


PERSONAL INFORMATION


Marisa Gariglio



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WORK EXPERIENCE

- 2001–Present Full Professor of Medical Microbiology, and Head of the laboratory of Molecular Virology at the Department of Translational Medicine, Medical School, University of Eastern Piedmont, Novara (Italy)
- 2019–Present Member of the academic senate of University of Eastern Piedmont, Novara (Italy)
- 2018–Present Vice-Director of the Department of Translational Medicine, Novara Medical School
- 2016 Coordinator of the PhD program in Medical Sciences and Biotechnology, Novara Medical School
- 2005–2015 Coordinator of the PhD program in Clinical and Experimental Medicine, Novara Medical School
- 1998–2001 Associate Professor of Medical Microbiology, University of Eastern Piedmont, Novara (Italy)
- 1995–1998 Assistant Professor at the Department of Medical Sciences (laboratory of Molecular Virology), University of Eastern Piedmont, Novara (Italy)
- 1990–1992 Visiting scientist at the Department of Molecular Biology "Hoffmann La Roche", Basel (Switzerland)

EDUCATION AND TRAINING

- 1994 **PhD in Immunology**
Department of Public Health and Microbiology, Medical School, University of Turin, Turin (Italy)
- 1990 **Medical Degree**
University of Turin, Turin (Italy)
- 1984 **Doctor in Biology**
University of Turin, Turin (Italy)

PERSONAL SKILLS

Mother tongue(s) Italian

Foreign language(s)

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	
C1	C2	C1	C1	C2

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages - Self-assessment grid

English

Organisational / managerial skills

Major Research Areas:

Human Tumor Viruses:

Human Papillomavirus infection, innate immune response, and cancer development

Human Polyomavirus (BK and trichodysplasia spinulosa polyomavirus) reactivation in immunosuppressed individuals

Merkel Cell Polyomavirus-induced carcinogenesis with specific focus on the tumor microenvironment in Merkel Cell Carcinoma

Dysregulation of the innate immune response and development of inflammatory/autoimmune conditions: The danger associated molecular pattern (DAMP) activity of the interferon-inducible protein IFI16

Major research achievements in the last five years:

Achievement 1: Interplay between high-risk human papillomavirus infection and the innate immune response in keratinocytes. The PI's research background includes extensive work on the interferon system and innate antiviral immunity. In Albertini et al., *J Immunol.* 2018, and Lo Cigno et al., *J Virol.* 2019, she provided new evidence that the E7 oncoprotein plays a central role in dampening host innate immunity raising the possibility that targeting the downstream effector SUV39H1 or the RIG-I pathway is a viable strategy to treat viral and neoplastic disease.

Achievement 2: The role of β HPV in skin carcinogenesis. She has developed innovative techniques for detecting β HPV infection in biopsy specimens, including E4 staining, as a marker of infection. By applying this procedure to HPV8 transgenic mice, she was able to generate a novel model of β HPV-induced skin carcinogenesis characterized by aberrant expansion of Lrig1-positive keratinocyte stem cells (KSCs) in the upper hair follicle (HF) (Lanfredini et al., *J Invest Derm.* 2017; Olivero et al., *Front Microbiol.* 2018). Furthermore, she successfully engrafted human skin tumors in nude mice showing progression of β HPV+ actinic keratosis into squamous cell carcinoma (SCC) (Borgogna et al. *Front Microb.* 2018). Finally, she contributed as co-editor—with Drs. Herbert Pfister and Sigrun Smola—to the Microbiology-Research Topic entitled "Human Papillomaviruses and Polyomaviruses in Skin Cancer" published in *Front Microbiol.* 2019.

Achievement 3: Polyomavirus infection/reactivation, nephropathy and tumor development. Her research has always been characterized by close on-site collaboration with both clinicians managing transplant recipients and pathologists. Thanks to this established network and the funds from an AIRC grant awarded in 2016, she has shown that, during the development of nephropathy in transplant recipients, the human BK polyomavirus (BKPyV) acquires mutations conferring fitness advantage to the virus. This observation has then led to the discovery of a role for cellular APOBEC3 DNA cytosine deaminases in driving BKV mutagenesis *in vivo* (Peretti et al., *Cell Host Microbe.* 2018).

Achievement 4. The interferon inducible IFI16 protein as mediator of inflammation/autoimmunity. In collaboration with the groups of Drs. Marco De Andrea and Santo Landolfo (University of Turin), she has been the first to demonstrate that the interferon-inducible IFI16 protein is released in the extracellular milieu upon stress stimuli, such as UVB and viral infections, where it triggers inflammation via TLR4-MD2/TIRAP/MyD88 signaling. In particular, they have shown that IFI16 functions as a damage-associated molecular pattern (DAMP), thereby providing the rationale for a novel pathomechanism of inflammation involving the formation of multiple complexes between extracellular IFI16 and subtoxic doses of LPS variants, which then signal through TLR4 (Iannucci et al., *Plos Pathogens*, in press). Her group

is currently testing the possibility of targeting the IFI16/TLR4 axis to develop novel therapies for IFI16-driven inflammation. A series of reagents such as anti-IFI16 antibodies, in-house ELISA kits for the detection of anti-IFI16 autoantibodies and circulating IFI16 protein have been developed and used to dissect the clinical significance of IFI16-based markers in several autoimmune diseases;

Training activity

She has so far trained 27 Ph.D. students in virology, including: Cinzia Borgogna and Valentina Dell'Oste, who are now Assistant Professors of Medical Microbiology at the Medical School of Novara and Turin, respectively; Irene Lo Cigno, who is now Assistant Professor at the Medical School of Novara; Alberto Peretti, who did his post-doc at NCI (Chris Buck's laboratory) with an FIRC fellowship for abroad and is now working for Immagina Biotechnology-Italy; Simone Lanfredini, who is now a post-doc at Oxford University, Department of Oncology; Carlotta Olivero who won a Marie Skłodowska-Curie Action (MSCA) fellowship in 2017 to work 2 years (2018-19) at the European Cancer Stem Cell Research Institute (ECSCRI) in Cardiff and her final last year (2020) in Dr. Gariglio's laboratory; and Silvia Albertini who is now a post-doc at the University Medical Center of Hamburg- Eppendorf, with a fellowship from the Rotary Foundation.

Referee activities

Reviewer on a regular basis for Journal of Virology, Virology, Journal of General Virology, Oncogene, International Journal of Cancer, PLoS Pathogens, Viruses, Cells. Reviewer for grant applications from different National and International organisations, e.g MIUR PRIN project, Association for International Cancer Research, UICC, Association pour la Recherche sur le Cancer and others.

Digital skills

SELF-ASSESSMENT				
Information processing	Communication	Content creation	Safety	Problem-solving
Proficient user	Independent user	Independent user	Independent user	Independent user

Digital skills - Self-assessment grid

ADDITIONAL INFORMATION

Publications

More than 150 papers in peer-reviewed journals. Above 3609 citations on Scopus (H index 37). More than 300 presentations in national/international conferences, meetings and workshops, and 4 patents.

SELECTED PUBLICATIONS (Since 2015, from a total of 151)

Iannucci A, Caneparo V, Raviola S, Debernardi I, Colangelo D, Miggiano R, Griffante G, Landolfo S, **Gariglio M***, De Andrea M*. Toll-like receptor 4-mediated inflammation triggered by extracellular 1 IFI16 is enhanced by lipopolysaccharide binding. **PLOS Pathogens**

Lo Cigno I, Calati F, Borgogna C, Zevini A, Albertini S, Martuscelli L, De Andrea M, Hiscott J, Landolfo S, **Gariglio M**. Human Papillomavirus E7 Oncoprotein Subverts Host Innate Immunity via SUV39H1-Mediated Epigenetic Silencing of Immune Sensor Genes. **J Virol**. 2020 Jan 31;94(4). pii: e01812-19. doi:10.1128/JVI.01812-19. Print 2020 Jan 31. PubMed PMID: 31776268.

De Andrea M, De Santis M, Caneparo V, Generali E, Sirotti S, Isailovic N, Guidelli GM, Ceribelli A, Fabbroni M, Simpatico A, Cantarini L, Gisondi P, Idolazzi L, **Gariglio M**, Selmi C. Serum IFI16 and anti-IFI16 Antibodies in Psoriatic Arthritis. **Clin Exp Immunol**. 2020 Jan;199(1):88-96. doi:10.1111/cei.13376. Epub 2019 Oct 15.

Borgogna C, Albertini S, Zavattaro E, Veronese F, Peruzzi L, van der Meijden E, Feltkamp MCW, Tosoni A, Volpe A, Boldorini R, **Gariglio M**. Primary trichodysplasia spinulosa polyomavirus infection in a kidney transplant child displaying virus-infected decoy cells in the urine. **J Med Virol**. 2019 Oct;91(10):1896-1900. doi: 10.1002/jmv.25519. Epub 2019 Jul 2. PubMed PMID: 31209897.

Pastrana DV, Peretti A, Welch NL, Borgogna C, Olivero C, Badolato R, Notarangelo LD, **Gariglio M**, FitzGerald PC, McIntosh CE, Reeves J, Starrett GJ, Bliskovsky V, Velez D, Brownell I, Yarchoan R, Wyvill KM, Uldrick TS, Maldarelli F, Lisco A, Sereti I, Gonzalez CM, Androphy EJ, McBride AA, Van Doorslaer K, Garcia F, Dvoretzky I, Liu JS, Han J, Murphy PM, McDermott DH, Buck CB. Meta-genomic Discovery of 83 New Human Papillomavirus Types in Patients with Immunodeficiency. **mSphere**. 2018 Dec 12;3(6). pii: e00645-18. doi: 10.1128/mSphereDirect.00645-18. PubMed PMID: 30541782; PubMed Central PMCID: PMC6291628.

Pfister HJ, **Gariglio M**, Smola S. Editorial: Human Papillomaviruses and Polyomaviruses in Skin Cancer. **Front Microbiol**. 2018 Nov 15;9:2778. doi: 10.3389/fmicb.2018.02778. eCollection 2018. PubMed PMID: 30498488; PubMed Central PMCID: PMC6250093.

Pautasso S, Galitska G, Dell'Oste V, Biolatti M, Cagliani R, Forni D, De Andrea M, **Gariglio M**, Sironi M, Landolfo S. Strategy of Human Cytomegalovirus To Escape Interferon Beta-Induced APOBEC3G Editing Activity. **J Virol**. 2018 Sep 12;92(19). pii: e01224-18. doi: 10.1128/JVI.01224-18. Print 2018 Oct 1. PubMed PMID: 30045985; PubMed Central PMCID: PMC6146821.

Peretti A, Geoghegan EM, Pastrana DV, Smola S, Feld P, Sauter M, Lohse S, Ramesh M, Lim ES, Wang D, Borgogna C, FitzGerald PC, Bliskovsky V, Starrett GJ, Law EK, Harris RS, Killian JK, Zhu J, Pineda M, Meltzer PS, Boldorini R, **Gariglio M**, Buck CB. Characterization of BK Polyomaviruses from Kidney Transplant Recipients Suggests a Role for APOBEC3 in Driving In-Host Virus Evolution. **Cell Host Microbe**. 2018 May 9;23(5):628-635.e7. doi: 10.1016/j.chom.2018.04.005. PubMed PMID: 29746834; PubMed Central PMCID: PMC5953553.

Borgogna C, Olivero C, Lanfredini S, Calati F, De Andrea M, Zavattaro E, Savoia P, Trisolini E, Boldorini R, Patel GK, **Gariglio M**. β -HPV Infection Correlates with Early Stages of Carcinogenesis in Skin Tumors and Patient-Derived Xenografts from a Kidney Transplant Recipient Cohort. **Front Microbiol**. 2018 Feb 5;9:117. doi: 10.3389/fmicb.2018.00117. eCollection 2018. PubMed PMID: 29459852; PubMed Central PMCID: PMC5807414.

Albertini S, Lo Cigno I, Calati F, De Andrea M, Borgogna C, Dell'Oste V, Landolfo S, **Gariglio M**. HPV18 Persistence Impairs Basal and DNA Ligand-Mediated IFN- β and IFN- λ (1) Production through Transcriptional Repression of Multiple Downstream Effectors of Pattern Recognition Receptor Signaling. **J Immunol**. 2018 Mar 15;200(6):2076-2089. doi: 10.4049/jimmunol.1701536. Epub 2018 Jan 31. PubMed PMID: 29386255.

Lanfredini S, Olivero C, Borgogna C, Calati F, Powell K, Davies KJ, De Andrea M, Harries S, Tang HKC, Pfister H, **Gariglio M**, Patel GK (senior authors contributed equally). HPV8 Field Cancerization in a Transgenic Mouse Model Is due to Lrig1+ Keratinocyte Stem Cell Expansion. **J Invest. Dermatol**. 2017 Oct;137(10):2208-2216. doi: 10.1016/j.jid.2017.04.039. Epub 2017 Jun 6. PubMed PMID: 28595997; PubMed Central PMCID: PMC5613749.

Biolatti M, Dell'Oste V, Pautasso S, Gugliesi F, von Einem J, Krapp C, Jakobsen MR, Borgogna C, **Gariglio M**, De Andrea M, Landolfo S. Human Cytomegalovirus Tegument Protein pp65 (pUL83) Dampens Type I Interferon Production by Inactivating the DNA Sensor cGAS without Affecting STING. **J Virol**. 2018 Feb 26;92(6). pii: e01774-17. doi: 10.1128/JVI.01774-17. Print 2018 Mar 15. PubMed PMID: 29263269; PubMed Central PMCID: PMC5827387.

Biolatti M, Dell'Oste V, Pautasso S, von Einem J, Marschall M, Plachter B, **Gariglio M**, De Andrea M, Landolfo S. Regulatory Interaction between the Cellular Restriction Factor IFI16 and Viral pp65 (pUL83) Modulates Viral Gene Expression and IFI16 Protein Stability. **J Virol**. 2016 Aug 26;90(18):8238-50. doi:10.1128/JVI.00923-16. Print 2016 Sep 15. PubMed PMID: 27384655; PubMed Central PMCID: PMC5008087.

Lo Cigno I, De Andrea M, Borgogna C, Albertini S, Landini MM, Peretti A, Johnson KE, Chandran B, Landolfo S, **Gariglio M**. The Nuclear DNA Sensor IFI16 Acts as a Restriction Factor for Human Papillomavirus Replication through Epigenetic Modifications of the Viral Promoters. **J Virol**. 2015 Aug;89(15):7506-20. doi: 10.1128/JVI.00013-15. Epub 2015 May 13. PubMed PMID: 25972554; PubMed Central PMCID: PMC4505635.

Bawadekar M, De Andrea M, Lo Cigno I, Baldanzi G, Caneparo V, Graziani A, Landolfo S, **Gariglio M**. The Extracellular IFI16 Protein Propagates Inflammation in Endothelial Cells Via p38 MAPK and NF- κ B p65 Activation. **J Interferon Cytokine Res**. 2015 Jun;35(6):441-53. doi: 10.1089/jir.2014.0168. Epub 2015 Feb 25. PubMed PMID: 25715050; PubMed Central PMCID: PMC4490711.

Quint KD, Genders RE, de Koning MN, Borgogna C, **Gariglio M**, Bouwes Bavinck JN, Doorbar J, Feltkamp MC. Human Beta-papillomavirus infection and keratinocyte carcinomas. **J Pathol**. 2015 Jan;235(2):342-54. doi: 10.1002/path.4425. Review. PubMed PMID: 25131163.

Bawadekar M, De Andrea M, **Gariglio M**, Landolfo S. Mislocalization of the interferon inducible protein IFI16 by environmental insults: implications in autoimmunity. **Cytokine Growth Factor Rev.** 2015 Apr;26(2):213-9. doi:10.1016/j.cytogfr.2014.10.003. Epub 2014 Oct 30. Review. PubMed PMID: 25466628.

PATENT APPLICATIONS:

- Marisa Gariglio, Irene Lo Cigno, Federica Calati "SIRT1 inhibitor or antagonist for use in preventing and/or treating an HPV-induced disease" 02020000023281 filed 10/02/2020
- Marisa Gariglio, Michele Mondini, Santo Landolfo, Silvia Costa "Extracellular IFI16 as therapeutic agent", US20130058956, WO/2011/092294
- Marisa Gariglio, Michele Mondini, Santo Landolfo, Francesca Gugliesi, Erika Miraglia, Silvia Costa "Detection of IFI16 in body fluids", US20110300529, WO/2010/066913
- Marisa Gariglio, Santo Landolfo, and Michele Mondini "Differential Diagnosis of Scleroderma", US20100105086, WO/2008/023234

Memberships

Member of the board of the Italian Society of Microbiology (SIM)
Network italiano per la bioterapia dei tumori (NIBIT)
American Society of Microbiology (ASM)
Societa Italiana di Virologia – Italian Society for Virology (SIV-ISV)

Novara, 14 January, 2021

Marisa Gariglio