CURRICULUM VITAE ABREVIADO (CVA)

***IMPORTANT** – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.*

Part A. PERSONAL INFORMATION

First name	Cristina		
Family name	Solano Goñi		
Gender (*)	Female	Birth date	
ID number			
e-mail	cristina.solano@unavarra.es	https://www.unavarra.es/pdi?uid=4363	
Open Researcher and Contributor ID (ORCID) (*)		0000-0002-6207-1766	

A.1. Current position

Position	Catedrática de Universidad (Professor)		
Initial date	06/10/2023		
Institution	Public University of Navarra		
Department/Center	Navarrabiomed Biomedical Research Center		
Country	Spain	Teleph. number	
Key words	*Salmonella*, biofilm, c-di-GMP, signal transduction		

A.2. Previous positions (research activity interruptions, indicate total months)

Period	Position/Institution/Country/Interruption cause
06/2011 - 10/2023	Associate Professor (Prof. Titular); Public University of Navarra
09/2004 - 06/2011	Associate Lecturer (Prof. Asociada); Public University of Navarra
06/2001 - 06/2011	Advanced Specialized Graduate; IDAB (UPNA/CSIC/ Navarra Gov)
04/1999 - 05/2001	Postdoctoral Fellow; IDAB (UPNA/CSIC/ Navarra Government)
12/1998 - 03/1999	Graduate; Public Health Institute of Navarra
09/1994 - 09/1998	PhD Student (Navarra Government Grant); University of Navarra
10/2014 - 02/2015	Interruption: Maternity leave (16 weeks)
06/2002 - 10/2002	Interruption: Maternity leave (16 weeks)
07/1994 - 09/1994	Interruption: Maternity leave (8 weeks)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Bachelor in Pharmacy	University of Navarra (Spain)	1994
PhD in Pharmacy	University of Navarra (Spain)	1998

Part B. CV SUMMARY

Bachelor in Pharmacy from the University of Navarra in 1994. Doctor in Pharmacy from the same university in 1998, where I studied the **ability of *Salmonella* to form a biofilm and its contribution to virulence**. During this stage, I enjoyed a predoctoral stay at the Central Veterinary Laboratory (Surrey, UK).

After working as a graduate at the microbiology laboratory of the Institute of Public Health of Navarra, directing the implementation of an accreditation system, I joined the Public University of Navarra (UPNA) in 1999, and enjoyed a postdoctoral stay of two and a half years at the Institute of Agrobiotechnology (IDAB), a mixed center between UPNA/CSIC/Government of Navarra, under the direction of Dr. Iñigo Lasa. In the year 2001, I obtained, through a public competitive examination, a position of Advanced Specialized Graduate (CSIC) linked to IDAB that I held until June 2011. In 2004, I became Associate Lecturer in the area of microbiology at UPNA. In the year 2011, I joined this same area as Associate Professor, and was promoted to Professor in 2023. I co-lead the Microbial Pathogenesis Research Unit at Navarrabiomed (mixed center UPNA/Government of Navarra) to understand, at the molecular level, the

bacterial biofilm formation process, with an emphasis on signal transduction systems in the bacterial pathogens *Salmonella* and *Staphylococcus aureus*.
In particular, our studies have identified certain **exopolysaccharides and proteins as universal elements of biofilms** produced by a variety of bacterial species (e.g. **cellulose**; the **Bap** family of proteins). We have also contributed to the understanding of the genetic network controlling the synthesis of the biofilm exopolysaccharide **PIA/PNAG** in *S. aureus*. I have also participated in the characterization of a *S. aureus* strain deprived of its complete sensorial **Two Component System network** and in the description of a new genetic organization that we have named "**Non Contiguous Operon**" that is widely present in bacterial genomes. On the other hand, through a pioneer approach, I constructed a ***Salmonella* multiple mutant devoid of c-di-GMP** that has allowed us to analyze the relevance of c-di-GMP signaling in the production of *Salmonella* biofilms and bacterial motility and to develop an efficient vaccine strain for protection against salmonellosis in pigs. Further scientific highlights are the **promotion of biofilm formation as a strategy to enhance bacterial biocatalytic activity** and the study of the **fitness cost** that plasmids confer on clinical staphylococcal isolates.
I have been Principal Investigator of 6 research projects (3 regional and 6 national funded by AEI) and collaborator in 19 national and 3 European projects. I am author of 45 scientific articles in indexed journals (**76% in the top 25% journals; 4420 citations**) and two book chapters, with an h index of 25. I have supervised 12 Master´s theses and **5 PhD theses**, while two others are currently underway. The doctoral students I have supervised are engaged in successful professional careers as senior scientists either in biotech companies or research institutions (e.g. Windfall Bio (USA); Pasteur Institute; University of Gothenburg).
I have a sustained manuscript review activity. I am also an evaluator of the Spanish State Research Agency (AEI) and the Israel Science Foundation since 2011 and 2020, respectively, and part of the **editorial board of Microbiology Spectrum** (ASM). I actively take part in science outreach activities to promote public awareness of science (e.g. Science and Innovation Week; Hoy por Hoy Navarra-Cadena SER).
I have also been responsible for the Quality Assurance Committee of the Master in Agrobiotechnology (2011-2015), deputy director of the Agricultural Production Department-UPNA (2012-2016), of the Health Science Department-UPNA (2016-2021) and of IDAB (2013-2016). I have been recognized with five research six-year terms and six five-year teaching periods and I was a founding partner of the **RECOMBINA spin-off company**.

Part C. RELEVANT MERITS *(sorted by typology)*

C.1. Publications

Iturbe P, San Martín A, Hamamoto H, Marcet-Houben M, Galbaldón T, **Solano C**, Lasa I. (2024) Noncontiguous operon atlas for the *Staphylococcus aureus* genome. **microLife** 5: uqae007.

Dorado-Morales P, Garcillán-Barcia MP, Lasa I, **Solano C**. (2021) Fitness cost evolution of natural plasmids of *Staphylococcus aureus*. **mBio** 12:e03094-20 (**IF: 7.786**, 22/137 Microbiology).

Dorado-Morales P, Martínez I, Rivero-Buceta V, Díaz E, Bähre H, Lasa I, **Solano C**. (2021) Elevated c-di-GMP levels promote biofilm formation and biodesulfurization capacity of *Rhodococcus erythropolis*. **Microb Biotechnol** 14: 923–937 (**IF: 6.575**, 23/159 Biotechnology and Applied Microbiology).

Gil C, Latasa C, García-Ona E,… **Solano C**. (2020) A DIVA vaccine strain lacking RpoS and the secondary messenger c-di-GMP for protection against salmonellosis in pigs. **Vet Res** 51 (3): 1-10 (**IF: 3.699**, 7/146 Veterinary Sciences).

Saenz-Lahoya S, Bitarte N, García B,… **Solano C**, Toledo-Arana A, Lasa I. (2019) Noncontiguous operon is a genetic organization for coordinating bacterial gene expression. **PNAS** 116: 1733-1738 (**IF: 9.412**, 8/71 Multidisciplinary Sciences) (Author position 7/9).

Villanueva M, García B, Valle J,… Lasa I. (2018) Sensory deprivation in *Staphylococcus aureus*. **Nature Communications** 9:523 (**IF: 11.878**, 5/69 Multidisciplinary Sciences) (Author position 6/10).

Echeverz M, García B, Sabalza A, Valle J, Gabaldón T, **Solano C***, Lasa I. (2017) Lack of the PGA exopolysaccharide in *Salmonella* as an adaptive trait for survival in the host. **PLoS Genetics** 13(5), e1006816 **(*Co-corresponding autor)** (**IF: 5.540**, 22/171 Genetics & Heredity).

Latasa C, Echeverz M, García B,… **Solano C.** (2016) Evaluation of a *Salmonella* strain lacking the secondary messenger c-di-GMP and RpoS as a live oral vaccine. **PloS One** 11(8), e0161216 (**recommended by the Faculty of 1000 PRIME as "exceptional"**) (**IF: 2.806**, 15/64 Multidisciplinary Sciences).

Zorraquino V, García B, Latasa C, Echeverz M, Toledo-Arana A, Valle J, Lasa I, **Solano C.** (2013) Coordinated cyclic-Di-GMP repression of *Salmonella* motility through YcgR and cellulose. **J Bacteriol** 195:417 – 428 (**IF: 2.688**, 51/119 Microbiology).

Selected for comment article: Bacterial Wheel Locks: Extracellular Polysaccharide Inhibits Flagellar Rotation. Christopher M. Waters. J. Bacteriol. 2013; 195: 409-410

Solano C, García B, Latasa C,… Lasa I. (2009) Genetic reductionist approach for dissecting individual roles of GGDEF proteins within the c-di-GMP signaling network in *Salmonella*. **PNAS** 106:7997–8002 (**IF: 9.432**, 3/50 Multidisciplinary Sciences) (Author position 1/9).

C.2. Invitations to contribute review articles to high impact journals

Rapún-Araiz B, Haag AF, **Solano C**, Lasa I. (2020) The impact of two-component sensorial network in staphylococcal speciation. **Curr Opin Microbiol** 55:40–47 (**IF: 7.934**, 14/136 Microbiology).

Solano C, Echeverz M, Lasa I. (2014) Biofilm dispersion and quorum sensing. **Curr Opin Microbiol** 18:96–104 (**IF: 5.900**, 15/119 Microbiology).

Valle J, **Solano C**, García B, Toledo-Arana A, Lasa I. (2013) Biofilm switch and immune response determinants at early stages of infection. **Trends Microbiol** 8:364-371 (**IF: 9.808**, 7/119 Microbiology).

C.3. Research projects

Principal Investigator

Identification of novel pathways regulated by the cyclic-di-GMP signaling system in *Salmonella enterica*. **Ministerio de Ciencia e Innovación**. PID2021-127420NB-I00. **139.150 €.** 01.09.2022-31.08.2025. PI: Cristina Solano

Functional characterization of molecular determinants for *Staphylococcus aureus* adaptation to virulence. **MINECO**. BIO2017-83035-R. **267,168€.** 1.1.2018-30.9.2021. PI: Iñigo Lasa and Cristina Solano

Deciphering the singularities of the universal biofilm exopolysaccharide PNAG and evaluation of its biotechnological potential. **MINECO**. BIO2014-53530-R. **290,400€.** 1.1.2015-30.6.2018. PI: Iñigo Lasa and Cristina Solano

Construction and validation of an attenuated *Salmonella* strain for use as a vaccine against porcine colibacillosis. **Fundación Caja Navarra**. **28,000€.** 30.6.2014-30.6.2015. PI: Cristina Solano

Implication of the signal transduction system mediated by c-di-GMP in the pathogenesis of *Salmonella* Typhi and *Salmonella* no-Typhi. **Government of Navarra**. Resolución 1312/2010. **61,640.5€.** 1.8.2010-1.8.2013. PI: Cristina Solano

Multifunctional magnetic nanoparticles for detection and treatment of biofilms. Department of Innovation, Business and Employment. RESOLUCIÓN 2201/2009. **Government of Navarra**. IIM 13002.RI1. **261,864€**. 1.5.2009-30.4.2012. PI: Cristina Solano

Collaborator (most relevant)

New strategies for the control of nosocomial infections. **MINECO**. Convocatoria Retos-Colaboración. RTC-2015-3184-1. **576,135.92€**. 1.3.2015-31.3.2018. PI: Iñigo Lasa

Global analysis of antisense regulatory mechanisms in *Staphylococcus aureus*. PIM2010EPA-00606 (ERANET Pathogenomics). **UNIÓN EUROPEA**. **326,725 €.** 1.3.2011-31.8.2014. PI: Iñigo Lasa

Functional genomic characterization of molecular determinants for staphylococcal fitness, virulence and drug resistance (STAPHDYNAMICS). LSHM-CT-2006-019064 **UNIÓN EUROPEA**. **208.800 €.** 1.4.2006-31.3.2010. PI: Iñigo Lasa

C.4. Contracts, technological or transfer merits

PATENT: Solano C, García B, Toledo-Arana A, Latasa C, Zorraquino V, Valle J, Lasa I. Method for producing multiple modifications in the chromosome of gram-negative bacteria and strains which are deficient in c-di-GMP synthesis obtained by said method.
ES-2324084-B1, WO2009/065993, EP-2223997-A1, US2011262480, 2706204
Priority country: UE; USA; Canada
Entity holder: UNIVERSIDAD PUBLICA DE NAVARRA/CSIC
Exploiting company: Recombina S.L.

Participation in Technology-Based Companies: Founding partner of the RECOMBINA Biotech spin-off company. January 2013.

C.5 Supervision of PhD theses

2023. **Liliana Andrea Morales Laverde**. Analysis of the association between polymorphisms in intergenic regions of *Staphylococcus aureus* genes involved in biofilm formation and periprosthetic joint infections.
Actual position: Postdoctoral Researcher. University of Gothenburg.

2022. **Carmen Gómez Arrebola**. Papel de los sistemas de dos componentes de *Staphylococcus aureus* en la susceptibilidad a complestatina y corbomicina y en la regulación génica en ausencia de fosforilación.
Actual position: Titulado Superior. Servei de Salut de les Illes Balears.

2021. **Pedro Luis Dorado Morales**. Genetic tools derived from *Staphylococcus aureus* for biotechnological applications in Gram-positive bacteria.
Actual position: Postdoctoral Researcher. Pasteur Institute.

2017. **Maite Echeverz Sarasúa**. Insights into c-di-GMP signaling and the PGA exopolysaccharide biological functions using *Salmonella* as a model organism.
Actual position: Senior Scientist. Laboratory of Microbial Pathogenesis. Navarrabiomed.

2012. **Violeta Zorraquino Salvo**. Analysis of the signal transduction pathway mediated by c-di-GMP in *Salmonella*: mechanisms of specificity and regulation of motility.
Actual position: Senior Scientist. Windfall Bio. San Mateo, California.

In progress (2): 1. Laura Imedio (Predoctoral contract UPNA). Study of the relationship between signaling systems that control biofilm formation in *Salmonella enterica*; **2. Leire Azparren** (Predoctoral contract FPU). Identification of novel pathways regulated by the cyclic-di-GMP signaling system in *Salmonella enterica*.

C.6 Awards and honours

Prize "Rafael Gómez Lus" to the oral communication entitled "Engineering biofilm formation to enhance dibenzothiophene biodegradation in *Rhodococcus erythropolis*" presented by Pedro Dorado Morales at the XII Scientific Meeting of the Specialized Group of Molecular Microbiology. Zaragoza, September 5-7, 2018.

Prize for Research in the Areas of Exact, Biological, Medical and Technological Sciences, for the best scientific contribution made during the years 2013 and 2014 (2015 Call for the UPNA Research Awards).

Accesit Eduardo Ortiz de Landazuri 2010 for the research project "Implication of the signal transduction system mediated by c-di-GMP in the pathogenesis and chronification of *Salmonella* Typhi and *Salmonella* no-Typhi". Health Department. Government of Navarra. August 1, 2010.