UNIVERSITÀ
POLITECNICA
DELLE MARCHE

Supervisor: Prof. Vignaroli Carla

Dept. of Life and Environmental Sciences

UNIVERSITÀ POLITECNICA DELLE MARCHE

Supervisor: Carla Vignaroli

Activities

The research activity of Carla Vignaroli has primarily focused on the study of **antibiotic-resistance in bacteria** isolated from clinical, animal, and environmental samples. Her work has included the characterization and molecular typing of resistant and virulent isolates, as well as the analysis of mobile genetic elements carrying resistance genes. These studies aim to evaluate their transferability and to elucidate the role of such elements in the dissemination of antibiotic resistance among different strains and bacterial species.

The research activity also includes the evaluation of the antibacterial activity of novel compounds, tested both alone and in combination with conventional antibiotics against clinically relevant human pathogens, including MRSA and multidrug-resistant *P. aeruginosa* strains. The ultimate goal is to test the efficacy of innovative strategies to combat the growing global threat of antibiotic resistance.

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Description

PhD in General and Applied Microbiology
Associate Professor of Microbiology
Teaching General Microbiology and Marine microbiology in the Bachelor's Degree in Biological Sciences and Foodborne microbial Diseases in the Master's degree in Nutrition Science.
Leader of the Microbiology Lab at DiSVA Department of Polytechnic University of Marche, Ancona

She is co-author of 82 papers (h-index=29, citations 2328) of which 78 published on international peer-review journals and she attended to many national and international congresses with oral and poster presentations. She has been also supervisor of many experimental thesis for the Faculty of Science and tutor of PhD thesis for the PhD School of DISVA in Biomolecular science.
Membership of the SIMGBM society (Società Italiana di Microbiologia Generale e Biotecnologie Microbiche)

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Funded research projects

SUN RISE SMALLER (STRATEGIC) UNIVERSITIES NETWORK FOR REGIONAL INNOVATIVE AND SUSTAINABLE EVOLUTION

HR EXCELLENCE IN RESEARCH

• 2013-2016 – Principal Investigator in the Eureka Project (innovation projects for PhD grants) supported by a pharmaceutical company (ACRAF SpA), Marche region and UNIVPM.

• 2017- Principal Investigator of the Scientific Research Project “Carbapenemase-producing bacteria: from the environment to humans or vice versa?” financed by UNIVPM to support projects related to the topics of “Horizon 2020” European calls.

• 2017 – Principal Investigator of the project FCRVR ID#9210 “ Detection of environmental reservoirs of carbapenem resistance”, supported by Fondazione Cariverona.

• PRIN bando 2017 - Responsible of Research Unit (from 2021) of the project # 201728ZA49 “Emergence of virulence and antibiotic-resistance vectors in coastal and deep sea marine environments and analysis of the mechanisms and conditions underlying their spread and evolution”

• 2019 - Responsible of Research Unit of the project FFC#16/2019 “Fighting Pseudomonas aeruginosa persisters in cystic fibrosis pulmonary infections: improved detection and therapeutic strategies” supported by “Fondazione Ricerca Fibrosi Cistica

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Research Group Description

Members of the research group

- Prof Carla Vignaroli (Associate Professor)
- Dr Serena Simoni (Assistant Professor)
- 1 PhD student

Main research topics

- Isolation, identification, and typing of clinically relevant bacteria from different matrices, and analysis of phylogenetic relationships
- Study of antibiotic resistance mechanisms in pathogenic bacteria by Whole Genome Sequencing
- Evaluation of the antibacterial and antibiofilm activity of natural compounds, alone and in combination with antibiotics
- RT-PCR techniques for the quantification of microbial species and for the assessment of gene expression in bacteria
- Study of the resistance to last-resort antibiotics in animal, environmental, and food strains
- Identification of bacterial efflux pump inhibitors and quorum sensing inhibitors, and evaluation of their activity in combination with antibiotics against multidrug-resistant *Staphylococcus aureus* and *Pseudomonas aeruginosa* strains.

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Equipment and laboratories

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HR EXCELLENCE IN RESEARCH

Our laboratory hosts :

- Class II biological safety cabinet
- Autoclave for sterilization
- Optical microscope
- Refrigerated and benchtop centrifuges
- Spectrophotometer and NanoDrop
- Analytical balance
- pH meter
- Magnetic stirrer with heating plate
- Vortex mixer
- Thermostatic water bath and Incubator
- Refrigerators (4°C) and freezers (-20°C and -80°C)
- PCR thermal cycler
- Real-Time PCR
- Gel electrophoresis standard systems and PFGE apparatus
- UV/blue-light transilluminator
- Microplate Reader for ELISA, Fluorescence, and Luminescence Assays