

Curriculum Vitae

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PROFESSIONAL EXPERIENCE

- 2015–Present** Assistant Professor, Department of Biology, California State University Northridge, Northridge, CA.
- 2015–Present** Adjunct Assistant Professor (honorary), Department of Microbiology & Immunology, Weill Cornell Medical College, New York, NY.
- 2013–2015** Research Associate, Dept. Microbiol. Immunol., Weill Cornell Medical Coll., New York, NY.
- 2009–2012** Research Associate, Center for Adaptation Genetics and Drug Resistance and the Dept. of Molecular Biology and Microbiology, Tufts University School of Medicine, Boston, MA.
- 2006–2009** Postdoctoral Fellow, Center for Adaptation Genetics and Drug Resistance and the Dept. of Molecular Biology and Microbiology, Tufts University School of Medicine, Boston, MA.
- 2005–2006** Adjunct professor, Department of Microbiology, University of Barcelona, Barcelona, Spain.
- 2004–2005** University Research staff, Dept. of Microbiology, Univ. of Barcelona, Barcelona, Spain.
- 2002, 2003** Visiting Graduate fellow, Dept. Pharmacology, Univ. of Rome “La Sapienza”, Rome, Italy.
- 2000–2003** Graduate fellow, Department of Microbiology, University of Barcelona, Barcelona, Spain
- 1998–1999** Undergraduate fellow, Dept. of Microbiology, University of Barcelona, Barcelona, Spain.

EDUCATION

- 2005** Ph.D. in Microbiology *cum laude* (highest mark). University of Barcelona, Barcelona, Spain.
- 2002** Postgraduate Certificate in Education. Polytechnic University of Catalonia, Barcelona, Spain.
- 2001** M.Phil. in Microbiology. University of Barcelona, Barcelona, Spain.
- 1999** B.S. in Biology. University of Barcelona, Barcelona, Spain.

TEACHING EXPERIENCE

- 2016–Present** Principles of Microbiology lecture (BIOL 315, Spring 2016 – Fall 2016) course, California State University Northridge (CSUN).
- 2015–Present** Principles of Microbiology Laboratory (BIOL 315L, Fall 2015 – Fall 2016) course, CSUN.
- 2010, 2012** Visiting professor, Master in Advanced Microbiology, University of Barcelona.
- 2007–2008, 2012** Laboratory instructor in Microbiology, Tufts Univ. School of Dental Medicine.
- 2009–2011** Laboratory instructor in Medical Microbiology, Tufts University School of Medicine.
- 2005–2006** Adjunct professor, laboratory courses in Genetics and Biochemistry of Microorganisms, Fundamental Biotechnology, and Advanced Biology, University of Barcelona.
- 2000-2004** Laboratory instructor in Microbiology and Clinical Microbiology, University of Barcelona.

RESEARCH EXPERIENCE

California State University Northridge

- Regulation, physiological role and inhibition of AcrAB-TolC, the main multidrug efflux pump in *Escherichia coli* and other pathogenic Enterobacteria.
- Distribution and molecular mechanisms of resistance to carbapenems in the environment.
- Molecular and single cell imaging analyses of antibiotic resistance and tolerance in response to stress.

Weill Cornell Medical College

- Development of a multiplex PCR-LDR-qPCR assay for early detection of colon cancer and other diseases.
- Collaboration with Coferon Inc. to rationally design novel self-dimerizing fluoroquinolone antibacterials.

Tufts University School of Medicine

- Demonstration that the expression of the AcrAB-TolC pump is regulated by cellular metabolites and that, in turn, the pump function affects the regulation of many genes and cellular processes, such as motility.
- Demonstration that MarA-mediated multidrug resistance is regulated at multiple levels by different genes and stimuli, thus being interconnected with global cell regulation and metabolism.
- Demonstration that repression of the *hdeAB* acid resistance operon by MarA is influenced at the same time by pH, growth phase, and other regulators, and is associated with reduced resistance to acid stress.
- Collaboration with the Alliance for the Prudent Use of Antibiotics in project design to apply Next Generation Sequencing and PCR to detect selected pathogens and antibiotic resistance in the environment.

University of Rome "La Sapienza"

- Development of a new high-throughput colorimetric assay to study lipase activity and screen for lipase inhibitors; combined it with fluorimetry and HPLC to study inhibition of lipases by natural substances.

University of Barcelona

- Identification, cloning, purification, characterization and study of the inhibition of bacterial lipases involved in virulence: *Helicobacter pylori* EstV (ulcer and gastric cancer) and *Propionibacterium acnes* GehA (acne).
- Identification, cloning and characterization bacterial lipases from *Bacillus* spp. with biotechnological interest; large scale preparation and purification of some of them for their application in organic chemistry.
- Isolation of over 700 soil lipid/polysaccharide-degrading microorganisms and analysis of their lipase, esterase, xylanase, pectinase and cellulase enzymatic activities.
- Collaboration in the construction and analysis of a gene library of *Bacillus* sp. BP-7 to find new enzymes with biotechnological potential.

ARTICLES IN PEER-REVIEWED JOURNALS

- **Ruiz, C.** and Levy, S.B. 2014. Regulation of *acrAB* expression by cellular metabolites in *Escherichia coli*. *J. Antimicrob. Chemother.* 69: 390–399. [\[Link\]](#).
- **Ruiz, C.** and Levy, S.B. 2011. Use of Functional Interactions with MarA to Discover Chromosomal Genes Affecting Antibiotic Susceptibility in *Escherichia coli*. *Int. J. Antimicrob. Agents* 37: 177–178. [\[Link\]](#).
- **Ruiz, C.** and Levy, S.B. 2010. Many Chromosomal Genes Modulate MarA-Mediated Multidrug Resistance in *Escherichia coli*. *Antimicrob. Agents Chemother.* 54: 2125–2134. [\[Link\]](#).

- **Ruiz, C.**, McMurry, L.M. and Levy, S.B. 2008. Role of the multidrug resistance regulator MarA in global regulation of the *hdeAB* acid resistance operon in *Escherichia coli*. *J. Bacteriol.* 190: 1290–1297. [\[Link\]](#).
- **Ruiz, C.**, Falcocchio, S., Pastor, F.I.J., Saso, L. and Díaz, P. 2007. EstV, a novel bacterial lipase belonging to family V, is the first lipase from the pathogen *Helicobacter pylori*, and also from an epsilon-proteobacterium, cloned and characterized. *Appl. Environ. Microbiol.* 73: 2423–2431. [\[Link\]](#).
- **Ruiz, C.**, Falcocchio, S., Xoxi, E., Villo, L., Nicolosi, G., Pastor, F.I.J., Díaz, P. and Saso, L. 2006. Inhibition of *Candida rugosa* lipase by saponins, flavonoids and alkaloids. *J. Mol. Catal. B Enzym.* 40: 138–143. [\[Link\]](#).
- Falcocchio, S., **Ruiz, C.**, Pastor, F.I.J., Saso, L. and Díaz, P. 2006. *Propionibacterium acnes* GehA lipase, involved in acne development, can be successfully inhibited by selected natural substances. *J. Mol. Catal. B Enzym.* 40: 132–137. [\[Link\]](#).
- **Ruiz, C.**, Pastor, F.I.J. and Díaz, P. 2005. Isolation of lipid- and polysaccharide-degrading microorganisms from subtropical forest soil, and analysis of lipolytic strain *Bacillus* sp. CR-179. *Let. Appl. Microbiol.* 40: 218–222. [\[Link\]](#).
- Falcocchio, S., **Ruiz, C.**, Pastor, F.I.J., Saso, L., and Díaz, P. 2005. Identification of a carboxylesterase-producing *Rhodococcus* soil isolate. *Can. J. Microbiol.* 51: 753–758. [\[Link\]](#).
- **Ruiz, C.**, Falcocchio, S., Xoxi, E., Pastor, F.I.J., Díaz, P. and Saso, L. 2004. Activation and inhibition of *Candida rugosa* and *Bacillus*-related lipases by saturated fatty acids, evaluated by a new colorimetric microassay. *Biochim. Biophys. Acta* 1672: 184–191. [\[Link\]](#).
- **Ruiz, C.**, Pastor, F.I.J. and Díaz, P. 2003. Isolation and characterization of *Bacillus* sp. BP-6 LipA, a ubiquitous lipase among mesophilic *Bacillus* species. *Let. Appl. Microbiol.* 37: 354–359. [\[Link\]](#).
- Prim, N., Sánchez M., **Ruiz, C.**, Pastor, F.I.J. and Díaz, P. 2003. Use of methylumbelliferyl-derivative substrates for lipase activity characterization. *J. Mol. Catal. B Enzym.* 22: 339–346. [\[Link\]](#).
- **Ruiz, C.**, Blanco, A., Pastor, F.I.J. and Díaz, P. 2002. Analysis of *Bacillus megaterium* lipolytic system and cloning of LipA, a novel subfamily I.4 bacterial lipase. *FEMS Microbiol. Lett.* 217: 263–267. [\[Link\]](#).

PATENTS

- Barany, F., Efcavitch, WJ., **Ruiz Rueda, C.**, Huang, J., Feinberg, PB. 2015. Method for identification and relative quantification of nucleic acid sequence expression, splice variant, translocation, copy number, or methylation changes using combined nuclease, ligation, and polymerase reactions with carryover prevention. PCT International Application No. PCT/US2015/054759, filed 08 October 2015. Patent Pending.

ORAL COMMUNICATIONS IN MEETINGS AND INVITED LECTURES

- Regulation of the efflux pump AcrAB-TolC by internal signals in *Escherichia coli*. University of Barcelona, Barcelona, Spain. 16th April, 2012.
- Regulation of multiple antibiotic resistance mediated by MarA in *Escherichia coli*. University of Barcelona, Barcelona, Spain. 13th April, 2012.
- Mechanisms and regulation of multiple antibiotic resistance in *Enterobacteriaceae*. University of Barcelona, Barcelona, Spain. 26th March, 2010.
- Implication of chromosomal genes in regulation of multiple antibiotic resistance mediated by the transcription factor MarA. University of Barcelona, Barcelona, Spain. 25th March, 2010.
- Many Chromosomal Genes Play an Important Role in MarA-Mediated Multiple Antibiotic Resistance in *Escherichia coli*. Boston Bacterial Meeting. Boston, MA. 2009.
- Cloning, biochemistry and molecular biology of *Propionibacterium acnes* and *Helicobacter pylori* lipases. II International Workshop “Synthesis, testing and Pharmacological Applications of Lipase Inhibitors”. Rome, Italy. 2004.

- Inhibition of *Candida rugosa*, *Helicobacter pylori* and *Propionibacterium acnes* lipolytic enzymes by natural substances. II International Workshop “Synthesis, testing and Pharmacological Applications of Lipase Inhibitors”. Rome, Italy. 2004.
- Screening of lipid- and polysaccharide-degrading microbial strains isolated from subtropical forest soils. XVIII Meeting of the Spanish society of Microbiology. Alicante, Spain. 2001.

POSTER COMMUNICATIONS IN MEETINGS

- **Ruiz, C.** and Levy, S.B. Feedback Regulation of *acrAB* Expression in *Escherichia coli*. 50th ICAAC Meeting. Boston, MA. 2010.
- **Ruiz, C.** and Levy, S.B. Genetic Interactions between MarA and Many Other Chromosomal Genes Modulate Multiple Antibiotic Resistance in *Escherichia coli*. 109th ASM General Meeting. Philadelphia, PA. 2009.
- **Ruiz, C.** and Levy, S.B. Inactivation of *nikD* Affects the Activity and Expression of MarA in *Escherichia coli*. 108th ASM General Meeting. Boston, MA. 2008.
- **Ruiz, C.**, McMurry, L.M. and Levy, S.B. Role of MarA in Repression of the *hdeA* Acid Resistance Gene in *Escherichia coli*. 107th ASM General Meeting. Toronto, Canada. 2007.
- **Ruiz, C.**, Falcocchio, S., Pastor, F.I.J., Saso, L., and Díaz. Natural substances as lipase inhibitors. Saponins, flavonoids and alkaloids: new therapeutical agents?. International Symposium on environmental biocatalysis “EnvBc 2006”. Cordoba, Spain. 2006.
- **Ruiz, C.**, Falcocchio, S., Saso, L., and Díaz, P. Cloning, purification and characterization of a novel lipase from *Helicobacter pylori* 26695. XX Meeting of the Spanish society of Microbiology. Cáceres, Spain. 2005.
- Prim, N., **Ruiz, C.**, Bofill, C., Pastor, F.I.J., and Díaz, P. Isolation of lipolytic microorganisms from subtropical soils. Cloning, purification and characterization of a novel esterase from strain *Pseudomonas* sp. CR-611. 12th European Congress on Biotechnology. Copenhagen, Denmark. 2005.
- Prim, N., **Ruiz, C.**, Bofill, C., Pastor, F.I.J., and Díaz, P. Isolation of lipid-degrading microorganisms from subtropical forest soil, and analysis of lipolytic strain *Pseudomonas* sp. CR-611. Cost E23 Action on “Biotechnology for the Pulp and Paper Industry: From Tailor-Made Biocatalysts to Mill Application”. Baiona, Spain. 2005.
- **Ruiz, C.**, Falcocchio, S., Xoxi, E., Villo, L., Pastor, F.I.J., Díaz, P., and Saso, L. Inhibition of *Candida rugosa* lipase by saponins, flavonoids and alkaloids. BIOTEC’ 2004 Meeting of the Spanish Society of Biotechnology. Oviedo, Spain. 2004.
- **Ruiz, C.**, Falcocchio, S., Xoxi, E., Díaz, P., Saso, L. Inhibition of microbial lipases evaluated by a new colorimetric microassay and by High Pressure Liquid Chromatography. XIX Meeting of the Spanish society of Microbiology. Santiago de Compostela, Spain. 2003.
- **Ruiz, C.**, Pastor, F.I.J. and Díaz, P. Isolation cloning and characterization of *Bacillus* sp. BP-6 and *Bacillus megaterium* lipases. IX Meeting on Industrial Applications of Enzymes. Barcelona, Spain. 2001.

ABSTRACTS

- Díaz, P., Prim, N., Sánchez, M., **Ruiz, C.**, and Pastor, F.I.J. MUF-derivative substrates as useful tools for fast and accurate lipase activity detection. International Workshop “Synthesis, testing and Pharmacological Applications of Lipase Inhibitors”. Rome, Italy. 2001.
- Pastor, F.I.J., Prim, N., Gallardo, O., **Ruiz, C.**, Vidal, T. and Díaz, P. Development of lipases with application in paper industry. Iberoamerican Meeting of Cellulose and Paper (CIADICYP). Puerto Iguazú, Argentina. 2000.

OTHER SCIENTIFIC CONTRIBUTIONS

- **Peer reviewer** for articles submitted to: *Antimicrobial Agents and Chemotherapy*; *Journal of Bacteriology*; *Journal of Antimicrobial Chemotherapy*; *Applied and Environmental Microbiology*; *Microbial Drug Resistance*; *Plasmid*; *Analytical Chemistry Insights*; *Food Chemistry*; and *Frontiers in Microbiology*.
- **Participation in the organization of the research and development meeting** “VI Meeting of the Spanish thematic network: Biodegradation of lignin and hemicelluloses. Enzymatic, chemical and molecular aspects. Environmental and Industrial applications”. Barcelona, Spain. 2001.
- **Professional Memberships:** American Society for Microbiology; Spanish Society of Microbiology.

AWARDS AND FELLOWSHIPS

- 2010, 2012** Two Visiting Professor Fellowships awarded by the Spanish Ministry of Education to lecture in the Masters’ course “Antimicrobial Chemotherapy” by the University of Barcelona.
- 2005** Ph.D. European mention award by the consortium of European universities.
- 2005** Extraordinary Ph.D. thesis award by the University of Barcelona.
- 2002, 2003** Two Ph.D. travel fellowships by the Catalan government for research stays at the University of Rome “La Sapienza”.
- 2000–2003** Ph.D. fellowship by the Catalan government.
- 2000** Ph.D. fellowship by the Spanish Ministry of Education – declined.
- 1998-1999** Department Collaboration Fellowship for undergraduate students by the Spanish Ministry of Education.

GRANTS AND FUNDING

Submitted/Decision Pending Research Support

NIH SCORE SC3 Grant Ruiz Rueda (PI) 07/01/17-06/30/21
Title: Detection and Molecular Characterization of Carbapenem-Resistant Enterobacteriaceae and Pseudomonas in the Community and Environment

Ongoing Research Support

NIH BUILD PODER Pilot Project Grant Ruiz Rueda (PI) 07/01/16-06/30/17
Title: Role of multiple antibiotic efflux pumps in the removal of cellular metabolites

CSUPERB New Investigator Grant Ruiz Rueda (PI) 06/01/16-11/30/17
Title: Novel Approaches to Find Inhibitors of Multiple Antibiotic Efflux Pumps

CSUN Probationary Faculty Support Grant Ruiz Rueda (PI) Spring 2017
Title: Novel Approaches to Find Inhibitors of Multiple Antibiotic Efflux Pumps

CSUN New Faculty Start-Up Funds Ruiz Rueda (PI) 08/19/15-09/18/17
Title: Molecular mechanisms of multidrug resistance

Completed Research Support

NIH/NIAID 2R01 AI056021-27 Levy (PI) 09/30/1980 - 12/31/2012
The multiple antibiotic resistance (Mar) regulon
Role: Postdoctoral Research Associate/ Research Associate