". J. Bacteriol. 180: 3400-3404 (1998).
2. **Muscariello L.**, Marasco, R., De Felice, M., and M. Sacco. "The functional *ccpA* gene is required for carbon catabolite repression in *Lactobacillus plantarum*". Appl. Environ. Microbiol. 67: 2903-2907 (2001).
3. Marasco R, **Muscariello, L.**, Rigano, M., and M. Sacco. Mutational analysis of the *bglH* catabolite-responsive element (*cre*) in *Lactobacillus plantarum*. FEMS Microbiol. Letters 208: 143-146 (2002).
4. Lorquet F., Goffin, P., **Muscariello, L.**, Baudry, J.-B., Ladero, V., Sacco, M., Kleerebezem, M., and P. Hols. Characterization and functional analysis of the *poxB* gene, which encodes pyruvate oxidase in *Lactobacillus plantarum*. J. Bacteriol. 186: 3749-3759 (2004).
5. Siezen R., Boekhorst, J., **Muscariello, L.**, Molenaar, D., Renckens, B., and M. Kleerebezem. *Lactobacillus plantarum* gene clusters encoding putative cell-surface protein complexes for carbohydrate utilization are conserved in specific gram-positive bacteria. BMC Genomics. May 24;7:126 (2006).
6. Goffin P., **Muscariello, L.**, Lorquet, F., Stukkens, A., Prozzi, D., Sacco, M., Kleerebezem M., and P. Hols. Involvement of pyruvate oxidase activity and acetate production in the survival of *Lactobacillus plantarum* during the stationary phase of aerobic growth. Appl Environ Microbiol. Dec;72(12):7933-40 (2006).
7. Castaldo C., Siciliano, R.A., **Muscariello, L.**, Marasco, R., and M. Sacco. CcpA affects expression of the *groESL* and *dnaK* operons in *Lactobacillus plantarum*. Microb Cell Fact. Nov 27;5:35 (2006).
8. Casalone E, Landini P, **Muscariello L.**, Sacco M. La crescita e l'adattamento dei microrganismi in ambienti naturali. In: Barbieri P, Bestetti G, Galli E, Zannoni D. *Microbiologia ambientale ed elementi di ecologia microbica*. Casa Editrice Ambrosiana (2008).
9. Barbieri P, **Muscariello L.** Organismi geneticamente modificati per le biotecnologie ambientali. In: Barbieri P, Bestetti G, Galli E, Zannoni D. *Microbiologia ambientale ed elementi di ecologia microbica*. Casa Editrice Ambrosiana (2008).
10. Castaldo C, Vastano V, Siciliano RA, Candela M, Vici M, **Muscariello L.**, Marasco R, Sacco M. 2009. Surface displaced alfa-enolase of *Lactobacillus plantarum* is a fibronectin binding protein. Microb Cell Fact, 16:8-14. doi: 10.1186/1475-2859-8-14
11. Fiocco D, Collins M, **Muscariello L.**, Hols P, Kleerebezem M, Msadek T, Spano G. 2009. The *Lactobacillus plantarum ftsH* gene is a novel member of the CtsR stress response regulon. J Bacteriol, 191:1688-94. doi: 10.1128/JB.01551-08
12. **Muscariello L.**, VastanoV, Siciliano RA, Sacco M, Marasco R. Expression of the *Lactobacillus plantarum malE* gene is regulated by CcpA and a MalR-Like protein. 2011. J Microbiol, 49:950-955. doi: 10.1007/s12275-011-0495-5
13. Zotta T, Ricciardi A, Guidone A, Sacco M, **Muscariello L.**, Mazzeo MF, Cacace G, Parente E. 2012. . Inactivation of *ccpA* and aeration affect growth, metabolite production and stress tolerance in *Lactobacillus plantarum* WCFS1. Int J Food Microbiol, 155 51-59. doi: 10.1016/j.ijfoodmicro.2012.01.017
14. Mazzeo MF, Cacace G, Peluso A, Zotta T, Muscariello L, Vastano V, Parente E, Siciliano RA. Effect of inactivation of *ccpA* and aerobic growth in *Lactobacillus plantarum*: A proteomic perspective. J Proteomics, 75:4050-61 doi: 10.1016/j.jpro.2012.05.019

15. **Muscariello L**, Marino C, Capri U, Vastano V, Marasco R, Sacco M. **2013**. CcpA and three newly identified proteins are involved in biofilm development in *Lactobacillus plantarum*. J Basic Microbiol, 53:62-71. doi: 10.1002/jobm.201100456
16. Vastano V, Salzillo M, Siciliano RA, **Muscariello L**, Sacco M, Marasco R. 2014. The E1 beta-subunit of pyruvate dehydrogenase is surface-expressed in *Lactobacillus plantarum* and binds fibronectin. Microbiol Res, 169:121-127. doi: 10.1016/j.micres.2013.07.013
17. Salzillo M, Vastano V, Capri U, **Muscariello L**, Sacco M, Marasco R. 2015. Identification and characterization of enolase as a collagen-binding protein in *Lactobacillus plantarum*. J Basic Microbiol, 55:890-897. doi: 10.1002/jobm.201400942
18. Vastano V, Perrone F, Marasco R, Sacco M, **Muscariello L**. 2016. Transcriptional analysis of exopolysaccharides biosynthesis gene clusters in *Lactobacillus plantarum*. Arch Microbiol, 198:295-300. doi: 10.1007/s00203-015-1169-1
19. Salzillo M, Vastano V, Capri U, **Muscariello L**, Marasco R. 2017. Pyruvate dehydrogenase subunit  $\beta$  of *Lactobacillus plantarum* is a collagen adhesin involved in biofilm formation. J Basic Microbiol, 57:353-357. doi: 10.1002/jobm.201600575
20. Baglivo I, Pirone L, Pedone EM, Pitzer JE, **Muscariello L**, Marino MM, Malgieri G, Freschi A, Chambery A, Roop II RM, Pedone PV. Ml proteins from *Mesorhizobium loti* and MucR from *Brucella abortus*: an AT-rich core DNA-target site and oligomerization ability. Sci Rep, 7:15805. doi: 10.1038/s41598-017-16127-5
21. Perrone F, De Siena B, **Muscariello L**, Kendall SL, Waddell SJ, Sacco M. 2017. A Novel TetR-Like Transcriptional Regulator Is Induced in Acid-Nitrosative Stress and Controls Expression of an Efflux Pump in Mycobacteria. Front Microbiol, 8:2039. doi: 10.3389/fmicb.2017.02039