

Part A. PERSONAL INFORMATION		CV date	06/2024
First and Family name	ROBERTO SOLANO TAVIRA. Gender: MALE		
Social Security, Passport, ID number	03092255C	Age	58. Date of Birth: February 10 th 1966
Researcher codes	WoS Researcher ID	O-5908-2017	
	SCOPUS Author ID	35482666000	
	Open Researcher and Contributor ID (ORCID) **	0000-0001-5459-2417	

A.1. Current position

Position	Research Professor (Profesor de Investigación CSIC)		
Initial date	1/04/2009		
Institution	CSIC		
Department/Center	Plant Molecular Genetics, CNB		
Country	Spain	Tel. number	91 5855429
Key words	Jasmonate, phytohormone, plant, <i>Marchantia</i> , <i>Arabidopsis</i> , signaling, pathogen, metabolite		

A.2. Previous positions (research activity interruptions, art. 45.2.c)

Period	Position/Institution/Country/Interruption cause
03/2019-03/2023	Head of the department Plant Mol. Genetics
15-6-05/1/04/09	Scientific Researcher (Investigador Científico)/CNB-CSIC
11-8-00/15-6-05	Research associate (Científico Titular)/CNB-CSIC
01-01-00/10-08/00	Research assistant (Científico Titular Interino)/CNB-CSIC
1999	Research assistant (Investigador Contratado)/CNB-CSIC
Feb. 1996/ Dec 1998	Post-Doctoral/ Plant Science Institute-UPenn (Ecker lab)
1995	Postdoctoral/CNB-CSIC
1990-1995	Doctorate/CIB-CSIC

A.3. Education

PhD	University	Year
PhD in plant biology	Alcalá de Henares. Madrid (work in CIB-CSIC)	1995

Part B. CV SUMMARY (max. 3500 characters, including spaces)

I have been working at the CNB for over 25 years. I am an elected EMBO member since 2016 and an international leading authority on phytohormone signaling, in particular on the stress-related hormone jasmonate (JA). Work from my group has elucidated most of the core JA signaling pathway components, deciphered the molecular mechanisms underlying JA-response activation and clarified the evolutionary history of the pathway. In addition, I pioneered Genomics analyses in Spain, set up the Genomics Unit at CNB and developed functional genomics tools for the study of plant transcription factors. Major contributions of my team include, among others:

- i) identification of the bioactive form of the JA-hormone in eudicots and bryophytes (Fonseca et al Nature Chem Biol 2009; Monte et al., Nature Chem Biol 2018; PNAS 2022). This discovery also helped confirm the nature of the JA co-receptor (see (iii)) and the divergence in the bioactive hormone between bryophytes and vascular plants. It also provided a clear understanding on the evolution of the JA signaling pathway.
- ii) identification, mechanistic dissection and evolutionary conservation of transcription factors mediating JA-triggered plant responses (Lorenzo et al., Plant Cell 2003; 2004; Fernandez-Calvo et al., Plant Cell 2011; Boter et al., Plant Cell 2015; Peñuelas et al., Plant Cell 2019). These TFs regulate levels of secondary metabolites relevant for plant defense (eg, glucosinolates) and for biomedicine (eg, taxol or vincristine/vinblastine drugs used for cancer treatment)
- iii) identification and evolutionary conservation of the JA co-receptor, JAZ, which represses the activity of these TFs in the absence of the hormone (Chini et al., Nature 2007; Monte et al.,



Mol. Plant 2019). The article by Chini et al. was named as “Breakthrough of the year” in plant research and was the third “article” of the history of Spanish biology published in Nature.

iv) identification of the molecular components and elucidation of the mechanism of JAZ-mediated repression of the JA response; the NINJA adapter and the TOPLESS co-repressor (Pauwels et al., Nature 2010).

iv) Development of chemical tools to modulate JA signaling (Monte et al., Nature Chem Biol 2014).

v) determination of the molecular mechanisms of the JA-pathway regulation by environmental signals (Gimenez-Ibanez et al PLoS Biol 2014; Chico et al., Plant Cell, 2014).

vi) development of genomic tools and resources that have been of broad utility (Franco-Zorrilla et al PNAS 2014).

vii) identification of an alternative pathway for JA synthesis (Chini et al., Nature Chem Biol 2018)

viii) characterization of evolutionary conservation of plant defences in basal plants (Gimenez-Ibanez et al., Current Biology 2019)

ix) identification of a new mechanism of thermotolerance in plants (Monte et al., Current Biol 2020).

x) Identification of an anti-SARS-CoV-2 antiviral from *Marchantia polymorpha* (Jimenez-Alemán et al., 2021)

My group has pioneered the introduction of the novel model plant *Marchantia polymorpha*, which opened a whole new world to study bryophytes and plant evolution (Bowman et al., Cell 2017). My middle/long term scientific objectives include the determination of new components of the JA signaling pathway and their crosstalk with other fatty acid derived signaling molecules. Furthermore, I will continue the search for components of the JA route that could explain the regulation of so many physiological processes by a single molecule, both in Arabidopsis and in Marchantia. Finally, I would like to expand the biotechnological capacities of my lab by exploring the potential of bryophytes as a source of pharmacologically relevant compounds.

Part C. RELEVANT MERITS

C.1. 10 relevant Publications

1. Kneeshaw, S., Soriano, G., Monte, I., Hamberg, M., Zamarreño, A.M., García-Mina, J.M., Franco-Zorrilla, J.M., Kato, N., Ueda, M., Rey-Stolle, M.F., Barbas, C., Michavila, S., Gimenez-Ibanez, S., Jimenez-Aleman, G. H. and **Solano, R.** (2022). Ligand diversity contributes to the full activation of the jasmonate pathway in *Marchantia polymorpha*. **Proceedings of the National Academy of Sciences** 2022-09-06 119(36):e2202930119
2. Monte, I., Kneeshaw, S., Franco-Zorrilla, J.M., Chini, A., Zamarreño, A.M., García-Mina, J.M., **Solano, R.** An Ancient COI1-Independent Function for Reactive Electrophilic Oxylipins in Thermotolerance (2020) **Current Biology**, 30 (6), pp. 962-971.e3. DOI: 10.1016/j.cub.2020.01.023
3. Chico, J.M., Lechner, E., Fernandez-Barbero, G., Canibano, E., García-Casado, G., Franco-Zorrilla, J.M., Hammann, P., Zamarreño, A.M., García-Mina, J.M., Rubio, V., Genschik, P., **Solano, R.** CUL3BPM E3 ubiquitin ligases regulate MYC2, MYC3, and MYC4 stability and JA responses (2020) **Proceedings of the National Academy of Sciences of the United States of America**, 117 (11), pp. 6205-6215. DOI: 10.1073/pnas.1912199117
4. Isabel Monte¹, Sakiko Ishida², Angel M. Zamarreño³, Mats Hamberg⁴, José M. Franco-Zorrilla⁵, Gloria García-Casado⁵, Caroline Gouhier-Darimont⁶, Philippe Reymond⁶, Kosaku Takahashi⁷, José M. García-Mina³, Ryuichi Nishihama², Takayuki Kohchi² and **Roberto Solano**¹ (2018). Ligand-receptor co-evolution shaped the jasmonate pathway in land plants. **Nature Chemical Biology** volume 14, pages 480–488 (2018). doi:10.1038/s41589-018-0033-4
5. Andrea Chini, Isabel Monte, Angel M. Zamarreño, Mats Hamberg, Steve Lassueur, Philippe Reymond, Sally Weiss, Annick Stintzi, Andreas Schaller, Andrea Porzel, José M. García-Mina and **Roberto Solano** (2018). An ORP3-independent pathway uses 4,5-didehydro-



- jasmonate for jasmonate synthesis. **Nature Chemical Biology** Volume 14, pages 171–178 (2018). doi:10.1038/nchembio.2540
6. Monte, I., Hamberg, M., Chini, A., Gimenez-Ibanez, S., García-Casado, G., Porzel, A., Pazos, F., Boter, M., and **Solano, R.** (2014). Rational design of a ligand-based antagonist of jasmonate perception. **Nature Chemical Biology**, DOI: 10.1038/NCHEMBIO.1575
 7. José M. Franco-Zorrilla, Irene López-Vidriero, José L. Carrasco, Marta Godoy, Pablo Vera, and **Roberto Solano**. DNA-binding specificities of plant transcription factors and their potential to define target genes. **PNAS** 2014; doi:10.1073/pnas.1316278111
 8. Selena Gimenez-Ibanez, Marta Boter, Gemma Fernández-Barbero, Andrea Chini, John P. Rathjen and **Roberto Solano**. The Bacterial Effector HopX1 Targets JAZ Transcriptional Repressors to Activate Jasmonate Signaling and Promote Infection in Arabidopsis. **PLOS Biology** 2014 12(2): e1001792. doi:10.1371/journal.pbio.1001792
 9. Fonseca, S., Chini, A., Hamberg, M., Adie, B., Porzel, A., Kramell, R., Miersch, O., Wasternack, C., and **Solano, R.** (2009). (+)-7-iso-Jasmonoyl-L-isoleucine is the endogenous bioactive jasmonate. **Nature Chemical Biology** 5, 344-350
 10. Chini, A., Fonseca, S., Fernández, G., Adie, B., Chico, J.M., Lorenzo, O., García-Casado, G., López-Vidriero, I., Lozano, F.M., Ponce, M.R., Micol, J.L. and **Solano, R.** (2007) The JAZ family of repressors is the missing link in Jasmonate signalling. **Nature**, 448, 666-671

C.2. Congress

Invited Talks: More than 10 national conferences and more than 30 international conferences in 13 countries, including GORDON, KEYSTONE, etc, and invited conferences in the most prestigious international institutes such as Max-Planck, John-Innes, Leibniz, U. of Kyoto, U. of North Carolina, etc. Many of them are “Keynote Lectures”

C. 3. Research projects and grants (last 10 years)

2023-2026: PID2022-140766OB-I00. *Novel regulators of the MpCOI1-dependent and -independent JA pathways (NOVEL)*. FUNDING AGENCY: MICIU. PI: ROBERTO SOLANO

2020-2023: Ancestral Role of Jasmonates in Thermotolerance (JANCESTRAL). FUNDING AGENCY: MINECO. PI: ROBERTO SOLANO

2017-2019: EVOFUN-JA (Evolución Evolucion y conservacion funcional de la ruta de señalizacion de JA en plantas. FUNDING AGENCY: MINECO (BIO2016-77216-R). PI: ROBERTO SOLANO

2016: Obtención de plantas de tomate resistentes a *Pseudomonas syringae* por modificación de la dinámica estomática durante el proceso infectivo. FUNDING AGENCY: FUAM (Fondo para la Ciencia y la Innovación) (Ref: 2015007). PI: Roberto Solano

2014-2016: Receptor promiscuity in hormonal crosstalk and its biotechnological potential towards a sustainable agriculture. FUNDING AGENCY: MINECO (BIO2013-44407-R). PI: ROBERTO SOLANO

2011-2013: MOREJAZFUN (Novel Mechanisms of Regulation and Specificity of JAZ function in Jasmonate signalling). FUNDING AGENCY: MICINN (BIO2010-21739). PI: ROBERTO SOLANO

2009-2012: BALANCE (Activities of small metabolites in balancing plant responses to environmental stress and growth). FUNDING AGENCY: MICINN (KBBE; ERANET; EUI2008-03666). PI: ROBERTO SOLANO

2007-2012: TRANSPLANTA (Function and Biotechnological potencial of transcription factors in plants). FUNDING AGENCY: MCYT (CONSOLIDER). PI (subproyect): ROBERTO SOLANO TAVIRA. Coordinator: JAVIER PAZ-ARES

2007-2010: Identificación de nuevos componentes de la ruta de señalización de jasmónico en arabidopsis y caracterización funcional de jasmonate-insensitive 3, un represor de la ruta y



probable diana de scfcoi1. FUNDING AGENCY: MCYT (BIO2007-66935). PI: ROBERTO SOLANO

C.4. Contracts

Patents

1. Patente: P202130016 (ES1641.1602) EXTRACT FROM A PLANT OF MARCHANTIA POLYMORPHA SUBSP. AND THEIR USES. Roberto Solano, Guillermo Jimenez-Alemán, Pablo Gastaminza, Urtzi Garaigorta
2. European priority Patent N° EP16382513, with international extension PCT/EP17/078493 filed on 07/11/2017 by CSIC. "NUCLEOTIDE SEQUENCE FOR IMPROVING RESISTANCE AGAINST PLANT PATHOGENS", licenced to PLANT BIOSCIENCE LIMITED. (Date of Licence 25/02/2018) Inventore: Roberto Solano, Selena Giménez Ibáñez, Andrés Ortigosa Urbieto, Marta Boter Gil, Andrea Chini y Gloria García Casado.
3. European priority Patent N° EP15382672, filed on 29/12/2015 by CSIC. "NUCLEOTIDE SEQUENCE FOR IMPROVING RESISTANCE AGAINST PATHOGENS", Inventors: Roberto Solano, Selena Gimenez-Ibañez; Andrea Chini; Marta Boter Gil; Gloria García.
4. International extension of European Patent PCT/EP2014/069796 (worldwide extension). Novel Compounds. USA. 17/09/2014. CSIC. Inventors: Roberto Solano, Andrea Chini; Isabel Monte; Mats Hamberg.
5. European priority Patent EP 13382362.5 filed on 18/09/2013 by CSIC and Lipidox LSD (Sweden). Novel compounds antagonizing JA-Ile perception. Inventors: Roberto Solano, Isabel Monte, Andrea Chini & Mats Hamberg. [Licensed to a British Biotech company (Plant Bioscience Limited, UK)].
6. Joseph R. Ecker & Roberto Solano. Title: Transcriptional activation in the ethylene gas signaling pathway mediated by ETHYLENE-INSENSITIVE3 and ETHYLENE-RESPONSE-FACTOR1. 60/109973. Country of priority: USA. Date of priority: 25/11/1998. Owner: University of Pennsylvania. Countries to which it has been extended: All

C.5. Other merits

- 2023: Silver Medal de la "International Plant Growth Substance Association"
- 2016 to present: elected **EMBO** member
- 2014 to 2021: 8 years "Highly cited researcher" (Thomson-Reuters/Clarivate Analytics)
- 2019: Sexenio Tecnológico concedido

Institutional responsibilities

- 2019 to 2023: **Head of Department** of Plant Molecular Genetics, National Centre for Biotechnology (CNB-CSIC), Madrid, Spain.
- 2021: Member of the Experts Board (review panel) of the Biotechnology National program from AEI (Spanish Agency for Research), Spain
- 2017: Member of the Experts Board (review panel) of the Biotechnology program from the "Ministerio de Economía y Competitividad", Spain
- 1999-present: Proposals Reviewer for the Spanish National Agency of Scientific Evaluation (ANEP).
- 2004: Member of the Experts Board (review panel) of the Biotechnology program from the Ministry of Education and Science, Spain.
- 2003: Member of the Reviewer commission of the Spanish National Agency of Scientific Evaluation (ANEP).
- 2002-present: International proposals Reviewer from US-Israel Binational Science Foundation and NSF. Ad hoc proposals reviewer for the Dutch FWO and UK BBRSC