

CURRICULUM VITAE

Barbara Molesini

Department of Biotechnology

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Personal information

Birthplace and birth date: Bussolengo (VR), Italy, December 18th, 1976

PRESENT POSITION

Assistant professor (from November 2006)

Area: 05/A2 – Biological Sciences

Italian SSD: BIO/04 –Plant physiology

Department of Biotechnology, University of Verona

EDUCATION

- 2001: Degree in Agroindustrial Biotechnology, University of Verona. Thesis title: “Transcriptional profiles analysis modulated by nitric oxide in *Arabidopsis thaliana*”. Supervisor: Dr. A. Polverari; Co-supervisor: Prof. M. Delledonne.
- 2005: Ph.D in Biotechnology, University of Verona. PhD thesis title: “Expression profile analysis of early phases of fruit development in parthenocarpic tomato plants”. Supervisor: Prof. A. Spena; Co-supervisor: Dr. T. Pandolfini.

POST-GRADUATE TRAINING AND FELLOWSHIPS

- 01/10/2001-31/12/2001: research fellow at Department of Science and Technology of University of Verona, Title of the project: “Expression profile analysis of leguminous plants inoculated with auxin-hypersynthesising rhizobia strains” (Prof. A. Spena).
- 31/07/2001-31/10/2001: Short-term research contract with” Università Cattolica del Sacro Cuore” of Piacenza (Italy) for molecular analysis of maize mutants (Prof. A. Marocco).
- 01/01/2002-31/12/2004 PhD in Biotechnology “Expression profile analysis of early phases of fruit development in parthenocarpic tomato plants”. (Supervisor: Prof. A. Spena).
- 2001: scholarship as assistance to Genetic Biotechnology laboratory, Degree in Agroindustrial Biotechnology, University of Verona.
- 2004 and 2005: scholarship as assistance to Biomolecular Technology laboratory, Degree in Agroindustrial Biotechnology, University of Verona.
- 01/02/2005 -31/10/2006: Post-Doctoral Fellow at Department of Science and Technology of University of Verona. Title of the project: “Identification of genes involved in early stages of tomato fruit development”. (Prof. A. Spena).

TRAINING COURSES PARTICIPATION

- Precision Genome Engineering, UGent - VIB Research Building FSVM- January 2016
- “Nutraceuticals” organized by International School of Pharmacology, Fondazione Ettore Majorana e Centro per la Cultura Scientifica, Erice-Italy, 26th – 30th September 2015.

- Summer school “Advanced microscopy techniques as a tool for analyzing plant cells and tissues” organized by “Società Botanica Italiana”, Sabaudia, Rome-Italy, 16th-19th October 2006.
- “Affimetrix microarray data analysis” organized by “Associazione per la Ricerca Biomedica e Biotecnologica”, Torino-Italy, 29th September-3rd October, 2003.
- “PERL course for microarray data mining” organized by “Associazione per la Ricerca Biomedica e Biotecnologica” in collaboration with CINECA, Torino-Italy, 17th-21th March 2003.
- “Bioinformatic course” organized by “Società Italiana Genetica Agraria”, Cortona-Italy 12th-14th November 2002.

RESEARCH ACTIVITY AND MAIN ACHIEVEMENTS

Major area of interest:

- Plant molecular biology and plant biotechnology mainly focused on crop improvement.

Main achievements:

- Design and production of hairpin constructs for gene silencing and obtainment of systemic resistance to Plum Pox Virus by RNA interference
- Functional characterization of genes by using RNA interference as a tool for discovering of genes involved in fruit development
- Parthenocarpy obtained via genetic engineering
- Characterization of transgenic parthenocarpic tomato lines by field trials and analysis of fruit production and quality
- Transcriptomic and proteomic analyses on different species aimed at identifying gene/protein markers of specific developmental programs
- Study of the potential therapeutic effects of natural compounds (purified from tomato fruits) *in vitro* on human cells and *in vivo* on animal model.

Technical expertise:

Molecular analysis of transgenic plants (Southern blot), gene expression analysis (Northern Blot, quantitative reverse transcription PCR, western blot), RACE-PCR, genetic constructs for *in vitro* transcription/translation, small RNAs isolation and cloning, transient and stable genetic transformation via *Agrobacterium tumefaciens*, methods for achieving RNA silencing, chimeric genetic construct preparation for functional analysis of target genes, transcriptomic and proteomic analysis, genetic constructs for genome editing via CRISPR-Cas9 system, Chromatin Immunoprecipitation for the analysis of transcription factor binding sites.

SCIENTIFIC PUBLICATIONS (SCOPUS AUTHOR ID: 6507922315)

Astegno A, Bonza MC, Vallone R, La Verde V, D'Onofrio M, Luoni L, Molesini B, Dominici P. Arabidopsis calmodulin-like protein CML36 is a calcium (Ca²⁺) sensor that interacts with the plasma membrane Ca²⁺-ATPase Isoform ACA8 and stimulates its activity. *J Biol Chem.* 2017 Jul 18. pii: jbc.M117.787796. doi: 10.1074/jbc.M117.787796.

Molesini B, Zanzoni S, Mennella G, Francese G, Losa A, Rotino GL, Pandolfini T. The Arabidopsis N-Acetylornithine Deacetylase Controls Ornithine Biosynthesis via a Linear Pathway with Downstream Effects on Polyamine Levels. *Plant Cell Physiol.* 2017 Jan 1;58(1):130-144. doi: 10.1093/pcp/pcw167.

- Treggiari D, Zoccatelli G, Chignola R, Molesini B, Minuz P, Pandolfini T. Tomato cystine-knot miniproteins possessing anti-angiogenic activity exhibit in vitro gastrointestinal stability, intestinal absorption and resistance to food industrial processing. *Food Chem.* 2017 Apr 15;221:1346-1353. doi: 10.1016/j.foodchem.2016.11.020.
- Molesini B, Treggiari D, Dalbeni A, Minuz P, Pandolfini T. Plant cystine-knot peptides: pharmacological perspectives. *Br J Clin Pharmacol.* 2017 Jan;83(1):63-70. doi: 10.1111/bcp.12932.
- Treggiari D, Zoccatelli G, Molesini B, Degan M, Rotino GL, Sala T, Cavallini C, MacRae CA, Minuz P, Pandolfini T. A cystine-knot miniprotein from tomato fruit inhibits endothelial cell migration and angiogenesis by affecting vascular endothelial growth factor receptor (VEGFR) activation and nitric oxide production. *Mol Nutr Food Res.* 2015 Nov;59(11):2255-66. doi:10.1002/mnfr.201500267.
- Molesini B, Mennella G, Martini F, Francese G, Pandolfini T. Involvement of the Putative N-Acetylmethionine Deacetylase from *Arabidopsis thaliana* in Flowering and Fruit Development. *Plant Cell Physiol.* 2015 Jun;56(6):1084-96. doi: 10.1093/pcp/pcv030.
- Molesini B, Cecconi D, Pii Y, Pandolfini T. Local and systemic proteomic changes in *Medicago truncatula* at an early phase of *Sinorhizobium meliloti* infection. *J Proteome Res.* 2014 Feb 7;13(2):408-21. doi: 10.1021/pr4009942.
- Dall'Osto L, Piques M, Ronzani M, Molesini B, Alboresi A, Cazzaniga S, Bassi R. The *Arabidopsis thaliana* mutant lacking carotene hydroxylase activity reveals a critical role for xanthophylls in photosystem I biogenesis. *Plant Cell.* 2013 Feb;25(2):591-608. doi: 10.1105/tpc.112.108621.
- Pii Y, Molesini B, Pandolfini T. The involvement of *Medicago truncatula* non-specific lipid transfer protein N5 in the control of rhizobial infection. *Plant Signal Behav.* 2013 Jul;8(7):e24836. doi: 10.4161/psb.24836.
- Pandolfini T, Molesini B, Spena A. AUCSIA: an ancestral green plant miniprotein and the emergence of auxin transport. *Plant Signal Behav.* 2013 Feb;8(2):e22928. doi: 10.4161/psb.22928.
- Pii Y, Molesini B, Masiero S, Pandolfini T. The non-specific lipid transfer protein N5 of *Medicago truncatula* is implicated in epidermal stages of rhizobium-host interaction. *BMC Plant Biol.* 2012 Dec 7;12:233. doi:10.1186/1471-2229-12-233.
- Molesini B, Pandolfini T, Pii Y, Korte A, Spena A. *Arabidopsis thaliana* AUCSIA-1 regulates auxin biology and physically interacts with a kinesin-related protein. *PLoS One.* 2012;7(7):e41327. doi: 10.1371/journal.pone.0041327.
- Molesini B, Pii Y, Pandolfini T. Fruit improvement using intragenesis and artificial microRNA. *Trends Biotechnol.* 2012 Feb;30(2):80-8. Doi 10.1016/j.tibtech.2011.07.005.
- Cavallini C, Trettene M, Degan M, Delva P, Molesini B, Minuz P, Pandolfini T. Anti-angiogenic effects of two cystine-knot miniproteins from tomato fruit. *Br J Pharmacol.* 2011 Mar;162(6):1261-73. doi: 10.1111/j.1476-5381.2010.01154.x.

Molesini B, Rotino GL, Spena A, Pandolfini T. Expression profile analysis of early fruit development in *iaaM*-parthenocarpic tomato plants. *BMC Res Notes*. 2009 Jul 21;2:143. doi: 10.1186/1756-0500-2-143.

Molesini B, Pandolfini T, Rotino GL, Dani V, Spena A. *Aucsia* gene silencing causes parthenocarpic fruit development in tomato. *Plant Physiol*. 2009 Jan;149(1):534-48. doi: 10.1104/pp.108.131367.

Pandolfini T, Molesini B, Spena A. Molecular dissection of the role of auxin in fruit initiation. *Trends Plant Sci*. 2007 Aug;12(8):327-9.

Rotino GL, Acciarri N, Sabatini E, Mennella G, Lo Scalzo R, Maestrelli A, Molesini B, Pandolfini T, Scalzo J, Mezzetti B, Spena A. Open field trial of genetically modified parthenocarpic tomato: seedlessness and fruit quality. *BMC Biotechnol*. 2005 Dec 21;5:32.

Polverari A, Molesini B, Pezzotti M, Buonauro R, Marte M, Delledonne M. Nitric oxide-mediated transcriptional changes in *Arabidopsis thaliana*. *Mol Plant Microbe Interact*. 2003 Dec;16(12):1094-105.

Pandolfini T, Molesini B, Avesani L, Spena A, Poverari A. Expression of self-complementary hairpin RNA under the control of the *rolC* promoter confers systemic disease resistance to plum pox virus without preventing local infection. *BMC Biotechnol*. 2003 Jun 25;3:7. Epub 2003 Jun 25.

BOOK CHAPTERS

Sabbadini S, Pandolfini T, Girolomini L, *Molesini B*, and Navacchi O- Chapter 17: Peach (*Prunus persica* L.), in *Agrobacterium Protocols Volume 2, Series: Methods in Molecular Biology*, Vol. 1224, Wang, Kan (Ed.) (2014)

Pandolfini T, Molesini B, Spena A- Chapter 9: Parthenocarpy in Crop Plants, pag 326-345. In *Annual Plant Reviews, Volume 38 (2009), Fruit Development and Seed Dispersal*, Lars Ostergaard (Editor).

GRANTS

(2002) Participant to a FIRB project of “Ministero dell’Istruzione dell’Università e della Ricerca” (MIUR), assigned to Prof. Angelo Spena (University of Verona). Title: “Quantitative and Qualitative improvement of productivity in horticulture: Genetic engineering of parthenocarpic fruit development and improved fertility in cultivated varieties of tomato, eggplant, strawberry, raspberry, table grape, lemon and mandarin”. Period: 36 months.

(2005) Participant to a COFIN project of MIUR, assigned to Prof. Angelo Spena (University of Verona). Title: “RNA silencing of genes involved in early stages of tomato fruit development”. Period: 24 months.

(2010) Participant to a research unit of a PRIN project of MIUR, presented by Prof. Pietro Minuz (University of Verona), project positively evaluated but not financed. Title: “Interazione piastrine-endotelio e sintesi di prostaciclina: ruolo di micro RNA”.

(2011) Participant to a research unit of an EU’s Seventh Framework Programme for Research (FP7), project positively evaluated but not financed, presented by Prof. Tiziana Pandolfini

(University of Verona). Title: "Microbial biodiversity and humic matter decomposition in lakes".

(2011) Responsible of the joint project "Biotechnological approach to obtain tomatoes with an increased content of cystine-knot miniproteins" between University of Verona and Reserch Unit for Vegetable Crops of Montanaso Lombardo (Italy). Period: 12 months

(2012) Participant to a research unit of a PRIN project of MIUR, assigned to Prof. B. Mezzetti (Università Politecnica delle Marche). Title: "Molecular strategies to gain resistance to Sharka viruses (PPV) in peach and apricot". Period: 36 months.

(2016) Expert member of the working group 2 (WG2) "Application of RNAi technology in GM plants" within the EU COST Action CA15223: Modifying plants to produce interfering RNA. Period: Start action 27/10/2016 – end Action: 26/10/2020.

(2016) Responsible of the joint project "Obtainment of parthenocarpy in tomato using the CRISPR/Cas9 system" between University of Verona and Reserch Unit for Vegetable Crops of Montanaso Lombardo (Italy). Period: 24 months.

ARTICLES FROM NATIONAL AND INTERNATIONAL CONGRESS OR CONFERENCE PAPERS

- Treggiari, D.; Zoccatelli, G.; Chignola, R.; Molesini, B.; Minuz, P.; Pandolfini, T. Bioavailability of tomato cystine-knot miniproteins with anti-angiogenic properties. "XIV FISV CONGRESS", 20 – 23 September 2016, University of Rome, La Sapienza, Italy, pp.123.
- B. Molesini, S. Zanzoni, G. Mennella, G. Francese, A. Losa, G. L. Rotino, T. Pandolfini. Molecular insights on the role of Arabidopsis thaliana NAOD in fruit set. "XIV FISV CONGRESS", 20 – 23 September 2016, University of Rome, La Sapienza, Italy, pp.73.
- Treggiari D., Zoccatelli G., Molesini B., Dalbeni A., Degan M., Minuz P., Pandolfini T., Characterization and evaluation of potential anti-angiogenic activity of tomato miniproteins and lycopene. FISV congress, Pisa, Italy, 24-27 September 2014 , 2014 , pp. 65-66
- Chiara Santi, Barbara Molesini, Youry Pii, Tiziana Pandolfini, Study of the role of type III LTPs during the symbiotic interaction between Sinorhizobium meliloti and Medicago truncatula. FISV Congress, Pisa, Italy , 24-27 September 2014 , 2014 , pp. 95-95
- Chiara Santi, Barbara Molesini, Youry Pii, Tiziana Pandolfini, The involvement of root-specific LTPs in the symbiotic interaction between Medicago truncatula and Sinorhizobium meliloti . "The Second Adam Kondorosi Symposium" , Gif Sur Yvette - Paris , 11-12 December 2014 , pp. 1-1
- D Treggiari, G Zoccatelli, B Molesini, M Degan, P Minuz, T Pandolfini, Cystine-knot miniproteins present in Solanaceae display biological effects on human endothelial cells. 3rd International Conference on FOOD-OMICS , Cesena, Italy, 22-23-24.05.2013, pp. 116-117
- Molesini B., Pandolfini T., Study of the role of a putative acetylornithine deacetylase on fruit development in Arabidopsis thaliana , "SIBV Fifth Congress" , Foggia, Italy, 18-20 September 2013 , pp. 57-57
- Y. Pii, B. Molesini, T. Pandolfini, The non-specific lipid transfer protein N5 of Medicago truncatula is required for efficient nodulation during symbiosis with N-fixing rhizobia in XVII. International Plant Nutrition Colloquium and Boron Satellite

- Meeting Proceedings Book (2013) , "XVII International Plant Nutrition Colloquium and Boron Satellite Meeting" , Istanbul, Turkey , 19-22 August 2013, pp. 242-243
- Sabbadini S., Girolomini L., Molesini B., Navacchi O., Pandolfini T., Mezzetti B., Strategies for the induction of PPV resistance through gene silencing in cultivars and rootstocks of Prunus spp. "12th International Symposium on Biosafety of Genetically Modified Organisms" , St. Louis USA, 16-20 September 2012 , 2012 , pp. P1.40
 - D Treggiari, B Molesini, G Zoccatelli, M Degan, T Pandolfini, P Minuz., Tomato cysteine-knot miniproteins: purification and new insights into the molecular mechanisms of their anti-angiogenic properties in Proceedings of the British Pharmacological Society , British Pharmacological Society Winter Meeting 2012 , London UK , 18-20 December 2012, pp. 148P
 - Palma D, Molesini B., Sabbadini S, Polverari A, Navacchi O, Mezzetti B, Pandolfini T. Development of a method for conferring resistance to GFLV and GLR associated viruses through post transcriptional gene silencing. SIGA Congress, Assisi, Italy, 19-22 September 2011.
 - Pii Y, Molesini B., Pandolfini T. Expression study of MtN5, a Medicago truncatula gene required for nodulation, during the early phases of rhizobia infection. SIBV Congress, Rome, Italy, 12-14 July 2010.
 - Molesini B., Pii Y., Pandolfini T., Spina A., Analysis of Arabidopsis thaliana Aucsia mutants. SIBV Congress, Verona , Italy, 30th June-2nd July , 2009 , pp. 47
 - Molesini B., Pandolfini T., Rotino G.L., Dani V., Spina A., Hormonal control of fruit development: Aucsia genes as new players in auxin-mediated fruit initiation? SIBV congress, Verona Italy, 30th June- 2nd July, 2009.
 - Molesini B., Pandolfini T., Rotino G.L., Dani V., Spina A., Aucsia a novel gene family that regulates fruit initiation in tomato , SIFV congress, Pisa , 30th June- 2nd July, 2008
 - Cavallini Chiara; Molesini Barbara; Vezzalini Marzia; Sorio Claudio; Delva Pietro; Minuz Pietro; Pandolfini Tiziana; Spina Angelo, Study of the biological action of two tomato cysteine-rich peptides on human endothelial and carcinoma cells , "IX FISV Congress FISV" , Riva del Garda, Italy. , 26/09/2007 – 29/09/2007, 2007
 - B. Molesini, V. Dani, G.L. Rotino, A. Spina, T. Pandolfini, Development of an in vitro RNA silencing method for the functional analysis of genes affecting early tomato fruit growth , "FISV, VIII NATIONAL CONGRESS" , RIVA DEL GARDA , Italy, 28 September, 1 October, 2006
 - B. Molesini, G.L. Rotino, A. Spina, T. Pandolfini, Expression pattern of genes involved in polyamine metabolism during early phases of parthenocarpic fruit development in tomato , "2nd Solanaceae Genome Workshop " , ISCHIA , 25-29 September , 2005
 - B. Molesini, T. Pandolfini, G.L. Rotino, R. Calogero, A. Spina, Expression profile analysis of fruit set in parthenocarpic tomato plants , Acta Physiologiae Plantarum ,26. n3 supplement. "14° FESPB Congress" , CARCOW, POLAND , 23-27 August , 2004
 - B. Molesini, T. Pandolfini, L. Avesani, A. Spina, A. Polverari, Expression of self-complementary hairpin RNA under the control of the rolC promoter confers systemic disease resistance to plum pox virus without preventing local infection , "XVII Annual Congress (SIGA) " , Verona , 24-27 September, 2003
 - PANDOLFINI T., MOLESINI B., AVESANI L., SPINA A., A. POLVERARI, INDUCTION OF POST-TRANSCRIPTIONAL GENE SILENCING IN PHLOEM TISSUES CONFERS SYSTEMIC RESISTANCE TO PLUM POX VIRUS IN NICOTIANA BENTHAMIANA , Congress of "Società Italiana di Patologia vegetale" , Sorrento , September, 2003
 - Pilati S, Molesini B, Dominici P- Characterization of the interaction of Arabidopsis glutamate decarboxylase with calmodulin. 3rd International Symposium on Vitamin B6, PQQ, Carbonyl Catalysis and Quinoproteins, University of Southampton, UK. 14/19 April 2002.

Oral presentation at congress/conference

- Molesini B, Rotino GL, Pandolfini T. RNA silencing as a tool for studying genes involved in fruit set. COST IPLANTA, 1ST Conference, Rome – Italy, 15th-17th February 2017.
- Sinorhizobium-Medicago symbiosis: local and systemic signaling at early stages of infection. PLANT BIOLOGY WINTER SCHOOL 26th-28th February 2015, Centro Residenziale Universitario of Bertinoro (Forlì-Cesena)-Italy.
- Molesini B., Pandolfini T., Rotino G.L., Dani V., Spina A., Hormonal control of fruit development: Aucsia genes as new players in auxin-mediated fruit initiation?, "Società italiana di Biologia Vegetale- First Congress" , Verona, Italy, 30th June- 2nd July 2009.

REVIEWER ACTIVITY

Referee for international peer-reviewed journals:

PLOS One

Plant and Cell Physiology

Plant Physiology and Biochemistry

BMC Research Notes

International Journal of Food Sciences and Nutrition

Plant Science

Frontiers in Plant Science, section Plant Physiology.

Editorial board member

Member of the Editorial board of the "Journal of crop improvement" (ISSN: 1542-7528), Publisher: Taylor and Francis Ltd. IF 2016= 0.68.

Member of the Editorial board of the journal "Cellular and Molecular Biology" (ISSN: 0145-5680), Publisher: © C M B Association. IF 2016= 0.92.

TEACHING ACTIVITY

Bachelor's degree in Biotechnology: course Plant molecular methods (2016/2017) (from 2015-present)

Bachelor's degree in Biotechnology: course Molecular biology-Laboratory (from 2009 until 2015)

Bachelor's degree in Viticultural and Oenological Science and Technology: course Plant biology (from 2011 until 2013)

Bachelor in Agroindustrial Biotechnology: course Biomolecular Technology – Laboratory (from 2006 until 2009).

Verona, October 10, 2017

Dr. Barbara Molesini

