



CURRICULUM VITAE (CVA)

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

Part A. PERSONAL INFORMATION

CV date

November 2022

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|---|---------------------|--|
| ARTIST PERSONAL INFORMATION | | |
| First name | Mónica | |
| Family name | Pradillo Orellana | |
| e-mail | pradillo@bio.ucm.es | URL Web http://mpradill.wixsite.com/plantmeiosis |
| Open Research and Contributor ID (ORCID)(*) | | 0000-0001-6625-6015 |

(*) Mandatory

A.1. Current position

| | | | |
|---------------------|--|----------------|-----------|
| In Current position | | | |
| Position | Associate Professor (“Contratado Dr.”) | | |
| Initial date | February 19 th 2019 | | |
| Institution | Universidad Complutense de Madrid | | |
| Departament/Center | Department of Genetics, Physiology, and Microbiology | | |
| Country | Spain | Teleph. number | 913944764 |
| Key words | Meiosis, chromosomes, cytogenetics, plants, Homologous Recombination, DNA Repair | | |

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

| Period | Position/Institution/Country/Interruption cause |
|-----------|---|
| 2015-2019 | Associate Professor interim (“Contratado Dr. interino”)/UCM/Spain |
| 2011-2015 | Assistant Professor (“Ayudante Doctor”)/UCM/Spain |
| 2007-2011 | Graduate Teaching Assistant (“Ayudante”)/UCM/Spain |

A.3. Education

| PhD, Licensed, Graduate | University/Country | Year |
|----------------------------|-------------------------------|------|
| PhD at Genetics Department | Universidad Complutense/Spain | 2009 |
| Degree in Biology | Universidad Complutense/Spain | 2003 |

Part B. CV SUMMARY (max. 5000 characters, including spaces)

I graduated in Biology with a major in Genetics at the UCM (2003). In 2004, I received the Extraordinary Bachelor's Award. After my doctoral studies (FPU grant), I got a position as an Assistant Professor. I defended my doctoral thesis in 2009, supervised by the leading expert on meiosis Prof. Juan L. Santos. Currently, I am an Associate Professor/Lecturer. During these years, I have taught more than 1,800 h and I have also supervised 9 Master degree final Projects. I have combined my teaching activities with two three-month stays, one of them in the Imperial College (London, UK), for which I obtained an EMBO grant (2012).

My research career has been mainly focused on the study of homologous recombination in meiosis using the model species *Arabidopsis thaliana*. During my PhD, I analyzed chromosome behavior in mutants defective for the recombinase RAD51, describing a specific role for this protein in *Arabidopsis* meiosis (Pradillo *et al.*, 2012, *Plant Cell* 69:921-33). During my postdoc, I characterized the meiotic function of genes involved in the biogenesis of small RNAs, and discovered the existence of a homeostatic control of crossovers (for the first time in plants), as well as the function of the nuclear envelope-associated SUN proteins in the dynamics of meiotic plant chromosomes (Varas *et al.*, 2015 & Oliver *et al.*, 2016, in which I am the last author; see articles 7 and 8). These analyses were included in two theses that I supervised: Cecilia Oliver (2013) and Javier Varas (2014). All these results prompted me to get the award “Distinguished young investigator” by the Spanish Society of Genetics, for the relevance of the scientific contributions during 2014-2015. Later, thanks to my involvement in the

European project COMREC (FP7-PEOPLE-2013-ITN: 606956), I became familiar with the study of meiosis in polyploid genomes. This has resulted in a publication (Parra-Núñez *et al.*, 2019; see article 5) and in the supervision of another thesis: Pablo Parra (2020), focused on the control of meiotic recombination in autopolyploids.

During the last years I have also been interested in the study of the nuclear envelope and its role in chromosome behavior during plant meiosis. The role of the NE in meiosis has long been neglected by many research groups studying meiosis. This is a novel and of interest topic, for which there is little information. My research in this field has brought me into contact with a plant chromatin network, funded by a COST project. As a consequence of my research about the influence of the nuclear envelope on meiosis, especially in relation to the nuclear pore complexes, I have been invited speaker in the most prestigious conference for meiosis research (Gordon), and in seminars in European and American Universities and research institutes. Currently, I have funding from a national project (PID2020-118038GB-I00) and I am supervising a thesis on this topic (Nadia Fernández, FPU16/02772, currently Graduate Teaching Assistant at Faculty of Biology, UCM). I have also published several papers on this topic (Varas *et al.*, 2015, *Plant J* 81:329-46; Pradillo *et al.*, 2019, *Nucleus* 10:55-66; Fernández-Jiménez and Pradillo, 2020, *J Exp Bot* 71:5148-59).

I have participated in five national and in two European research projects. I am currently a PI of a European project (ITN network) to study the influence of (bread) wheat genetic background and genome organization on recombination rates (MEICOM, H2020-MSCA-ITN-2017:765212). My participation in European projects and networks has allowed me to establish collaborations as stated in my CV (e.g. R. Mercier from the Max Planck Institute for Plant Breeding Research, A. Schnittger from University of Hamburg or P. Ziolkowski from Adam Mickiewicz University in Poland, among others, see articles 1, 2 and 4). My career in the field of plant meiosis is internationally valued, especially because there are very few groups that are experts in cytogenetics. I have been involved in the organization of three international meetings (2nd MeioNet meeting in Miraflores de la Sierra, 2017; SEB Symposium about Impact of Chromatin Domains on Plant Phenotypes in El Escorial, 2019; SEB 2021 meeting in Antwerp, finally held online, 2021). I am an occasional reviewer of international research projects and articles published in prestigious journals. I am a member of the Editorial Committee of *Front Plant Sci*, since January 2016. I have also participated in the edition of a special issue of *J Exp Bot* and a protocol book (27 chapters; *Methods Mol Biol*, published by Springer). In addition, I am a member of the Cell Biology committee of the Society for Experimental Biology (UK) since 2020. I have two periods of research activity (“sexenios”). As a teacher, I am very aware of the importance of disseminating science research to society. I regularly participate in outreach activities to disseminate science to the society (*Semana de la Ciencia*) and UCM innovation projects, organizing activities for high school students. In addition, I am the Coordinator of the Master Genetics and Cell Biology (60 ECTS) since September 2019.

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (see instructions) *Corresponding author

1. Zhu L, Fernández-Jiménez N, Szymanska-Lejman M, ..., Ziolkowski PA* (2021) (**Pradillo M** 10/12) Natural variation identifies SNI1, the SMC5/6 component, as a modifier of meiotic crossover in *Arabidopsis*. *Proc Natl Acad Sci USA* 118: e2021970118. doi: 10.1073/pnas.2021970118. (Q1).
2. Yang F, Fernández-Jiménez N, Tučková M, Vrána J, Cápál P, Díaz M, **Pradillo M**, Pecinka A* (2021) Defects in meiotic chromosome segregation lead to unreduced male gametes in *Arabidopsis* SMC5/6 complex mutants. *Plant Cell* 33: 3104-19. doi: 10.1093/plcell/koab178. (Q1 and D1).
3. Martinez-Garcia M, Fernández-Jiménez N, Santos JL, **Pradillo M*** (2020) Duplication and divergence: New insights into AXR1 and AXL functions in DNA repair and meiosis. *Sci Rep* 10:8860. doi: 10.1038/s41598-020-65734-2. (Q1).
4. Wijnker E, Harashima H, Müller K, ..., Schnittger A* (2019) (**Pradillo M** 9/10) The Cdk1/Cdk2 homolog CDKA;1 controls the recombination landscape in *Arabidopsis*. *Proc Natl Acad Sci USA* 116: 12534-12539. doi: 10.1073/pnas.1820753116. (Q1).
5. Parra-Núñez P, **Pradillo M***, Santos JL (2019) Competition for chiasma formation between identical and homologous (but not identical) chromosomes in synthetic autotetraploids of *Arabidopsis thaliana*. *Front Plant Sci* 9:1924. doi: 10.3389/fpls.2018.01924. (Q1 and D1)

6. Varas J, Santos JL, **Pradillo M*** (2017) The absence of the Arabidopsis chaperone complex CAF-1 produces mitotic chromosome abnormalities and changes in the expression profiles of genes involved in DNA repair. *Front Plant Sci* 8:525. doi: 10.3389/fpls.2017.00525. (Q1)
7. Oliver C, Santos JL, **Pradillo M*** (2016) Accurate chromosome segregation at first meiotic division requires AGO4, a protein involved in RNA-dependent DNA methylation in *Arabidopsis thaliana*. *Genetics* 204:543-553. Highlighted article. doi: 10.1534/genetics.116.189217. (Q1).
8. Varas J, Sánchez-Morán E, Copenhaver GP, Santos JL, **Pradillo M*** (2015) Analysis of the relationships between double-strand breaks, synaptonemal complex and crossovers using the *Atfas1-4* mutant. *PLoS Genet* 11:e1005301. Cover of the journal in the month of July. doi: 10.1371/journal.pgen.1005301. (Q1).
9. **Pradillo M***, Knoll A, Oliver C, Varas J, Corredor E, Puchta H, Santos JL (2015) Involvement of the cohesin cofactor PDS5 (SPO76) during meiosis and DNA repair in *Arabidopsis thaliana*. *Front Plant Sci* 6:1034. doi: 10.3389/fpls.2015.01034. (Q1 and D1).
10. Crismani W, Girard C, Froger N, ..., Mercier R* (2012) (**Pradillo M** 4/9) FANCM limits meiotic crossover. *Science* 336:1588-1590. doi: 10.3389/fpls.2018.00368. (Q1 and D1).

C.2. Congress

1. XLII Congreso de la Sociedad Española de Genética (online). 14-18 June 2021. The plant-specific nucleoporin NUP136 is essential to ensure the obligatory crossover in Arabidopsis meiosis (Fernández-Jiménez N, Pradillo M). Poster and flash talk.
2. Monogram 2021. University of Dundee (online). 26-30 April 2021. Meiotic nuclear envelope is required for proper chromosome dynamics and homologous recombination (Pradillo M). Invited speaker.
3. Impact of chromatin domains on plant phenotype (Society for Experimental Biology meeting). San Lorenzo del Escorial, Madrid, Spain. December 2019. The nuclear envelope is the dance floor for the chromosomes during meiosis (Pradillo M, Fernández-Jiménez N, Blasio F). Invited speaker.
4. EMBO Workshop on Meiosis. La Rochelle, France. 25-29 August 2019. How are the dynamics of SUN proteins and Nuclear Pore Complexes during plant meiosis? (Fernández-Jiménez N, Blasio F, Pradillo M). Poster and flash talk.
5. The Gordon Research Conference on Meiosis: Molecular Mechanisms and Regulation of Meiosis Across Species. Colby-Sawyer College, New London, NH (USA). 10-15 June 2018. Nuclear pore complexes and meiosis: A new face of Arabidopsis nucleoporins (Pradillo M, Fernández N, Martínez-García M, Varas J, Martín B, Limón JC, Santos JL). Invited speaker.
6. EMBO Workshop: Plant Genome Stability and Change. IPK Gatersleben, Germany. 3-6 June 2018. When the nucleus meets the cytoplasm: A role for nuclear envelope-associated proteins in meiosis and DNA repair (Pradillo M, Fernández N, Martínez-García M, Varas J, Martín B, Limón JC, Santos JL). Invited speaker and chair in one of the sessions.
7. 2nd MeioNet Meeting. Miraflores de la Sierra, Madrid (Spain). 14-16 June 2017. What is the meiotic role of the Arabidopsis nucleoporin SAR1 (Fernández N, Martínez M, Varas J, Santos JL, Pradillo M); Changes in meiotic recombination during the diploidisation process in *Arabidopsis thaliana* (Parra P, Martín B, Santos JL, Pradillo M). Oral communications.
8. The biology of meiosis: implications for fertility and genetic disorders. Salamanca, Spain. 4-5 June 2015. Histone H2AX phosphorylation modulates the choice of DSB processing pathway during plant meiosis (Pradillo M, Alghamdi S, Almuhur R, Cooper C, Parra P, Sánchez-Morán E). Oral communication (selected talk).
9. EMBO Workshop on genetic stability & change: Genome maintenance mechanisms in plants. Roscoff, France. 2-5 May 2012. The cohesin cofactor protein SPO76 in Arabidopsis thaliana: Its role in meiosis and DNA repair (Pradillo M, Corredor E, Varas J, Oliver C, Santos JL). Oral communication (selected talk).

C.3. Research projects

International research projects

1. Meiotic Control of Recombination in Crops [MEICOM, Marie Curie Initial Training Networks (ITN), Multi-Partner ITN; Call: H2020-MSCA-ITN-2017; Grant agreement number: 765212]. EU coordinator: Eugenio Sánchez-Morán (University of Birmingham, UK). Funding source: European

Union (H2020). Amount: 247,872.96 € (UCM). Period: Jan 2018-Jun 2022. I have been the **PI** of this Project and leader of dissemination and outreach activities. I also belong to the Recruitment and Equal Opportunities Committee.

2. Impact of nuclear domains on gene expression and plant traits (COST Action CA16212). Coordinator: Christophe Tatout (University of Clermont-Ferrand, France). Funding source: European Union (H2020). Period: Nov 2017-Nov 2021. My position: **Management Committee Member** – Spain; Lead group of WG3.
3. Control of Meiotic Recombination: Arabidopsis to Crops [COMREC, Marie Curie Initial Training Networks (ITN), Multi-Partner ITN; Call: FP7-PEOPLE-2013-ITN; Grant agreement number: 606956]. Coordinator: Prof. Chris Franklin (University of Birmingham, UK). Funding source: European Union (FP7). Amount: 228,881.62 € (UCM). Period: Nov 2013-Nov 2017. **Scientist in Charge together with Juan Luis Santos Coloma (UCM).**
4. Systematic analysis of factors controlling meiotic recombination in higher plants (MEIOSys)” (Ref. KBBE-2009-222883). Coordinator: Prof. Chris Franklin (University of Birmingham, UK). Spanish PI: Juan Luis Santos (UCM). Funding source: European Union (FP7). Amount: 325,890 € (UCM). Period: Sept 2009-Aug 2014. **Member of the research team.**

National research projects

5. Functional analysis of the nuclear pore complexes in chromosome dynamics during plant meiosis (MEIONUP) (PID2020-118038GB-I00). **PI:** Mónica Pradillo (UCM). Funding source: Ministry of Science and Innovation. Amount: 121.000 €. Period: Sep 2021-Aug 2024.
6. Meiosis in polyploid plants: Analysis of recombination in allopolyploids (wheat) and autopolyploids (Arabidopsis) (AGL2015-67349-P). **PI:** Juan Luis Santos and Tomás Naranjo (UCM). Funding source: Ministry of Economy and Competitiveness. Amount: 80,000 €. Period: Jan 2016-Dec 2019. **Member of the research team.**
7. Study of epigenetic changes occurring during spermatogenesis in *Caenorhabditis elegans* (2015/EEUU/13). **PI:** Jesús Page (UAM). University cooperation projects with the United States (collaboration with Dr. Monica Colaiácovo laboratory in Harvard Medical School, USA). Funding source: Universidad Autónoma de Madrid-Santander. Amount: 11.500,00 €. Period: Jul 2015-Dec 2016. **Member of the research team.**
8. Analysis of meiosis in plants using gene and chromosomal mutations (AGL2012-38852). **PI:** Juan Luis Santos (UCM). Funding source: Ministry of Economy and Competitiveness. Amount: 80,000 €. Period: Jan 2013-Dec 2015. **Member of the research team.**

Others

9. Chromosomal dynamics of the cell division (UCM 910452). Group evaluated by the state research agency (AEI). Funding source: Universidad Complutense de Madrid. Amount: 2,200 €/year. I am the **PI** of this group since March 2019.
10. Influence of nuclear architecture and chemical compounds on fertility through the study of meiosis in plants (PR108/20-25). **PI:** Mónica Pradillo (UCM). Funding source: Universidad Complutense de Madrid/Banco de Santander. Amount: 11.800,68 €.

C.4. Contracts, technological or transfer merits

The results corresponding to the *Science* paper: “FANCM limits meiotic crossovers” (2012, see above), are protected by the application FR1158262 of the Institut National de la Recherche Agronomique and have led to the development of the patent WO2013038376 (“Increase in meiotic recombination in plants by inhibiting the FANCM protein”), published in Australia (03/20/2014) and in the USA (04/23/2014). They are also pending publication in the European Patent Office and in Israel.