

CURRICULUM VITAE ABREVIADO (CVA)

Part A. PERSONAL INFORMATION

<i>First name</i>	María		
<i>Family name</i>	Gómez Vicentefranqueira		
<i>Gender</i>	Female	<i>Birth date</i>	02/11/1969
<i>ID number</i>	03848921D		
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<i>Open Researcher and Contributor ID (ORCID)</i>	0000-0002-3266-7999		

A.1. Current position

<i>Position</i>	PI Functional Organization of the Genome group		
<i>Initial date</i>	01/09/2010		
<i>Institution</i>	Consejo Superior de Investigaciones Científicas		
<i>Department/Center</i>	CBMSO	Centro de Biología Molecular Severo Ochoa	
<i>Country</i>	Spain	<i>Phone</i>	911964724
<i>Key words</i>	Genome biology, DNA replication, chromatin, nucleosomes, epigenetics, transcription, genomic stability, histones		

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

<i>Period</i>	<i>Position/Institution/Country/Interruption cause</i>
1994-1998	PhD Fellow / Institute of Microbiology and Biochemistry (CSIC-University of Salamanca, Spain)
1998-1999	Postdoctoral Fellow / Institute of Microbiology and Biochemistry (CSIC-University of Salamanca, Spain)
2000-2004	Postdoctoral Scientist (<i>EMBO Fellow, Marie Curie Fellow, HSPO Fellow</i>) / MRC Clinical Sciences Centre, London, UK
2004-2009	Junior PI (<i>Ramón y Cajal Researcher</i>) / Institute of Functional Biology and Genomics (CSIC-University of Salamanca, Spain)
5/2007-8/2007	Maternity leave (4 months)
2009-2010	Tenured PI (<i>Científico Titular CSIC</i>) / Institute of Functional Biology and Genomics, IBFG (CSIC-University of Salamanca, Spain)
10/2009-12/2009	Maternity leave (4 months)
10/2010-Present	Tenured PI (<i>Científico Titular CSIC</i>) / Centro de Biología Molecular Severo Ochoa, CBMSO (Madrid, Spain)
1/2014-3/2014	Illness leave (breast tumor treatment; 3 months)
7/2019-12/2019	Sabbatical stay at the Human Genetics Unit, HGU (MRC-University of Edinburgh, UK)

A.3. Education

<i>PhD, Licensed, Graduate</i>	<i>University/Country</i>	<i>Year</i>
Degree in Biology	University of Salamanca / Spain	1992
Masters in Biology	University of Salamanca / Spain	1993
PhD in Biology	University of Salamanca / Spain	1998

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

I received my PhD Degree in Biology from the University of Salamanca in June 1998, studying the genomic localization of DNA replication origins in human cells and in *Schizosaccharomyces pombe*, under the supervision of Dr. Francisco Antequera. We showed that in both systems replication initiation occurs with high frequency at promoter regions, although the processes were independent from each other. These findings have been highly relevant in the DNA replication field, and together have been cited 518 times. In January 2000,



I joined the laboratory of Prof. Neil Brockdorff at the CSC (London, UK) as postdoctoral researcher supported by EMBO, Marie Curie and Human Frontiers Fellowships, to study the impact of epigenetic changes in DNA replication regulation. We showed that the DNA methylation and silencing chromatin modifications of the inactive X-chromosome affect the timing, but not the activity of DNA replication origins. These unexpected findings opened new ways of thinking on epigenetic regulation beyond gene expression, and together have been cited 129 times. Afterwards I got a “Ramón y Cajal” position and moved to the IBFG (CSIC-USAL) as junior PI in July 2004. There I started my own research line focus in understanding the interplay between DNA replication, transcription and chromatin in regulating genome function. This continues to be the general interest of my lab since I obtained a tenured position at the CSIC and moved to the CBMSO in September 2010.

The most relevant scientific achievements from my laboratory “Functional Organization of the Genome” are:

- Unveiling a novel regulatory mechanism of replication initiation generating short dsDNA fragments derived from the nucleosome-free region at replication origins (Gómez and Antequera, 2008. *GenesDev*). Recommended in *Faculty Opinions* (score 23.1): (<https://doi.org/10.3410/f.1099354.555590>) (<https://doi.org/10.3410/f.1099354.556477>) (<https://doi.org/10.3410/f.1099354.561023>)
- First genomic mapping of DNA replication origins in mESCs (Sequeira-Mendes et al, 2009. *PLoS Genet*). Pioneer work in the field published with an accompanying paper in the same issue (<https://doi.org/10.1371/journal.pgen.1000454>)
- First high-resolution determination of the nucleosome architecture of mammalian replication origins (Lombraña et al. 2013. *EMBO J*).
- Determination that transcription dynamics is the driving force of the organization of replication initiation in the genome of the human parasite *Leishmania major* (Lombraña et al., 2016. *Cell Rep*)
- First demonstration that chromatin conformation regulates the coordination between DNA replication and transcription (Almeida et al., 2018. *Nat Comm*). Recommended in *Faculty Opinions* (score 18.5): (<https://doi.org/10.3410/f.733101286.793549635>) (<https://doi.org/10.3410/f.733101286.793549795>)
- Uncovering an unexpected regulatory role of histone H1 on lncRNA turnover on chromatin necessary to maintain genome stability (Fernández-Justel et al., 2022 *Cell Rep*).
- First study of the 3D organization of DNA replication origins in mESCs (Jodkowska et al., 2022. *NAR*). Recommended in *Faculty Opinions* (score 9.2): (<https://doi.org/10.3410/f.742432563.793597245>)

The results from my lab contributed to put forward the notion of the complex interdependency between the processes of DNA replication, genomic transcription and chromatin structure to maintain genome’s performance, which is at the core of our research projects. Our findings resulted in invitations to participate as speaker at international meetings not only in the DNA replication field (CSHL: DNA replication and Genome Maintenance, 2017), but also in the chromatin regulation and epigenetic fields (KAUST, 2020; EMBO Workshop 2020), and to perform a 6-months sabbatical stay at the HGU, 2019. They also allowed me to establish several international collaborations to apply for European funds: the participation as co-coordinator in the consortium *RepliFate*, funded in the last HORIZON-MSCA-DN-2021 call (GA101072903) (www.replifate.eu), and the participation in an ERC Synergy proposal together with Dra. Sara Buonomo (University of Edinburgh, UK) and Dr. Dave Gilbert (San Diego Biomedical Research Institute, USA) that we intend to submit to the next call in November 2023.

I have trained several scientists along these years; directed 8 PhD Theses (4 already defended, 1 to be defended in March 2023, and 3 in process), 11 Master Theses, 12 Degree Theses, 2 JAE-Intro Fellowships, 6 Erasmus Students and several summer/sort term students. The four doctors graduated from the lab have successfully continued their professional careers in the health system, academia or industry: one is a Medical Doctor, two hold preeminent positions in Pharmaceutical Companies and the fourth one is a Postdoctoral Researcher at Dr.



Maite Huarte laboratory (CIMA, Spain). Many of the lab alumni also moved to prestigious research centers to continue their career steps. I'm also actively involved in raising the interests of the new generations in Science, organize laboratory classes and give talks to primary and secondary school students yearly at the Italian School in Madrid and participate in the AEAC/CSIC program Cientific@s en Prácticas (<https://aeac.science/actividad/cientifics-en-practicas/>).

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (last 10 years, 10 selected papers) * *indicates corresponding author.*

- Jodkowska, K., Pancaldi, V., Almeida, R., Rigau, M., Fernández-Justel, JM., Graña, O., Rubio, M., Rodríguez-Acebes, S., Carrillo, E., Pisano, D., Al-Sharour, F., Valencia, A., **Gómez, M*** and Méndez, J*. 2022. 3D chromatin connectivity underlies replication origin efficiency in mouse embryonic stem cells. *Nucl. Acids. Res* 50:12149-12165. *CO-CORRESPONDING AUTHORS.
- Fernández-Justel, JM., Santa-María, C., Martín-Vírgala, S., Ramesh, S., Ferrera-Lagoa, A., Salinas-Pena, M., Isoler-Alcaraz, J., Maslon, MM., Jordan, A., Cáceres, J and **Gómez, M***. 2022. Histone H1 regulates non-coding RNA turnover in chromatin in a m6A-dependent manner. *Cell Rep* 40: 111329.
- Gallego, A., Fernández-Justel, JM., Martín-Vírgala, S., Maslon, MM. And **Gómez, M***. 2022. Slow RNAPII transcription elongation rate, low levels of RNAPII pausing, and elevated histone H1 content at promoters associate with higher m6A deposition on nascent mRNAs. *Genes* 13: 1652.
- Massip, F., Laurent, M., Brossas, C., Fernández-Justel, JM., **Gómez, M.**, Prioleau, MN., Duret, L. and Picard, F. 2019. Evolution of Replication Origins in Vertebrate Genomes: Rapid Turnover Despite Selective Constraints. *Nucl. Acids. Res* 47: 5114-5125.
- Almeida, R., Fernández-Justel, J. M., Santa-María, C., Cadoret, J. C., Cano-Aroca, L., Lombrana, R., Herranz, G., Agresti, A., and **Gómez, M***. 2018. Chromatin conformation regulates the coordination between DNA replication and transcription. *Nat Comm.*, 9: 1590.
- Lombrana, R., Álvarez A, Fernández-Justel, J. M., Almeida, R., Poza-Carrión, C., Gomes, F., Calzada, A., Requena, J. M., and **Gómez, M***. 2016. Transcriptionally driven DNA replication programme of the human parasite *Leishmania major*. *Cell Rep* 16: 1774-1786.
- Lombrana, R., Almeida, R., Álvarez, A. and **Gómez, M***. 2017. R-loops and DNA replication initiation in mammalian cells: a missing link? *Frontiers in Genet* 6: 1-7.
- Ayuda-Durán, P., Devesa, F., Gomez, F., Sequeira-Mendes, J., Ávila-Zarza, C., **Gómez, M.** and Calzada, A. 2014. The CDK regulators Cdh1 and Sic1 promote efficient usage of DNA replication origins to prevent chromosomal instability at a chromosome arm. *Nucl Acids Res* 42: 7057-7068.
- Lombrana, R., Almeida, R., Revuelta, I., Madeira, S., Herranz, G., Sainz, N., Bastolla, U. and **Gómez, M***. 2013. High-resolution analysis of DNA start sites and nucleosome architecture at efficient mammalian replication origins. *EMBO J* 32: 2631-2644.
- Sequeira-Mendes, J. and **Gómez, M***. 2012. On the opportunistic nature of transcription and replication initiation in the metazoan genome. *Bioessays* 34: 119-125.

C.2. Congress (last 5 years, 10 selected communications)

- **Short talk**, EMBO/EMBL Symposium: The complex life of RNA. 2022. Heidelberg, Germany
- **Invited speaker**, 40^o Meeting of the Spanish Society Biochemistry and Molecular Biology. 2022. Málaga, Spain
- **Invited speaker**, XLII Meeting of the Spanish Society of Genetics. 2021. Madrid, Spain
- **Invited speaker**, EMBO Workshop on Chromatin structure, Organization and Dynamics. 2020. Prague, Czech Republic_ *cancelled due to covid pandemics*

- **Invited speaker**, X Symposium Epigenetics and Chromatin of the Societat Catalana de Biologia. 2020. Barcelona, Spain
- **Invited speaker**, KAUST Research Conference on “Emerging Themes in (epi-) Genome Architecture and Function. 2020. Thwal, Saudi Arabia
- Poster presentation, Conferences Jacques Monod: Genome instability: when RNA meets chromatin. 2019. Roscoff, France
- Poster presentation, EMBO/EMBL Symposium: RNA and genome maintenance: Cooperation and conflict management. 2018. Mainz, Germany
- Poster presentation, EMBO/EMBL Symposium: DNA replication: from basic biology to disease. 2018. Heidelberg, Germany
- **Invited speaker and discussion leader**, Cold Spring Harbor Meeting: Eukaryotic DNA replication and genome maintenance. 2017. Cold Spring Harbor. NY, USA.

C.3. Research projects (last 10 years, selected)

- DNA replication as a driver for cell fate decisions (101072903-RepliFate). European Research Executive Agency. MSCA Doctoral Network | Horizon Europe (HORIZON-MSCA-2021-DN-01). Participant (PI: Emilio Lecona). 2022-2026; 2.650.000€ total network; 313.604€/grupo María Gómez Vicentefranqueira
- Replication-transcription crosstalk and its impact on genome homeostasis (PID2019-105949GB-I00). Ministry of Science, Innovation and Universities | Proyectos Excelencia. PI: María Gómez Vicentefranqueira. 2020-2023; 210.000€
- Replication-transcription crosstalk and its impact on genome homeostasis (2019AEP004). Ministry of Science, Innovation and Universities | Ayuda Extraordinaria CSIC. PI: María Gómez Vicentefranqueira. January-May 2020; 15.979€
- Epigenetic engineering to evaluate replication-transcription conflicts and their consequences on genomic instability (PRX19/00293). Ministry of Science, Innovation and Universities | Becas Movilidad Salvador de Madariaga. PI: María Gómez Vicentefranqueira. July-December 2019; 19.620€
- Molecular basis of the immune deficiency in Wolf-Hirschhorn syndrome 4p- (RA2016). Ramón Areces Foundation | Rare diseases. Co-IPs: César Cobaleda Hernández and María Gómez Vicentefranqueira. 2017-2018; 120.000€
- Dynamic Interplay between Chromatin Structure, DNA Replication and Transcription Elongation to Maintain Genome Stability (BFU2016-78849-P). Ministry of Economy and Competitiveness | Proyectos Excelencia. PI: María Gómez Vicentefranqueira. 2017-2019; 181.500€

C.4. Others: Organization of I+D activities (last five years):

- Co-organizer of the Symposium of the MSCA Doctoral Network “RepliFate: DNA replication at the heart of cell fate decisions and cancer development” 21st-22nd November 2022. CBMSO. Madrid, Spain.
- Scientific Coordinator of the “Regulation of Gene Expression and Genome Dynamics” group of the Spanish Society of Biochemistry and Molecular Biology (SEBBM), since 2021-present.
- Co-organizer of the 2nd Epigenetics Mini-Symposium at the CBMSO: “From mechanisms to disease: epigenetics”. February 2020. Madrid, Spain.
- Junior Ambassador SEBBM 2016-2020.
- Member of the “Excellence Network” *Chromodyst* (2017-2019)_Pending renewal
- Coordination of chapter 5 of the CSIC Scientific Challenges Initiative: “Functional epigenetics and epitranscriptomics and their role in health and disease” by Ángel Barco and María Gómez. 2020. Vol 3: Genome and Epigenetics. CSIC Scientific Challenges: Towards 2030, p103-121 (<http://hdl.handle.net/10261/251445>).
- Guest editor *Genes* Special Issue “Epigenetics and Epitranscriptomics crosstalk”. 2022 (https://www.mdpi.com/journal/genes/special_issues/Epigenomics_Epitranscriptomics)
- Participation in the IX National Genetics Course of the Spanish Genetics Society (CNG2023): Structure, Function and Evolution of the Genome (<http://wwwuser.cnb.csic.es/cng2023/>)