

CURRICULUM VITAE ABREVIADO (CVA)**IMPORTANT** – The Curriculum Vitae cannot exceed 4 pages. Instructions to fill this document are available in the website.**Part A. PERSONAL INFORMATION**

First name	Aura		
Family name	Carreira Moreno		
Gender (*)	Mujer	Birth date (24/10/1975)	
Social Security, Passport, ID number	08932625T		
e-mail	acarreira@cbm.csic.es	URL Web	https://www.cbm.uam.es/acarreiralab
Open Researcher and Contributor ID (ORCID) (*)	0000-0001-5489-4343		

(*) *Mandatory***A.1. Current position**

Position	Investigador Científico CSIC / Group leader CBMSO		
Initial date	17-Dec-2021		
Institution	Centro de Biología Molecular Severo Ochoa CSIC-UAM		
Department/Center	Genome Dynamics and Function /CBMSO		
Country	Spain	Teleph. number	+34911964497
Key words	Genome integrity; Breast Cancer; Homologous Recombination; BRCA2; Variants of uncertain clinical significance		

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

Period	Position/Institution/Country/Interruption cause
2017-2021	senior group leader DR2 CNRS at Institut Curie/France
2011-2016	junior Group leader CR1 CNRS at Institut Curie/France

A.3. Education

PhD, Licensed, Graduate	University	Year
PhD	CBMSO Autonomous University of Madrid, SP	2005
B.Sc.	Alcala University, SP	1998

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

Our lab interrogates the cellular mechanisms deployed to preserve genome integrity through the lenses of BRCA2 tumor suppressor protein. This model has allowed us to shed light on the link between genome instability and cancer.

Combining biochemistry, cell biology, proteomics and missense variants identified in breast cancer patients as a genetic tool, we have shed light into the mechanisms involved in preserving chromosome stability such as DNA repair by homologous recombination (HR) with the discovery of a novel DNA binding domain (von Nicolai *et al.*, *Nature Commun.* 2016), or BRCA2 mediating meiotic recombination (Martinez *et al.*, *PNAS* 2016) (coll. Steve Kowalczykowski, UC Davis, US); We showed that BRCA2 and the RNA helicase DDX5 cooperate to resolve DNA-RNA hybrids at DNA breaks at highly transcribed regions promoting HR (Sessa *et al* EMBOJ 2021) (coll. Andres Aguilera, Cabimer, SP). We have uncovered the involvement of BRCA2 in the repair of ssDNA gaps at stressed replication forks (Vugic *et al.*, 2023); and demonstrated the role of BRCA2 in promoting correct chromosome alignment by stabilizing kinetochore-microtubules attachment (coll. Sophie Zinn-Justin, I2BC, Saclay, FR) (Ehlen *et al.*, *Nature Commun.* 2020). We have contributed to the work that first describes BRCA2 hypomorphic variants conferring increased moderate risk of breast cancer (Shimelis *et al.*, *Cancer Research* 2017), and revealing a first BRCA2 variant that results in hyperrecombination (Alvaro-Aranda, *et al.*, *NAR*, 2023).



Which of the functions of BRCA2, when defective, drive tumor formation is a long-standing question that we are investigating by functional assays and multi-“omics” as illustrated in a recent invited review (Minello & Carreira *JMB* 2023).

My contributions to the scientific community include several reviews and 2 book chapters written with lab members of my group and serving as guest co-editor in two book series: *Methods in Molecular Biology* book entitled: “Homologous Recombination” together with Andres Aguilera (Cabimer, SP) (2021) or a Genes special issue on Mediators of recombination with Sergey Korolev (St Louis Univ. School of Medicine, US) (2021). I have served as reviewer for national and international grants (MRC UK, ANR, FR, Dutch Cancer Society) and of multiple journals (Nature, Mol. Cell, Nature Comm. NAR, PNAS, Science Adv., Cell Reports), as jury member in thesis or HDR (French diploma to direct research) of ~12 fellows, and ~6 thesis committees. I am elected member of Faculty of Opinions since 2017, Member of the jury French Breast Cancer Association Ruban Rose (2018-2022). I have also been elected member of the Scientific Committee of Institut Curie from 2017-2021 and I am currently an elected member of the "Junta" of CBMSO (2023-).

I have given lectures at Masters and PhD courses at Institut Curie, FR, IPBS Toulouse, FR and UAM, Madrid, SP. I co-organize a biannual PhD international course on Genome Instability and Human Disease (5th edition was held in October 2023 at Institut Curie, FR). I have co-organized 2 symposiums, (Gray-Curie Institutes Symposium, 2014 Oxford, UK) and joint Curie-UCSF-QBI symposium at Institut Curie (FR) (2019). I have been invited at international conferences (ex. 5th DNA repair/replication structures and Cancer Conf. Cancun, MX (2022); The GRC on DNA damage, Mutation and Cancer in Ventura, CA, US (2020).

Over the last 10 years we have been supported by national and international funding such as the Worldwide Cancer Research, French Institut of Cancer (INCa), ANR (National Research Association, FR), the Spanish Agency of investigation (AEI), the Spanish Association for Cancer Research (AECC) or the Basser Center for BRCA (Penn. Univ. US). For the achievements of our team I have received the French Bronze medal from CNRS in 2017 and the "Avenir" price from the French Breast Cancer Association in 2018. I was also promoted to Directeur de Recherche (DR2) from CNRS in 2017 and appointed Investigador Científico at CSIC in Dec. 2021.

During the last 10 years, I have directed 8 international PhD students, 5 already defended with honors and 3 are currently ongoing. From those 5, Isaac Dumoulin (FR) is currently a postdoc in Shan Zha lab (Columbia Univ, US), Anna Minello (IT) just defended her thesis (Dec 2023) and is looking for a postdoc position in EU, Domagoj Vugic (CT) works in a Biotech company in Paris. Gaetana Sessa (IT) is working as a Clinical Res. Associate in Milan, and Catharina von Nicolai (DE) did a short postdoc in Thomas Helleday lab at the Karolinska Institute and decided to move to France take a Clinical Res. Associate position in Paris. I have also supervised 12 master students, 11 postdocs and several research assistants.

Our lab is member of the Conexion Cancer CSIC hub and Chromodyst network of excellence coordinated by Felipe Cortes (CNIO, SP) and have been awarded an International Res.Project from CNRS-CSIC (co-coordinator Stephan Vagner, Institut Curie, FR).

Part C. RELEVANT MERITS (sorted by typology)

C.1. Publications (see instructions)

1. Alvaro-Aranda L, Petitalot A, Djeghmoum Y... Carreira A[#] (23/23) (#AC). The BRCA2 R2645G variant increases DNA binding and induces hyper-recombination. ***Nucleic Acids Res.*** 2023 Dec 24;. doi: 10.1093/nar/gkad1222.

2. Minello A, Carreira A. (AC) (2023) BRCA1/2 Haploinsufficiency: Exploring the Impact of Losing one Allele. ***J Mol Biol.*** Sep 14;.168277. doi: 10.1016/j.jmb.2023.168277. **Review**

3. Vugic D, Dumoulin I, Martin C, Minello A, Alvaro-Aranda L, Gomez-Escudero J, Chaaban R, Lebdy R, von Nicolai C, Boucherit V, Ribeyre C, Constantinou A, Carreira A. (#AC) (2023) Replication gap suppression depends on the double-strand DNA binding activity of BRCA2. **Nat Commun.** 14(1):446.

4. Sessa G*, Gómez-González B*, Silva S, ...Aguilera A#, Carreira A# (15/15)(#co-AC). (* equal contribution) (2021) BRCA2 promotes DNA-RNA hybrid resolution by DDX5 helicase at DNA breaks to facilitate their repair. **EMBO J**; 40(7):e106018.

5. D Vugic, À Ehlén, A Carreira# (#AC). (2021): **Book: Homologous Recombination: Monitoring Homologous Recombination Activity in Human Cells** **Methods in Molecular Biology** 2153, 115-126 (invited contribution, co-editor) Humana Press Springer ISBN 978-1-0716-0643-8

6. Ehlén À, Martin C, Miron S, ... Zinn-Justin S#, Carreira A#. (#co-AC) (2020) Proper chromosome alignment depends on BRCA2 phosphorylation by PLK1 **Nat Commun.**;11(1) 1-21

7. Nicolai C, Ehlén À, Martinez JS, Carreira A#. (#AC) (2018): **Book** Chapter 19. *Dissecting the Recombination Mediator Activity of BRCA2 Using Biochemical Methods* (invited contribution) **Methods in Enzymology** v600 479-511 Academic Press Elsevier ISBN: 978-0-12-814429-9

8. Shimelis H*, Mesman RLS*, von Nicolai C*, Ehlen A*, ... David Goldgar*, Aura Carreira* (129/131), Maaiké PG Vreeswijk*, Couch F**; (2017)(* equal contributors) *BRCA2 hypomorphic missense variants confer moderate risks of breast cancer.* **Cancer Res.**, 77(11): 2789-2799.

9. Nicolai C, Ehlén À, Martin C, Zhang X, Carreira A#, (#AC)(2016). *A second DNA binding site in human BRCA2 promotes homologous recombination* **Nat. Commun.**, 7(1) 1-8.

10. Martinez JS*, von Nicolai C*, Kim T, Ehlen A, Mazin AV, Kowalczykowski SC#, and Carreira A# (* equal contribution, #co-AC) (2016) *BRCA2 regulates DMC1-mediated recombination through the BRC repeats* **Proc. Natl. Acad. Sci. USA**; 113(13):3515-20.

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

1. 3rd Chromosomal Instability as Driver of Human Disease October 2023: Dubrovnik, CT(oral presentation)
2. Recombination Mechanisms Conference July 2023 Lisbon, PT (oral presentation)
3. 5th DNA repair/replication structures and Cancer Conf. April 2022: Cancun, MX (invited speaker)
4. Gordon Research Conference: "DNA damage, Mutation and Cancer"; March 2020: Ventura, CA, USA (invited speaker)
5. Jacques Monod Conf.: "Genome Instability: When RNA meets chromatin"; Sept. 2019: Roscoff, FR (invited speaker)
6. QBI-UCSF-Q-life-Curie Symp. "Quantitative approaches to Cancer Research" Sept. 2019 Paris,FR (invited speaker and co-organizer)
7. 13th edition of the French 3R Meeting May 2019; Toulon, FR (invited speaker)
8. Symposium Signalling and Cancer: November 2018; Rennes, FR (invited speaker)
9. EMBO RNA and Genome Maintenance Conference: October 2018: Mainz, DE (oral presentation).
10. 2nd Conference on DNA Replication as a source of DNA damage, July 2017, Rome, IT (oral presentation)

C.3. Research projects, indicating your personal contribution. In the case of young researchers, indicate lines of research for which they have been responsible.



1. 2023-2026: Spanish Foundation for Cancer Research (FC-AECC)(General Projects) Ref: PRYGN234480CARR. Title: "Development of BRCA2-PARP1 interaction inhibitors (B-PI) as chemo-radiosensitizers for homologous recombination proficient breast tumors" (Principal Investigator). Total funded: 291 K€.
2. 2022-2025: Worldwide Cancer Research and FC-ACC grant Ref: 22-0222; Title: "Unveiling mechanisms of tumor formation linked to BRCA2 mutation", (Principal Investigator) Total funded: 229 K€
3. 2021-2025: French National Research Association (ANR-PRC): Ref: ANR-21-CE13-0030 Title: "Centromere crisis: unraveling a novel link between mitotic errors, immune- sensors and senescence"(Partner) Total funded: 37 K€.
4. 2022-2027: International Research Project (IRP) CNRS Ref: IRP2021. Title: "The role of RNA binding activity of DNA repair proteins in replication fork dynamics: Focus on BRCA2" (Co-coordinator) Total funded: 75K€ (CNRS)+28 K€ (CSIC)
5. 2021-2023: AEI (Spanish Agency of Innovation) grant (Principal Investigator) Ref: PID2020-115977RB-I00: Title: "Role of BRCA2 at Challenged Replication Forks" Total funded: 314 K€
6. 2021-2022: Basser Innovation Award (Basser Center for BRCA, Penn. Univ. US) Title: "Understanding breast cancer driver mechanisms in *BRCA2* mutation carriers" (Principal Investigator) Total funded: 75K\$.
7. 2020-2022: La Ligue contre le Cancer (FR) Ref: M33523 Title: "The role of BRCA2 and DDX5 in the resolution of DNA-RNA hybrids" (Principal Investigator) Total funded: 65 K€
8. 2017-2021: ANR PRC French National Research Association Ref: ANR-17-CE12-0016 Title: (Coordinator) "Characterization of a novel DNA binding domain in BRCA2 protein" Total funded for 3 teams: 404 K€
9. 2015-2018: H2020 European grant (PHC-32-2014): Ref: 635290 PanCanRisk. Title: "Personalized bioinformatics for global cancer susceptibility identification and clinical management " (Partner). Total funded for 6 teams: 2,948 K€.
10. 2015-2018: French National Institute of Cancer Res. (INCa) Ref. PRT-K 14 134 Title: "Evaluation of *BRCA2* missense variants of unknown clinical significance to improve genetic counseling" - (Coordinator) Total funded for 3 teams: 411 K€.

C.4. Contracts, technological or transfer merits, Include patents and other industrial or intellectual property activities (contracts, licenses, agreements, etc.) in which you have collaborated. Indicate: a) the order of signature of authors; b) reference; c) title; d) priority countries; e) date; f) Entity and companies that exploit the patent or similar information, if any N/A