
Curriculum Vitae of Prof. Livia Leoni

Last update: September 21st, 2022

Date and place of birth, 4th February 1969; Rome, Italy

Education

1997-2000 Specialization degree in Microbiology and Virology, Sapienza University Medical School, Rome, Italy.

1993-1997 PhD in Human Health, Sapienza University Rome, Italy.

1988-1993 Master Degree in Biology, University Sapienza, Rome, Italy.

Research

L. Leoni research is focused on conserved mechanisms and regulatory processes involved in the expression of bacterial virulence and biofilm formation, with the aim of identifying new molecular targets for the development of new antibacterials (*e.g.*, antivirulence drugs and antibiotic potentiators). The main model organism used is the Gram negative ESKAPE pathogen *Pseudomonas aeruginosa*.

Main research achievements: i) first experimental proof of concept showing that novel antivirulence activities can be identified by drug-repurposing approaches; ii) in deep characterization of regulatory mechanisms involved in the pathogenesis of *P.aeruginosa* (*e.g.*, iron-dependent regulation, quorum sensing, c-di-GMP signaling, stringent response); iii) development of biosensors and high-throughput systems for the screening of biological active compounds targeting bacterial virulence.

Prevalent ERC sector: LS6 (Life Science). Subsectors: LS6_7, Mechanisms of infection; LS6_8, Biological basis of prevention and treatment of infection; LS6_9, Antimicrobials, antimicrobial resistance.

Bibliometric indicators

h-index is 27, resulting from 78 publications and 2293 citations (source: Scopus). Corresponding author in 17 publications, first name in 9 publications.

Coordination of research projects

(RU, Responsible of research unit; CO, coordinator of multiple RU)

Granted by Italian Ministry of Research (MIUR PRIN):

-2020-2023, "Transition from asymptomatic colonization to disease by human respiratory-tract bacteria as a target for vaccines and antimicrobial therapy" (RU). Prot. 202089LLEH

Granted by the Italian Cystic Fibrosis Research Foundation:

-2018-2019, "Drug repurposing for antivirulence therapy against *Pseudomonas aeruginosa* (CO, RU). FFC #13/2011.

-2013-2015, "Anti-virulence therapy against *Pseudomonas aeruginosa*: identification of anti-biofilm drugs and development of inhalable Niclosamide and Flucytosine formulations (CO, RU). FFC #10/2013.

-2011-2012, "Identification and characterization of novel drugs suppressing *Pseudomonas aeruginosa* virulence in chronic infection" (CO, RU). FFC #13/2011.

-2010-2012, "Non-conventional strategies against *Pseudomonas aeruginosa* infection: interference with iron homeostasis and quorum sensing" (RU). FFC #14/2010.

-2008-2010, "Development and validation of a novel screening system for the identification of *Pseudomonas aeruginosa* virulence inhibitors" (CO, RU). FFC #8/2008.

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-2007-2009, "Iron uptake and quorum sensing in *Pseudomonas aeruginosa* virulence" (RU). FFC #10/2007.

Professional positions

2012-today. Associate Professor, Università Roma Tre, Italy;

2015-today. Director of the bachelor degree in Food Science. University Roma Tre, Rome, Italy;

2022-today President of COSGA (Coordinamento Nazionale Corsi di Laurea in Gastronomia);

2000-2012. Staff Scientist, Università Roma Tre, Italy;

1997-1999. Post-doc position at the department of Microbiology, University "Sapienza" Rome.

Mixed professional experience

2014-today. Academic Editor of the Journal PLOS One;

2021-today. Expert evaluator for ECCMID grants;

2013-today. Expert evaluator for ICGEB grants (International Centre for Biotechnology Information);

2000-today. Referee for top-ranked scientific journals (Microbiology field);

2017. Editor of the book "Quorum sensing methods and protocols, II ed" in the series "Methods and Molecular Biology", Springer;

2013. Expert evaluator of "People Individual Marie Curie Actions" (FP7-PEOPLE-2013-IXF) LIFE panel - IEF, IIF and IOF schemes.

Invited presentations at international conferences (last 10 years)

1. Novel therapeutic approaches against a tough bacterial pathogen: *Pseudomonas aeruginosa*, FEMS conference, Belgrade, Serbia, 30 June-2 July, 2022.
2. Untangling and exploiting the quorum sensing signaling network of *Pseudomonas aeruginosa*. "From Protein Complexes to Cell-Cell Communication" conference Esztergom, Hungary, 26-29 October, 2019.
3. Repurposing old drugs for new anti-virulence strategies: a *Pseudomonas aeruginosa* story. 29th ECCMID, Amsterdam, Netherlands-13-16 April, 2019.
4. Repurposing old drugs for new anti-virulence strategies: a *Pseudomonas aeruginosa* story. Microbiology 2019, SIMGBM conference. Florence- Italy, 19-22 June 2019
5. Quorum sensing as a target for antivirulence therapy. International conference "Workshop on Systems Biology and Molecular Economy of Microbial Communities", International Centre for Theoretical Physics (ICTP) Trieste - Italy, 3 - 7 July 2017
6. Development of a biosensor for the screening of anti-biofilm drugs. International conference "European Society of Clinical Microbiology and Infectious Diseases" Conference, "Biofilm- based healthcare-associated infections" 9-10 October 2014, Roma, Italy
7. Development of a biosensor for the high-throughput screening of anti-biofilm drugs. International conference "2nd Applied Synthetic Biology in Europe". 25-27 November 2013, Malaga, Spain.

PATENTS

1. Visca P, Massai F, Imperi F, Zennaro E, **Leoni L**. Patent N° ITRM2010A000541. Title: Biosensor for N-3-oxo-dodecanoyl-homoserin lactone detection.
2. Imperi F, Frangipani E, **Leoni L**, Massai F, Visca P. 2012. 5-fluorocytosine as antibacterial agent. Patent request no. RM2012A000429.

Publications (only peer reviewed and indexed)

1. Fortuna A, Collalto D, Schiaffi V, Pastore V, Visca P, Ascenzioni F, Rampioni G, **Leoni L***. (2022) The *Pseudomonas aeruginosa* DksA1 protein is involved in H₂O₂ tolerance and within-macrophages survival and can be replaced by DksA2. *Sci Rep.* 12:10404.
2. Collalto D, Giallonardi G, Fortuna A, Meneghini C, Fiscarelli E, Visca P, Imperi F, Rampioni G, **Leoni L*** (2022) In vitro activity of antivirulence drugs targeting the *las* or *pqs* quorum sensing against cystic fibrosis *Pseudomonas aeruginosa* isolates. *Frontiers in Microbiology.* *Frontiers in Microbiology.* 13: 845231.
3. Morgana L, Mellini M, Fortuna M, Visca P, Imperi F, **Leoni L**, Rampioni G. (2022) PqsE mainly acts through RhIR to modulate and expand the *Pseudomonas aeruginosa* quorum sensing regulon. *Microbiology spectrum,* 10:e0096122.
4. Spinnato MC, Lo Sciuto A, Mercolino J, Lucidi M, **Leoni L**, Rampioni G, Visca P, Imperi F. (2022) Effect of a Defective Clamp Loader Complex of DNA Polymerase III on Growth and SOS Response in *Pseudomonas aeruginosa*. *Microorganisms* 10, 423. <https://doi.org/10.3390/microorganisms10020423>.
5. Visaggio D, Frangipani E, Hijazi S, Pirolo M, **Leoni L**, Rampioni G, Imperi F, Bernstein L, Sorrentino R, Ungaro F, Visca P. Variable Susceptibility to Gallium Compounds of Major Cystic Fibrosis Pathogens. *ACS Infect Dis.* 2021 Dec 29. doi: 10.1021/acsinfecdis.1c00409. Epub ahead of print. PMID: 34965085.
6. Fortuna A, Bähre H, Visca P, Rampioni G, **Leoni L***. (2021) The two *Pseudomonas aeruginosa* DksA stringent response proteins are largely interchangeable at the whole transcriptome level and in the control of virulence-related traits. *Environ Microbiol. Sep;23(9):5487-5504.* doi: 10.1111/1462-2920.15693. Epub 2021 Aug 10. PMID: 34327807.
7. Mellini M, Lucidi M, Imperi F, Visca P, **Leoni L**, Rampioni G. (2021). Generation of Genetic Tools for Gauging Multiple-Gene Expression at the Single-Cell Level. *Appl Environ Microbiol.* 87:e02956-20.
8. Baldelli V, D'Angelo F, Pavoncello V, Fiscarelli EV, Visca P, Rampioni G, **Leoni L***. (2020) Identification of FDA-approved antivirulence drugs targeting the *Pseudomonas aeruginosa* quorum sensing effector protein PqsE. *Virulence.* 11 :652-668.
9. Cimini V, Mellini M, Rampioni G, Sbroscia M, **Leoni L**, Barbieri M, Gianani I (2019). Adaptive tracking of enzymatic reactions with quantum light. *Opt Express.* 27:35245-35256.
10. Mellini M, Di Muzio E, D'Angelo F, Baldelli V, Ferrillo S, Visca P, **Leoni L**, Polticelli F, Rampioni G. In silico Selection and Experimental Validation of FDA-Approved Drugs as Anti-quorum Sensing Agents. (2019) *Front Microbiol.* 10:2355.
11. Lucidi M, Visaggio D, Prencipe E, Imperi F, Rampioni G, Cincotti G, **Leoni L**, and Visca P. (2019) New shuttle vectors for real-time gene expression analysis in multidrug-resistant *Acinetobacter* species: in vitro and in vivo response to environmental stressors. *Appl Environ Microbiol.* 2019 Aug 29;85(18). pii:
12. Imperi F, Fiscarelli EV, Visaggio D, **Leoni L**, Visca P. (2019) Activity and Impact on Resistance Development of Two Antivirulence Fluoropyrimidine Drugs in *Pseudomonas aeruginosa*. *Front Cell Infect Microbiol.* 9:49.
13. Runci F, Gentile V, Frangipani E, Rampioni G, **Leoni L**, Lucidi M, Visaggio D, Harris G, Chen W, Stahl J, Averhoff B, Visca P. (2019) Contribution of Active Iron Uptake to *Acinetobacter baumannii* Pathogenicity. *Infect Immun.* 87(4). pii: e00755-18.
14. Rampioni G, D'Angelo F, **Leoni L**, Stano P. (2019) Gene-Expressing Liposomes as Synthetic Cells for Molecular Communication Studies. *Front Bioeng Biotechnol.* 7:1.
15. Rampioni G, **Leoni L**, Stano P. (2019) Molecular Communications in the Context of "Synthetic Cells" Research. *IEEE Trans Nanobioscience.* Jan;18(1):43-50. doi: 10.1109/TNB.2018.2882543. Epub 2018 Nov 21. PubMed PMID: 30475724.
16. D'Angelo F, Baldelli V, Halliday N, Pantalone P, Polticelli F, Fiscarelli E, Williams P, Visca P, **Leoni L**, Rampioni G. (2018) Identification of FDA-Approved Drugs as Antivirulence Agents Targeting the *pqs* Quorum-Sensing System of *Pseudomonas aeruginosa*. *Antimicrob Agents Chemother.* 62 (11). pii: e01296-18.

17. Raneri M, Pinatel E, Peano C, Rampioni G, **Leoni L**, Bianconi I, Jousson O, Dalmasio C, Ferrante P, Briani F. (2018) *Pseudomonas aeruginosa* mutants defective in glucose uptake have pleiotropic phenotype and altered virulence in non-mammal infection models. *Sci Rep.* 8:16912.
18. Mantoni F, Paiardini A, Brunotti P, D'Angelo C, Cervoni L, Paone A, Cappellacci L, Petrelli R, Ricciutelli M, **Leoni L**, Rampioni G, Arcovito A, Rinaldo S, Cutruzzolà F, Giardina G. (2018) Insights into the GTP-dependent allosteric control of c-di-GMP hydrolysis from the crystal structure of PA0575 protein from *Pseudomonas aeruginosa*. *FEBS J.* 285:3815-3834.
19. Paiardini A, Mantoni F, Giardina G, Paone A, Janson, **Leoni L**, Rampioni G, Cutruzzolà F, Rinaldo S. (2018). A novel bacterial L-arginine sensor controlling c-di-GMP levels in *Pseudomonas aeruginosa*. *PROTEINS: Structure, Function, and Bioinformatics.* 86:1088-1096.
20. Lucidi M, Runci F, Rampioni G, Frangipani E, **Leoni L**, Visca P. (2018) New shuttle vectors for gene cloning and expression in multidrug resistant *Acinetobacter* species. *Antimicrob Agents Chemother.* 62(4). pii: e02480-17
21. Rampioni G, D'Angelo F, Messina M, Zennaro A, Tofani D, Kuruma Y, **Leoni L**, Stano P. 2018. Synthetic cells produce a quorum sensing chemical signal perceived by the bacterium *Pseudomonas aeruginosa*. *Chemical Communications*, DOI: 10.1039/C7CC09678J.
22. Rampioni G, Visca P, **Leoni L**, Imperi F. (2017). Drug repurposing for antivirulence therapy against opportunistic bacterial pathogens. *Emerg top Life Scien.* DOI: 10.1042/ETLS20160018
23. Rampioni G, Ramachandran Pillai C, Longo F, Bondi R, Baldelli V, Messina M, Imperi F, Visca P, **Leoni L.*** (2017) Effect of efflux pump inhibition on *Pseudomonas aeruginosa* transcriptome and virulence. *Scientific reports.* *Sci Rep.* 7:11392
24. Bondi R, Longo F, Messina M, D'Angelo F, Visca P, **Leoni L**, Rampioni G (2017). The multi-output incoherent feedforward loop constituted by the transcriptional regulators LasR and RsaL confers robustness to a subset of quorum sensing genes in *Pseudomonas aeruginosa*. *Mol Biosyst.* 13:1080-1089.
25. Rampioni G, Falcone M, Heeb S, Frangipani E, Fletcher MP, Dubern JF, Visca P, **Leoni L**, Cámara M, Williams P. 2016. Unravelling the Genome-Wide Contributions of Specific 2-Alkyl-4-Quinolones and PqsE to Quorum Sensing in *Pseudomonas aeruginosa*. *PLoS Pathog.* 12:e1006029.
26. Costabile G, d'Angelo I, d'Emmanuele di Villa Bianca R, Mitidieri E, Pompili B, Del Porto P, **Leoni L**, Visca P, Miro A, Quaglia F, Imperi F, Sorrentino R, Ungaro F. 2016. Development of inhalable hyaluronan/mannitol composite dry powders for flucytosine repositioning in local therapy of lung infections. *J Control Release.* 238: 80-91.
27. Pawar SV, Messina M, Rinaldo S, Cutruzzolà F, Kaefer V, Rampioni G, **Leoni L.*** (2016) Novel genetic tools to tackle c-di-GMP-dependent signalling in *Pseudomonas aeruginosa*. *J Appl Microbiol.* 120:205-217.
28. Scaccabarozzi L, **Leoni L**, Ballarini E, Barberio A, Locatelli B, Casula A, Bronzo V, Pisoni G, Jousson O, Morandi S, Rapetti L, García-Fernández A, Moroni P. *Pseudomonas aeruginosa* in dairy goats: genotypic and phenotypic comparison of intramammary and environmental isolates (2015). *PLOS ONE.* 10: e0142973
29. Fericola S, Paiardini A, Giardina G, Rampioni G, **Leoni L**, Cutruzzolà F, Rinaldo S. In Silico Discovery and In Vitro Validation of Catechol-Containing Sulfonohydrazide Compounds as Potent Inhibitors of the Diguanylate Cyclase PleD. *J Bacteriol.* 2015 Sep 28;198(1):147-56.
30. Fericola S, Torquati I, Paiardini A, Giardina G, Rampioni G, Messina M, **Leoni L**, Del Bello F, Petrelli R, Rinaldo S, Cappellacci L, Cutruzzolà F. Synthesis of Triazole-Linked Analogues of c-di-GMP and Their Interactions with Diguanylate Cyclase. *J Med Chem.* 2015 Oct 22;58(20):8269-84.
31. Costabile G, d'Angelo I, Rampioni G, Bondi R, Pompili B, Ascenzioni F, Mitidieri E., d'Emmanuele di Villa Bianca R, Sorrentino R, Miro A, Quaglia F, Imperi F, **Leoni L**, Ungaro F. (2015) Repositioning niclosamide for anti-virulence therapy of *Pseudomonas aeruginosa* lung infections: nanocrystal-embedded dry powders for inhalation suspension. *Mol Pharm.* 12:2604-17
32. Bondi R, Messina M, De Fino I, Bragonzi A, Rampioni G, **Leoni L.*** (2014) Affecting *Pseudomonas aeruginosa* phenotypic plasticity by quorum sensing dysregulation hampers pathogenicity in murine chronic lung⁴

- infection. PLOS ONE. 24; 9:e112105
33. Massai F, Rampioni G, Micolonghi C, Messina M, Zennaro E, Ascenzi P, **Leoni L***. (2014) Styrene is sensed by the N-terminal PAS sensor domain of StyS, a double sensor kinase from the styrene-degrading bacterium *Pseudomonas fluorescens* ST. Ann Microbiol. Published ahead of print. DOI 10.1007/s13213-014-0931-y.
 34. Rampioni G, Mavelli F, Damiano L, D'Angelo F, Messina M, **Leoni L**, Stano P. (2014) A synthetic biology approach to bio-chem-ICT: first moves towards chemical communication between synthetic and natural cells. Nat Comput. Natural Computing 13: 333-349.
 35. Imperi F, **Leoni L**, Visca P. (2014) Antivirulence activity of azithromycin in *Pseudomonas aeruginosa*. Frontiers of Microbiology. 5: 178.
 36. Rampioni G, **Leoni L**, Williams P. (2014) The art of war against bacteria: a deception strategy targeting quorum sensing communication systems. Bioorg Chem. Bioorg Chem. epub ahead of print. doi: 10.1016/j.bioorg.2014.04.005.
 37. Rampioni G, Damiano L, Messina M, D'Angelo F, **Leoni L**, Stano, P (2013) Chemical communication between synthetic and natural cells: a possible experimental design. Electron Proc Theor Comput Sci 130:14-26.
 38. Longo F, Rampioni G, Bondi R, Imperi F, Fimia GM, Visca P, Zennaro E, **Leoni L***. (2013) A new transcriptional repressor of the *Pseudomonas aeruginosa* quorum sensing receptor gene *lasR*. PLoS ONE 8(7): e69554.
 39. Imperi F, Massai F, Facchini M, Frangipani E, Visaggio D, **Leoni L**, Bragonzi A, Visca P. (2013) Repurposing the antimycotic drug flucytosine for suppression of *Pseudomonas aeruginosa* pathogenicity. Proc Nat Acad Sci USA. 110: 7458-63.
 40. Imperi F, Massai F, Ramachandran Pillai C, Longo F, Zennaro E, Rampioni G, Visca P, **Leoni L***. (2013) New Life for an Old Drug: the Anthelmintic Drug Niclosamide Inhibits *Pseudomonas aeruginosa* Quorum Sensing. Antimicrob Agents Chemother. 57: 996-1005.
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 42. Rampioni G, Bertani I, Rachamandran Pillai G, Zennaro E, Venturi V, **Leoni L***. (2012). Functional characterization of the quorum sensing regulator RsaL in the plant-beneficial strain *Pseudomonas putida* WCS358. Appl Environ Microbiol. 78:726-34.
 43. Venturi V, Rampioni G, Pongor S, **Leoni L***, (2011). The virtue of temperance: built-in negative regulators of quorum sensing in *Pseudomonas*. Mol Microbiol **82**: 1060-70.
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 45. Massai F, Imperi F, Quattrucci S, Zennaro E, Visca P, **Leoni L*** (2011). A multitask biosensor for microvolumetric detection of N-3-oxo-dodecanoyl-homoserin lactone quorum sensing signal. Biosensors and Bioelectronics. Biosens Bioelectron. 26: 3444-9.
 46. Rampioni G, Schuster M, Greenberg EP, Zennaro E, **Leoni L***. (2009). Contribution of the RsaL global regulator to *Pseudomonas aeruginosa* virulence and biofilm formation. FEMS Microbiol Lett. 301: 210-217
 47. Rampioni G, **Leoni L**, Pietrangeli B, Zennaro E. (2008). The interplay of StyR and IHF regulates substrate dependent induction and carbon catabolite repression of styrene-catabolism genes in *Pseudomonas fluorescens* ST. BMC Microbiol. 8: 92.
 48. Rampioni G, Schuster M, Greenberg EP, Bertani I, Grasso M, Venturi V, Zennaro E, **Leoni L*** (2007) RsaL provides quorum sensing homeostasis and functions as a global regulator of gene expression in *Pseudomonas aeruginosa*. Mol Microbiol. 66; 1557-1566
 49. Bertani I, Rampioni G, **Leoni L**, Venturi V (2007) The *Pseudomonas putida* Lon protease is involved in N-acyl homoserine lactone quorum sensing regulation BMC Microbiology. 7: 71
 50. Beltrametti F, Consolandi A, Carrano L, Bagatin F, Rossi R, **Leoni L**, Zennaro E, Selva E, Marinelli F. (2007). Resistance to Glycopeptide antibiotics in the teicoplanin producer is mediated by van-gene homologue⁵

- expression directing the synthesis of a modified cell wall peptidoglycan. *Ant. Micr. Ag. Chem.* 51:1135-1141
51. Rampioni G, Polticelli F, Bertani I, Righetti K, Venturi V, Zennaro E, **Leoni L.*** (2007) The *Pseudomonas* quorum sensing regulator RsaL belongs to the tetra-helical superclass of H-T-H proteins. *J. Bacteriol.* 189: 1922-1930
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