

ANDRÉS AGUILERA

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CV

BIO-SKETCH

Spanish, born in 1957 in Larache [Morocco], Full Professor of Genetics (University of Seville) and Director of the Andalusian Centre of Molecular Biology and Regenerative Medicine (CABIMER). PhD in Seville in 1983 with a stay in Solar Energy Research Institute (Denver, CO, USA). After two postdocs in the Darmstadt Technical University (DE) and the NYU Medical Center (USA), he started his lab in late 1990 in the Department of Genetics of the University of Seville, and moved in 2006 to CABIMER as co-founder of the Center. Elected member of EMBO and the Royal Academy of Sciences of Seville, active member of the Scientific Advisory Board of several Centers in Europe and of the Editorial Board of top scientific journals (eLife, EMBO J., EMBO R., MCB, etc.). Holder of several national Scientific Awards (National Prize of Genetics, Carmen & Severo Ochoa, Francisco Cobos, Andalusian Government, etc), he has been awarded prestigious HFSP and ERC-Adv grants, among others. Coordinator of the “Genome Instability” Spanish excellence Network (*since 2007-present*) initiated under the national CONSOLIDER research program, coordinator of the National Research Program on Genetics and Molecular Biology of the Spanish Government (4 years) and of the Biology & Biomedicine Research Area of the Spanish Research Council (CSIC) (2 years)

His research interests are the basis of genome instability and DNA repair. His work was pioneering in identifying the role of RNA, co-transcriptional R-loops and transcription-replication conflicts in genome instability. His lab identified the eukaryotic THO complex and its function in mRNP biogenesis and R-loop prevention, and that of other RNA-binding factors and of chromatin remodelers, such as SWI/SNF, FACT or SIN3A. He has largely contributed to understand R-loop homeostasis and biology as a source of genome instability, transcription-replication conflicts and the repair of replication-born DNA breaks.

Webpage: <http://www.cabimer.es/web3/en/research-groups/genome-instability-cancer/>

EDUCATION AND CURRENT POSITIONS

- Full Professor of Genetics, University of Seville [US] (*since 2004*)
- Director of CABIMER (*since April 1st, 2016*)
- Head of the *Genome Instability* laboratory (F. Biology, **US**, 1991-2006; CABIMER *since 2006*).
- Scientific Responsible of the *Genome Facility* of CABIMER, Seville (*since 2008*)
- Postdoctoral formation in Univ. Darmstadt, DE (2,5 years) and NYU Med Ctr, USA (4 years)
- Research stay in Solar Energy Research Institute, Denver, CO, USA (3 months) during PhD
- PhD in 1983, Department of Genetics, **US**

HONORS AND AWARDS

- 2021 *National Prize of Genetics* (Spanish Society of Genetics)
- 2020 *Bandera de Andalucía* (Andalusian Government)
- 2019 *Gregor J Mendel Medal*, Mendel Lectures, Masary Univ./Mendel Found., Brno, Czech Repub.
- 2019 Prize (National) “*Fundación Francisco Cobos*” on Biomedical Research
- 2017 Elected Member of the *Royal Academy of Sciences of Seville*
- 2016 Research Award “*Javier Benjumea Puigcerver*”, Fund. FOCUS-Abengoa/Univ. Seville
- 2013 *FAMA* Research Award to a “*Research Trajectory*”, **US**
- 2010 *III Columela* Research Award in Health Sciences, Andalusian Government
- 2003 *Carmen & Severo Ochoa* National Research Award for Molecular Biology, Spain
- 2000 Elected EMBO Member
- 1994 Young Investigator Research Award of the *Royal Academy of Sciences of Seville*, Spain
- 1999-2020 Grants ERC Advanced (2015-20) & HFSP (1999-2003)

SCIENTIFIC ACTIVITY AND PUBLICATIONS

- > 215 original articles and reviews in ISI journals.
- H=**63**. Total citations >14,150; 40 articles with ≥ 100 citations (*according to Scopus*).

- Editor of the books *Molecular Genetics of Recombination* (Springer, 2007), *Methods in Molecular Biology on Homologous Recombination*, (Springer-Humana Press, 2020) and *Methods in Molecular Biology on R-loops* ((Springer-Humana Press, *in press*))
- > 15 book-chapters.
- 32 PhD Theses supervised + 6 under supervision; 28 postdoctoral researchers supervised.
- Organizer of 13 International Workshops (1 EMBO/EMBL, 4 EMBO, 2 EURESCO, 2 J March, 2 UNIA, 2 J Monod, 1 CABIMER)
- > 170 Invited conferences in International meetings (GRC, Keystone, FASEB, EMBO, J. Monod, Juan March, ESF/EURESCO, UNIA, R Areces, Abcam...) and Research Centers.
- Member of Editorial Boards of eLife (*since 2016*), EMBO J (s. 2009), EMBO Rep (s. 2009), Mol Cell Biol (s. 2014), Mol Gen Genom (s. 2003), Microb Cell (s. 2014) and Curr Genet (2004-05).

SCIENTIFIC COMMITTEES AND INSTITUTIONAL RESPONSIBILITIES

- Scientific Advisory/Evaluator Boards:
 - Institut of Molecular Biology IMB, Mainz, DE (2021)*
 - Erasmus University Medical Center, Rotterdam, NL (2020)*
 - Centro de Investigaciones Científicas Avanzadas, Coruña, ES (2020-24)*
 - Institute of Molecular Biology IMB, Mainz, DE (2021)*
 - CEITEC (Brno, CZ) (2009-2016),*
 - Institut Université d'Hématologie CNRS/U. Paris, FR (2012-18),*
 - Institut Curie "Genotoxic Stress and Cancer Unit". Orsay, FR (2013-18),*
 - IBMB Barcelona (2014),*
 - CABD, Seville, ES (since 2016),*
 - EMBO Fellowship Committee (2013-17) & EMBO Membership Committee (2003-06),*
 - Barcelona Supercomputing Center (2011-2014),*
 - ICREA Research Professor Program of Catalunya (2006-10),*
 - ATIP-Avenir INSERM, FR (2010),*
 - ANR French Program of Research, FR (2107)*
 - AERES Agency for evaluation of French Research centers, FR (2009,13,14)*
 - Wellcome Trust, UK (2017,18)*
- Coordinator/Director of Spanish Research Program of Molecular & Cell Biology (2001-05)
- Coordinator of Biology & Biomedicine, covering 21 research centers of the Spanish Research Council CSIC (2006-08), and Vice-coordinator (2008-09)
- Coordinator/Responsible of the "Genome Instability" Consolider (2007-13) and Excellence (2013-present) networks in Spain coordinating from 11 to 15 different research groups
- Spanish Representative in the Yeast Genet Mol Biol Fin Pol Committee (*since 2010*)
- Chair of Dept Genetics, University of Seville (2013-16)
- Chair of the Dept. Molecular Biology CABIMER (2006-16)
- Scientific Vice-director of CABIMER (3 years, 2008-09 & 2011-12)
- Vice-president of the Spanish Society of Genetics (2015-2018)
- Professor responsible of >30 Degree and >20 Master or PhD courses (*since 1990*)
- Spain national Representative at the ERC in Horizon Europe 2021-27 (2021)
- External reviewer for ERC, AICR (IT), AECC (IT), ARC (FR), ICREA (CAT), MINECO, NIH-Israel Joint Program, etc.

Former PhD and postdoctoral researchers at present PIs running their own lab:

Félix Prado (CSIC, Sevilla), Sebastián Chávez (IBIS, Sevilla), María Moriel-Carretero (CBRM, Montpellier), Felipe Cortés-Ledema (CNIO, Madrid), Pablo Huertas (CABIMER, Sevilla), Cristina González-Aguilera (Univ Seville), Tatiana García-Muse (CABIMER), Gonzalo Millán-Zambrano (CABIMER).

FULL LIST OF ISI PUBLICATIONS

<https://pubmed.ncbi.nlm.nih.gov/?term=aguilera+andres+OR+aguilera+a+yeast+NOT+Aguilera+AR+NOT+Alexya+NOT+Angeles+OR+aguilera+gomez-gonzalez+pardo&sort=date>

20 SELECTED ORIGINAL PUBLICATIONS (as senior/main author)

1. San Martin-Alonso M, Soler-Oliva ME, García-Rubio M, García-Muse T, **Aguilera A. 2021** Harmful R-loops are prevented via different cell cycle-specific mechanisms. **Nat Commun.** 12(1):4451.
2. Bayona-Feliu A, Barroso S, Muñoz S, **Aguilera A. 2021** The SWI/SNF chromatin remodeling complex helps resolve R-loop-mediated transcription-replication conflicts. **Nat Genet.** 53(7):1050-1063
3. Pérez-Calero C, Bayona-Feliu A, Xue X, Barroso SI, Muñoz S, González-Basallote VM, Sung P, **Aguilera A. 2020.** UAP56/DDX39B is a major cotranscriptional RNA-DNA helicase that unwinds harmful R loops genome-wide. **Genes Dev.** 34(13-14):898-912.
4. Ortega P, Gómez-González B, **Aguilera A. 2019.** Rpd3L and Hda1 histone deacetylases facilitate repair of broken forks by promoting sister chromatid cohesion. **Nat Commun.** 10(1):5178.
5. García-Rubio M, Aguilera P, Lafuente-Barquero J, Ruiz JF, Simon MN, Geli V, Rondón AG, **Aguilera A. 2018.** Yra1-bound RNA-DNA hybrids cause orientation-independent transcription-replication collisions and telomere instability. **Genes Dev.** 32(13-14):965-977.
6. García-Pichardo D, Cañas JC, García-Rubio ML, Gómez-González B, Rondón AG, **Aguilera A. 2017** Histone Mutants Separate R Loop Formation from Genome Instability Induction. **Mol Cell.** 66(5):597-609.
7. Bhatia V, Barroso SI, García-Rubio ML, Tumini E, Herrera-Moyano E, **Aguilera A. 2014.** BRCA2 prevents R-loop accumulation and associates with TREX-2 mRNA export factor PCID2. **Nature** 511(7509):362-5.
8. Herrera-Moyano E, Mergui X, García-Rubio ML, Barroso S, **Aguilera A. 2014.** The yeast and human FACT chromatin-reorganizing complexes solve R-loop-mediated transcription-replication conflicts. **Genes Dev.** 28(7):735-48.
9. Castellano-Pozo M, Santos-Pereira JM, Rondón AG, Barroso S, Andújar E, Pérez-Alegre M, García-Muse T, **Aguilera A. 2013.** R loops are linked to histone H3 S10 phosphorylation and chromatin condensation. **Mol Cell.** 52(4):583-90.
10. Mischo HE, Gómez-González B, Grzechnik P, Rondón AG, Wei W, Steinmetz L, **Aguilera A***, Proudfoot NJ*. **2011.** Yeast Sen1 helicase protects the genome from transcription-associated instability. **Mol Cell** 41(1):21-32 (* co-corresponding)
11. Moriel-Carretero M, **Aguilera A. 2010.** A postincision-deficient TFIIH causes replication fork breakage and uncovers alternative Rad51- or Pol32-mediated restart mechanisms. **Mol Cell.** 37(5):690-701.
12. De Piccoli G, Cortes-Ledesma F, Ira G, Torres-Rosell J, Uhle S, Farmer S, Hwang JY, Machin F, Ceschia A, McAleenan A, Cordon-Preciado V, Clemente-Blanco A, Vilella-Mitjana F, Ullal P, Jarmuz A, Leitao B, Bressan D, Dotiwala F, Papusha A, Zhao X, Myung K, Haber JE*, **Aguilera A***, Aragón L.* **2006.** Smc5-Smc6 mediate DNA double-strand-break repair by promoting sister-chromatid recombination. **Nat Cell Biol.** 8(9):1032-4. (* co-corresponding)
13. Prado F, **Aguilera A. 2005.** Impairment of replication fork progression mediates RNA polII transcription-associated recombination. **EMBO J.** 24(6):1267-76.
14. Luna R, Jimeno S, Marín M, Huertas P, García-Rubio M, **Aguilera A. 2005** Interdependence between transcription and mRNP processing and export, and its impact on genetic stability. **Mol Cell.** 18(6):711-22.
15. Huertas P, **Aguilera A. 2003.** Cotranscriptionally formed DNA:RNA hybrids mediate transcription elongation impairment and transcription-associated recombination. **Mol Cell.** 12(3):711-21.
16. González-Barrera S, Cortés-Ledesma F, Wellinger RE, **Aguilera A. 2003.** Equal sister chromatid exchange is a major mechanism of double-strand break repair in yeast. **Mol Cell.** 11(6):1661-71.
17. Jimeno S, Rondón AG, Luna R, **Aguilera A. 2002.** The yeast THO complex and mRNA export factors link RNA metabolism with transcription and genome instability. **EMBO J.** 21(13):3526-35.
18. Chávez S, Beilharz T, Rondón AG, Erdjument-Bromage H, Tempst P, Svejstrup JQ, Lithgow T, **Aguilera A. 2000.** A protein complex containing Tho2, Hpr1, Mft1 and a novel protein, Thp2, connects transcription elongation with mitotic recombination in *Saccharomyces cerevisiae*. **EMBO J.** 19(21):5824-34.
19. Chávez S, **Aguilera A. 1997.** The yeast HPR1 gene has a functional role in transcriptional elongation that uncovers a novel source of genome instability. **Genes Dev.** 11(24):3459-70.
20. **Aguilera A**, Klein HL. **1990.** HPR1, a novel yeast gene that prevents intrachromosomal excision recombination, shows carboxy-terminal homology to the *Saccharomyces cerevisiae* TOP1 gene. **Mol Cell Biol.** 10(4):1439-51

10 SELECTED INVITED REVIEWS

1. García-Muse T, **Aguilera A. 2019.** R Loops: From Physiological to Pathological Roles. **Cell** 179:604-18
2. Gómez-González B, **Aguilera A. 2019.** Transcription-mediated replication hindrance: a major driver of genome instability. **Genes Dev.** 33(15-16):1008-1026.
3. Gaillard H, **Aguilera A. 2016.** Transcription as a Threat to Genome Integrity. **Annu Rev Biochem** 85:291-317
4. García-Muse T, **Aguilera A. 2016.** Transcription-replication conflicts: how they occur and how they are resolved. **Nat Rev Mol Cell Biol** 17:553-63
5. Gaillard H, García-Muse T, **Aguilera A. 2015.** Replication stress and cancer. **Nat Rev Cancer** 15:276-89
6. Santos-Pereira JM, **Aguilera A. 2015.** R loops: new modulators of genome dynamics and function. **Nat Rev Genet.** 16(10):583-97
7. **Aguilera A,** García-Muse T. **2013.** Causes of genome instability. **Annu Rev Genet** 47:1-32
8. **Aguilera A,** García-Muse T. **2012.** R loops: from transcription byproducts to threats to genome stability. **Mol Cell** 46:115-24
9. **Aguilera A,** Gómez-González B. **2008.** Genome instability: a mechanistic view of its causes and consequences. **Nat Rev Genet.** 9:204-17.
10. **Aguilera A. 2002.** The connection between transcription and genomic instability. **EMBO J** 21(3):195-201.

SCIENTIFIC INTERVIEW

Cold Spring Harbor Laboratory: <https://www.youtube.com/watch?v=XKz0U2pYQMQ>