

CV Date	03/05/2024
---------	------------

Part A. PERSONAL INFORMATION

First Name	Maria del Carmen		
Family Name	Muñoz Marin		
Sex	Female	Date of Birth	08/12/1985
ID number Social Security, Passport	30979437r		
URL Web			
Email Address	b32mumam@uco.es		
Open Researcher and Contributor ID (ORCID)	0000-0001-5075-8619		

A.1. Current position

Job Title	Profesora Ayudante Doctor		
Starting date	2022		
Institution	Universidad de Córdoba, Spain		
Department / Centre	Bioquímica y Biología Molecular / Departamento de Bioquímica y Biología Molecular		
Country		Phone Number	
Keywords			

A.2. Previous positions (Research Career breaks included)

Period	Job Title / Name of Employer / Country
2021 - 2022	Profesora Sustituta Interina / Universidad de Córdoba
2019 - 2021	Marie Curie Postdoctoral Researcher. Integration / European Union (Marie Curie IF-RI)
2019 - 2019	Postdoctoral Researcher / Universidad de Córdoba
2017 - 2019	Postdoctoral Researcher / Universidad de Córdoba
2016 - 2017	Postdoctoral Researcher / Universidad de Córdoba (Marie Curie Fellowship IOF)
2016 - 2016	Postdoctoral Researcher / University of Santa Cruz, California, UE / United States of America
2014 - 2016	Postdoctoral Researcher in the University of Santa Cruz (California) / Universidad de Córdoba, Spain (Marie Curie Fellowship IOF) / United States of America
2014 - 2014	Titulada Superior / Universidad de Córdoba, Spain
2012 - 2012	Titulada Superior / Universidad de Córdoba, Spain
2011 - 2012	Titulada Superior / Universidad de Córdoba, Spain
2011 - 2011	Titulada superior / Universidad de Córdoba, Spain / Spain
2010 - 2011	Licenciada / Universidad de Córdoba, Spain
2009 - 2010	Diplomada / Universidad de Córdoba, Spain

A.3. Education

Degree/Master/PhD	University / Country	Year
Programa Oficial de Doctorado en Biociencias y Ciencias Agroalimentarias	Universidad de Córdoba / Spain	2013

Part B. CV SUMMARY

Degree in Biochemistry (2003-2008) at the University of Córdoba, Spain. I began my scientific career in 2004 as an undergraduate student at the Department of Biochemistry and Molecular Biology in the Faculty of Veterinary Medicine of the University of Córdoba. I did a Ph.D. with International Mention in the same Department (2009-2013). During my Ph.D. I made

several stays: one at the National Oceanography Centre in Southampton (United Kingdom) for three months with the objective to study new techniques related to the Oceanography; an oceanographic cruise for two months in the Atlantic Ocean and finally 11 months at the Institute of Vegetal Biochemistry and Photosynthesis in Seville (IBVF). Thanks to these collaborations, I published the article “Prochlorococcus can use the Pro1404 transporter to take up glucose at nanomolar concentrations in the Atlantic Ocean” in one of the most prestigious international journals, Proceedings of the National Academy of Sciences of the USA (PNAS), in 2013. This article received an F1000 Prime Recommendation, and moreover, I got the research prize “Jacobo Cárdenas Torres 2014-2015” at the University of Córdoba. One month after I defended my Ph.D., I got the Individual Marie Curie International Outgoing Fellowship (IOF) to start a postdoc in Marine Microbiology at the University of Santa Cruz (California), under the supervision of Prof. J. Zehr, for two and a half years. During this period, I made several stays in other institutions in United States and I published four articles categorized in the first quartile and one in the first decile. Moreover, two of them as a corresponding author. The Marie Curie Fellowship gave me the opportunity to come back to the University of Córdoba for one year more to take advantage of the knowledge learned during my postdoc. One year later, I got another Individual Marie Curie Fellowship (RI), opening a novel research line on marine vesicles in Synechococcus. These European projects helped me gaining experience in the leadership and management of projects. I also promoted new international collaborations with Dr. S. Biller and Prof. S.W. Chisholm (Massachusetts Institute of Technology), where I was working for 2 months learning experimental approaches to study marine vesicles. Last year I got two projects as Principal Investigator working in my new line of research in marine vesicles and I

started to work as an Assistant Professor at the University of Córdoba (temporal contract). Furthermore, I have mentored final projects of Master and Degree students since 2012, reviewed an International PhD and I started to mentor my first PhD student working in my new line “Interactions between cyanobacteria mediated by vesicles and nanotubes”. From 2009 I am also carrying out outreach activities, organizing and attending to national and international conferences and I wrote 9 book chapters. Since 2017, I participate in the Multilingualism Plan in the University of Córdoba, teaching Biochemistry in English in the degrees of Veterinary Medicine and Food Science and Technology and attending innovative teacher training. Recently, I have been awarded with the I3 distinction from the Spanish Ministry of Universities and got funded my first national project.

Part C. RELEVANT ACCOMPLISHMENTS

C.1. Most important publications in national or international peer-reviewed journals, books and conferences

AC: corresponding author. (n° x / n° y): position / total authors. If applicable, indicate the number of citations

- 1 Scientific paper.** Muñoz-Marín, María Del Carmen; Luque-Romero, Ignacio; Zubkov, Mikhail; Hill, Polly G.; Díez-Dapena, Jesús; García-Fernández, José Manuel. 2013. Prochlorococcus can use the Pro1404 transporter to take up glucose at nanomolar concentrations in the Atlantic Ocean. National Academy of Sciences. Proceedings. 110-21, pp.8597-8602. ISSN 0027-8424.
- 2 Scientific paper.** Elisa Angulo Cánovas; Ana Bartual; Rocio López Igual; et al; María del Carmen Muñoz Marín. 2024. Direct interaction between marine cyanobacteria mediated by nanotubes. Science Advances. In press.
- 3 Scientific paper.** 2024. Mixotrophy in cyanobacteria. Current Opinion in Microbiology. 78-102432.
- 4 Scientific paper.** María del Carmen Muñoz Marín; Jonathan Magasin; Jonathan P. Zehr. 2023. Open strains of the N₂-fixing cyanobacterium UCYN-A exhibit distinctive transcriptional response to those of coastal strains. Plos One. 18-5 (e0272674).

- 5 **Scientific paper.** María del Carmen Muñoz Marín; Solange Duhamel; Karin M. Björkman; Jesús Diez Dapena; David M Karl; José Manuel García Fernández. 2022. Diel variability in glucose uptake by natural populations of *Prochlorococcus* in the North Pacific subtropical gyre. *Microbiology Spectrum*. 10-5: e02466-22.
- 6 **Scientific paper.** 2022. Mixotrophy in depth. *Nature Microbiology*. 7-1949-1950.
- 7 **Scientific paper.** Jose Angel Moreno Cabezuelo; María del Carmen Muñoz Marín; Antonio López Lozano; et al; José-Manuel García Fernández. 2022. Production, homology and mutagenesis studies on GlcH glucose transporter from *Prochlorococcus* sp. strain SS120. *BBA Bioenergetics*. 1864-2.
- 8 **Scientific paper.** Jesús Díez; Antonio López Lozano; Maria Agustina Dominguez Martín; Guadalupe Gómez Baena; María del Carmen Muñoz Marín; Yésica Melero Rubio; José Manuel García Fernández. 2022. Regulatory and metabolic adaptations in the nitrogen assimilation of marine picocyanobacteria. *FEMS Microbiology*. 47-1.
- 9 **Scientific paper.** ; Steven Biller; María del Carmen Muñoz Marín; Steve Lima; J Matinha Cardoso; P. Tamagnini; Paolo Oliveira. 2021. Isolation and Characterization of cyanobacterial Extracellular vesicles. *Journal of Visualized Experiments (JOVE)*. e63481.
- 10 **Scientific paper.** María del Carmen Muñoz Marín; Guadalupe Gómez Baena; Antonio López Lozano; Jose Angel Moreno Cabezuelo; Jesús Díez; José Manuel García Fernández. 2020. Mixotrophy in marine picocyanobacteria: use of organic compounds by *Prochlorococcus* and *Synechococcus*. *ISME Journal*. Springer Nature. <https://doi.org/10.1038/s41396-020-0603-9>
- 11 **Scientific paper.** Cornejo-Castillo, F; Muñoz-Marin, MC; Turk-Kubo, K; Farnelid, H.M; Acinas, S; Zehr, J.P. 2019. UCYN-A3, a newly characterized open ocean sublineage of the symbiotic N₂-fixing cyanobacterium *Candidatus Atelocyanobacterium thalassa*. *Environmental Microbiology*. 21-1, pp.111-124. <https://doi.org/doi:10.1111/1462-2920.14429>
- 12 **Scientific paper.** Muñoz-Marin, MC; Shilova, IN; Shi, T; Farnelid, HM; Ana Maria Cabello; Zehr, JP. 2019. A transcriptional cycle suited to daytime N₂ fixation in the unicellular cyanobacterium *Candidatus Atelocyanobacterium thalassa* (UCYN-A). *mBio*. 10-e02495-18. <https://doi.org/doi:10.1101/469395>
- 13 **Scientific paper.** Muñoz-Marin, MC; Gómez-Baena, G; Díez, J; Beynon, JR; Zubkov M.V; García-Fernández, JM. 2017. Glucose uptake in *Prochlorococcus*: diversity of kinetics and effects on the metabolism. *Frontiers Microbiology*. 8-327.
- 14 **Scientific paper.** Jonathan P.Zehr; Irina N. Shilova; Hanna M. Farnelid; Maria del Carmen Muñoz-Marin; Kendra A. 2016. Unusual marine unicellular symbiosis with the nitrogen-fixing cyanobacterium UCYN-A. *Nature Microbiology*. *Nature*. 2-16214, pp.1-10.
- 15 **Scientific paper.** Hanna Farnelid; Kendra Turk-Kubo; María del Carmen Muñoz-Marin; Jonathan P. Zehr. 2016. New insights into the ecology of the globally significant uncultured nitrogen-fixing symbiont UCYN-A. *Aquatic Microbial Ecology*. 77, pp.125-138.
- 16 **Scientific paper.** López-Lozano, A; Gómez-Baena, G; Muñoz-Marin, M.C; Rangel, O.A; Díez, J; García-Fernández, J.M. 2009. Expression of genes involved in nitrogen assimilation the C/N balance sensing in *Prochlorococcus* sp. strain SS120. *Gene Expression*. 14, pp.279-289. ISSN 1052-2166.

C.3. Research projects and contracts

- 1 **Project.** PID2022- 141370NAI00- Vesicles and nanotubes-mediated communication between marine cyanobacteria. María del Carmen Muñoz Marín. (Universidad de Córdoba). 01/09/2023-31/08/2026. 125.000 €.
- 2 **Project.** TED2021- 129142BI00-Efectos del calentamiento global sobre aspectos ecológicos clave de las cianobacterias marinas *Prochlorococcus* y *Synechococcus*. José Manuel García Fernández. (Universidad de Córdoba). 01/12/2022-30/11/2024. 207.000 €.
- 3 **Project.** TRANSPORTADORES DE ALTA AFINIDAD COMO MECANISMOS ADAPTATIVOS CLAVE EN EL ÉXITO ECOLÓGICO DE LAS PICOCIANOBACTERIAS MARINAS. José Manuel García Fernández. (Universidad de Córdoba). 05/10/2021-31/03/2023. 75.570 €.
- 4 **Project.** 1380795-F- Comunicación entre bacterias marinas mediante vesículas. María del Carmen Muñoz Marín. (Universidad de Córdoba). 01/01/2022-31/12/2022. 39.700 €.

- 5 Project.** Interacciones de cianobacterias marinas mediadas por vesículas. UCOIMPULSA. María del Carmen Muñoz Marín. (Universidad de Córdoba). 01/06/2021-31/05/2022. 5.000 €. Principal investigator.
- 6 Project.** H2020-MSCA-IF- 2018-RI-844891, VESYNECH - Determination of bacterial vesicles interactions in the most abundant marine cyanobacteria and its potential applications. European Commission, H2020-MSCA-IF- 2018-RI-844891. (Universidad de Córdoba (Spain)). 15/04/2019-14/04/2021. 160.932,48 €.
- 7 Project.** Evaluación de metales pesados Cu⁺², Cd⁺², Pb⁺², Zn⁺² en músculo, agua, y sedimento, y microbioma del camarón de cultivo y silvestre (*Penaeus vannamei*) en el estuario del río Chone, cuenca baja del río Jama, y piscinas camaroneras de la zona sur del país. Ines Malo Cevallos. (Universidad Politécnica Salesiana (UPS) y Universidad Técnica de Manabí (UTM), Ecuador). 01/05/2019-01/05/2020.
- 8 Project.** BFU2016-76227-P, High affinity transport and other adaptive mechanisms in marine cyanobacteria. Spanish Ministry of Economy and Competitiveness. (Universidad de Córdoba). 01/01/2017-31/12/2019. 139.150 €.
- 9 Project.** FP7-PEOPLE-2013-IOF proposal 625188, Analyzing metabolism in an unusual nitrogen fixing symbiosis using metatranscriptomics. European Commission, FP7-PEOPLE-2013-IOF proposal 625188. (Universidad de Santa Cruz, California (UE) y Córdoba (Spain)). 19/05/2014-19/11/2017. 255.243 €.
- 10 Project.** BFU2009-08008, Glucose utilization and adaptive and control mechanisms in the metabolism of nitrogen and carbon in *Prochlorococcus*. Otros programas del Plan Nacional I+D, Ministerio de Ciencia y Tecnología. (Universidad de Córdoba). 01/01/2010-2013. 151.250 €.
- 11 Project.** P07-CVI-3055, Keys of the ecologic success of the marine cyanobacteria *Prochlorococcus*: proteome and gene expression studies focused on the nitrogen and carbon metabolism. Junta de Andalucía-Excellence Projects. (Universidad de Córdoba). 01/02/2008-2012. 84.000 €.
- 12 Project.** P12-BIO-2141, Organic carbon utilization and nitrogen and carbon metabolism in the marine cyanobacteria *Prochlorococcus* and *Synechococcus*. Proyectos de Excelencia de la Junta de Andalucía, 2012. (Universidad de Córdoba). From 01/09/2014. 266.144 €.
- 13 Project.** BFU2013-44767, Carbon and nitrogen metabolism in marine cyanobacteria: use of glucose and diversity of regulatory mechanisms. Spanish Ministry of Economy and Competitiveness. (Universidad de Córdoba). From 01/01/2014. 157.300 €.