

CURRICULUM VITAE ABREVIADO (CVA)**Part A. PERSONAL INFORMATION**

First name	Maria-Dolors		
Family name	Piulachs		
Gender (*)	Female	Birth date	08/08/1958
DNI	37362827V		
e-mail	mdolors.piulachs@ibe.upf-csic.es	https://insectreproduction-ibe.csic.es/	
Open Researcher and Contributor ID (ORCID) (*)		0000-0002-4500-2718	

(*) Mandatory

A.1. Current position

Position	Research Scientist		
Initial date	2005		
Institution	CSIC		
Department/Center	Institute of Evolutionary Biology (CSIC- Univ. Pompeu Fabra)		
Country	SPAIN	Teleph. number	932309636
Key words	Insect oogenesis, Insect reproduction, Insect hormones, small noncoding RNAs		

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

Period	Position/Institution/Country/Interruption cause
1988	Postdoctoral Researcher from MEC/Barcelona Spain
January-December 1989	Postdoctoral Researcher from MAE. Universite de Bordeaux-CNRS, France
February 1989-2005	Scientific Tenured at CSIC

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Licensed	Univeristy of Barcelona	1984
PhD Biology	University of Barcelona	1987

(Include all the necessary rows)

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

The general goal of my scientific career is to elucidate how insect oogenesis is regulated. I obtained my PhD at the University of Barcelona in 1987, and in this period my research was based on the control of juvenile hormone synthesis. I delved into this subject when in 1989, with a postdoctoral fellowship from the Ministry of Education and Science, I stayed for a year in the "Laboratoire de neuroendocrinologie" (Université de Bordeaux, France), led by Prof. Adrien Girardie. This year, I also obtained the position of Tenured Scientific at CSIC. When I returned to Spain, in 1990, I established my research group, which was integrated into the Institute of Molecular Biology of Barcelona, with a research line focused on the hormonal regulation of insect reproduction, using the cockroach *Blattella germanica* as a model. I incorporated new molecular tools into my research, marking an important methodological advancement. In 2005 using the RNAi we described the role of genes involved in reproduction, such as those coding for the vitellogenin and lipophorin receptors (FEBS J. 2006 273: 325-335; BMC Mol. Biol. 2007, 8: 53), genes responsible for chorion formation (Exp. Cell Res. 2014, 320: 46-83; BMC Genomics. 2009 Apr 30; 10: 206; Insect Biochem. Mol. Biol 2009, 41: 101-108; PLoS

ONE 2011, 4: e8353), and genes integrated with signaling pathways regulating oogenesis (PLoS ONE 2014 6(4): e19350; Biol. Cell. 2015, 107, 1–13, Open Biol 2016, DOI: 10.1098/rsob.150197; Insect Biochem. Mol. Biol 2021 Doi: 10.1016/j.ibmb.2020.103407). In 2005, I was promoted to CSIC Scientific Researcher. In 2008, when the Institute of Evolutionary Biology (a joint center of CSIC and Universitat Pompeu Fabra) was founded, I joined it serving as coordinator of the Functional Genomics and Evolution program (2008 to 2016).

My objective is to identify the signals that trigger ovarian follicle growth and maturation. I utilized next-generation sequencing (NGS) to analyze gene expression in the ovaries. Initial findings indicate that most maternal mRNAs needed for embryo development are produced in the ovaries during the last nymphal instar, highlighting the need for precise regulation until zygote formation. Small noncoding RNAs may play a key role in this regulation. We sequenced and identified the *B. germanica* miRNAs and piRNA (PLoS ONE 2011 6(4): e19350; Sci. Rep. DOI: 10.1038/srep37736; J. Exp. Zool. Evol. 2018 DOI: 10.1002/jez.b.22815), aiming to study their role in *B. germanica* oogenesis. In the meantime, I have actively participated in the *B. germanica* genome project, an important milestone in our research (Nature Ecology & Evolution DOI:10.1038/s41559-017-0459-1). The analysis of the small RNA libraries obtained in the laboratory, redirected part of my research to study the siRNAs present in the libraries from dsRNA-treated individuals. The results showed that the treated individuals only use a part of the siRNAs produced, and we demonstrated a large half-life for these siRNAs (BBA-Gene Regulatory Mechanisms 2018, 1861: 554-560; BBA-Gene Regulatory Mechanisms 2021, 1864: 194704). We incorporated CRISPR-Cas9 to study the function of some genes that we could not address with RNAi. In collaboration with Dr. Takaaki Daimon (Kyoto University, Japan) we developed a protocol to do the direct parental CRISPR (DIPA-CRISPR) in *B. germanica* letting us edit the genome of this cockroach Cell Report Methods. 2022; 2, 100215. DOI: 10.1016/j.crmeth.2022.100215. My research to understand insect oogenesis continues resulting in seven publications in the last five years, including a review with the results generated in *B. germanica* (Adv. Insect Physiol. 2024; 66:1-47. DOI: 10.1016/bs.aiip.2024.03.001; see the complete list in <https://insectreproduction-ibe.csic.es/>). The regulatory role that small RNAs play in insect oogenesis has become increasingly relevant and the research we are carrying out reveals the possibility of being a new type of molecule that could be used as specific insecticides. It was in this context that we developed the PID2021-122316OB-I00 project, which has led to results attracting the attention of different companies. Currently, I coordinate or participate in 3 contracts with three National companies: Diater, Allergen Servilab S.L., and Mylva S.L. In collaboration with Mylva, AGAUR financed an Industrial Doctorate that I co-supervised.

In my scientific career, I have supervised 13 PhD students and 12 Master students, and I have participated in 32 national and international financed research projects. As a result, I have published 121 scientific papers in SCI journals, and 115 in peer-reviewed journals and I have presented 112 communications to the National and international Congresses. I maintain active collaborations with different research groups, both at the national and international levels, as evidenced by the co-authors of my publications (<https://insectreproduction-ibe.csic.es/>).

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (see instructions)

1. Belles, X., Maestro, J.L., Piulachs, M.D. (2024). The German cockroach as a model in insect development and reproduction in an endocrine context. **Advance of Insect Physiology**. 66:1.
2. Rumbo, M., Pagone, V., Piulachs, M.D. (2023). Diverse functions of the ecdysone receptor (EcR) in the panoistic ovary of the German cockroach. **Insect Biochemistry and Molecular Biology** 156 (2023) 103935.

3. Shirai, Y., Piulachs, M.D., Belles, X., Daimon, T. (2022). DIPA-CRISPR is a simple and accessible method for insect gene editing. **Cell Report Methods**.2, 100215. And Cover Image. DOI: 10.1016/j.crmeth.2022.100215.
4. Montañés, J.C., Rojano, C., Ylla, G., Piulachs, M.D., Maestro, J.L. (2021). siRNA enrichment in Argonaute 2-depleted *Blattella germanica*. **BBA - Gene Regulatory Mechanisms** 1864 (2021) 194704. DOI: 10.1016/j.bbagrm.2021.194704.
5. Ramos, S., Chelemen, F., Pagone, V., Elshaer, N., Irlles, P., Piulachs, M.D. (2020). Eyes absent in the cockroach panoistic ovaries regulates proliferation and differentiation through ecdysone signalling. **Insect Biochemistry and Molecular Biology** 123. DOI: 10.1016/j.ibmb.2020.103407.
6. Llonga, N., Ylla, G., Bau, J., Belles, X., Piulachs, M.D. (2018). Diversity of piRNA expression patterns during the ontogeny of the German cockroach. **J. Experimental Zoology. Part B: Molecular and Developmental Evolution**. DOI: 10.1002/jez.b.22815.
7. Ylla, G., Piulachs, M.D. and Belles, X. (2018) Comparative Transcriptomics in Two Extreme Neopterans Reveals General Trends in the Evolution of Modern Insects. **iScience** (Cell Press) 4, 164–179. DOI:10.1016/j.isci.2018.05.017.
8. Harrison, M., Jongepier, E., Robertson, H., Belles, X., Korb, J., Bornberg-Bauer, E. (2018) Hemimetabolous genomes reveal molecular basis of termite eusociality. **Nature Ecology & Evolution**. Piulachs position 27/41. DOI: 10.1038/s41559-017-0459-1
9. Rubio, M., Maestro, J.L., Piulachs, M.D., Belles, X. (2018) Conserved association of Argonaute 1 and 2 proteins with miRNA and siRNA pathways throughout insect evolution, from cockroaches to flies. **BBA-Gene Regulatory Mechanisms**. 1861: 554-560. DOI: 10.1016/j.bbagrm.2018.04.001
10. Belles X., Piulachs, M.D. (2015). Ecdysone signalling and ovarian development in insects: from stem cells to ovarian follicle formation. **Biochimica et Biophysica Acta. Gene regulatory mechanisms**.1849, 181–186 Review. DOI:10.1016/j.bbagrm.2014.05.025

C.2. Congress, indicating the modality of their participation (invited conference, oral presentation, poster)

My results have been communicated at 113 National and international conferences. In the last 10 years, I presented 29 communications. Seven of them, were invited conferences.

C.3. Research projects.

1. piRNAs, regulación génica y control de plagas de insectos. (2022-2025). Financiado por Agencia Estatal de Investigación (PID2021-122316OB-I00). INVESTIGADOR PRINCIPAL: M. Dolors Piulachs
2. Control no contaminante de plagas de cucarachas eliminando sus simbiontes esenciales PROYECTOS DE TRANSICIÓN ECOLÓGICA Y TRANSICIÓN DIGITAL 2021. Financiado por ministerio de Ciencia e Innovacion y Next generation EU(TED2021-130489B-I00). INVESTIGADORES PRINCIPALES: José Luis Maestro and Xavier Belles.
3. Estrategias sustentables para el control de insectos invasivos de interés agrícola y urbano (CÓDIGO FOVI230149). Fomento a la vinculación internacional para instituciones de investigación convocatoria 2023, Financiado por Agencia Nacional de Investigación y Desarrollo (ANID) CHILE. INVESTIGADOR PRINCIPAL: Paula Irlles.
4. Functional roles of somatic piRNAs and their evolution. Financiado por: Le National Science Centre (Poland). Sonata 17. 2022-2025. INVESTIGADOR PRINCIPAL: Guillem Ylla. Referencia 2021/43/D/NZ2/0322. Con la participación de M. Dolors Piulachs
5. Ayudas extraordinarias para la preparación de proyectos 2019. (2020-2021) Código: 2019AEP028 Financiado por el CSIC. INVESTIGADOR PRINCIPAL: M.Dolors Piulachs
6. RNAi "a la carta" para el control de cucarachas (2017-2020). Código CGL2016-76011-R. Financiado por el MINECO. INVESTIGADORES PRINCIPALES: M.Dolors Piulachs and Jose Luis Maestro.

C.4. Contracts, technological or transfer merits,

- Identificación de ácaros con herramientas moleculares. Active from July 2021 to July 2022. Company: Diater. Researcher responsible: M. Dolors Piulachs. CSIC number: 225555.
- Cría y suministro de *Blattella germanica*, *Periplaneta americana* y *Blatta orientalis*. May 2021 to Mayo 2022. Company: Allergen Servilab, SL. Researcher responsible: M. Dolors Piulachs. CSIC number: 223462
- Desenvolupament de noves tecnologies insecticides contra plagues urbanes basades en biomolècules. Ayuda para colaboración entre Mylva S.A. y el IBE-CSIC, para la Financiación de un contrato predoctoral- doctorados industriales (DI-2021_AGAUR_IBE). Researcher responsible: Jose Luis Maestro. CSIC number: 227339

C.5. Institutional responsibilities and memberships of scientific societies in the last 10 years.

- From March 2023 Special Content Editor for Journal Insect Physiology (Elsevier).
- From July 2018 member of the Praesidium of the European Congress of Entomology.
- Coordinator of the Functional Genomics and Evolution program at IBE (From 2008 to 2016).
- Spanish Co-Delegate for the Management Committee of the EU COST-Action “Modifying plants to produce interfering RNA”, (2016-2019).
- Participation in the German Cockroach Genome Project (2016-2018) (<https://www.hgsc.bcm.edu/arthropods/german-cockroach-genome-project>).
- Member of the Editorial Board of the SCI journals: Frontiers in Endocrinology (Review Editor), and Journal of Insect Physiology.
- Guest editor of a special issue of Current Opinions in Insect Science, entitled “Insect Oogenesis”, published in February 2019.
- Grant Evaluator for ANEP, NSF, and AEI among others.
- Reviewer for 22 SCI journals.
- Member of 6 qualifying juries in selective processes managed by the CSIC.
- Member of the jury in the Jaume I award (in 2016, 2019, 2020, and 2021 editions). Section Environmental Protection.
- Participant in the EU COST Action “Modifying plants to produce interfering RNA”, (2016-2019).