

BIOGRAPHICAL SKETCH

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NAME Antonio J. Giraldez, Ph.D.		POSITION TITLE Associate Professor	
eRA COMMONS USER NAME giraldeza			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Cadiz (Spain)	B.S.	1993-1996	Chemistry
University Autonoma of Madrid (Spain)	B.S.	1996-1998	Molecular Biology
European Molecular Biology Laboratory (Germany) Skirball. New York University, School of Medicine.N.Y.	Ph.D.	1998-2002	Developmental Biology
Harvard University, MA.	Post. Doc.	2003-2006	Developmental Biology
	Post. Doc.	2006	Developmental Biology

A. Personal Statement

My laboratory studies the role of microRNAs in vertebrates and is currently focused in two areas of research: the molecular pathways of non coding RNAs (processing mechanism and function) and the regulation of gene expression during the maternal to zygotic transition in vertebrate development. I have training and have mentored students and postdocs in the areas of developmental biology, bioinformatics, small regulatory RNAs and gene expression. As a graduate student at the European Molecular Biology Laboratories (under the supervision of Stephen Cohen), I identified a conserved antagonist of wnt signaling (*notum*). As a postdoctoral fellow at the Skirbal Institute (NYU) and Harvard University (under the supervision of Alexander Schier) I changed model systems (from *Drosophila* to Zebrafish) with the key focus of understanding the role of microRNAs in vertebrate development. During my training as a postdoc and faculty, my laboratory has uncovered fundamental principles in the microRNA pathway, including the identification of a novel miRNA family (miR-430) that regulates the maternal to zygotic transition, the identification of deadenylation as one of the molecular mechanisms that mediate miRNA-mediated repression, the regulation of TGFB signaling by miRNAs, the identification of a novel miRNA processing pathway independent of Dicer function and analyzed the dynamics of translational regulation using ribosome footprinting in a vertebrate embryo. My laboratory includes 11 scientists and combines expertise in the areas of Bioinformatics (2 post-docs), Biochemistry (2 post-docs and one PhD student), developmental biologists (1 post-docs and two PhD student) and three technician. Finally, we have extensively applied high-throughput sequencing to characterize the zebrafish transcriptome and small RNAs.

I am currently principal investigator on five RO1 grant, one R21 and one March of Dimes. In addition, I have successfully administered the projects (e.g. staffing, research protections, budget), collaborated with other researchers, and produced several peer-reviewed publications as a senior author from my laboratory. In summary, I have a demonstrated record of successful and productive research projects and have the necessary expertise in areas of high relevance for this project.

B. Positions and Honors.**Positions**

2011-Present	Associate Professor. Yale University School of Medicine. New Haven, Connecticut. USA
2007-2011	Assistant Professor. Yale University School of Medicine. New Haven, Connecticut. USA
2006	Postdoctoral Research, with Dr. Alexander F. Schier. Harvard University. Cambridge. MA.
2003-2006	Postdoctoral Research, with Dr. Alexander F. Schier. Skirball Institute. New York University School of Medicine. NY.
1998-2002	Ph.D with Dr. Stephen M. Cohen. Developmental Genetics. European Molecular Biology Laboratory. Heidelberg. Germany.

Honors

2014	Vilcek Prize for Creative Promise in Biomedical Sciences
2008	Pew Scholar in Biomedical Sciences
2009	Kavli Frontiers of Science Speaker
2007	Lois E. and Franklin H. Top, Jr., Yale Scholar Award
2007	John Kendrew Young investigator Award EMBL, Heidelberg
2007	NYAS Blavatnik Young Investigator Award (Finalist)
2006	Keystone Symposia Scholarship.
2005	Keystone Symposia Scholarship.
2004	HFSP Postdoctoral Fellowship
2003	EMBO Postdoctoral Fellowship
1998	EMBL PhD fellowship
1998	3rd National Prize in Chemistry Degree. Ministry of Science. Spain
1997	Undergraduate Research Fellowship. CBMSO. Universidad Autonoma Madrid.

C. Selected peer-reviewed publications.

1. Bazzini AA[‡]#, Johnstone TG[#], Christiano R, Mackowiak SD, Obermayer B, Fleming ES, Vejnar CE, Lee MT, Rajewsky N[‡], Walther TC and **Giraldez AJ[‡]**. Identification of smallORFs in animals using ribosome footprinting and evolutionary conservation. **EMBO J.** 2014 Apr 4.
2. Lee MT[#], Ashley R[#], Bonneau AR, Takacs CM, Bazzini AA, DiVito KR, Fleming ES, **Giraldez AJ[‡]**. Nanog, SoxB1 and Pou5f1/Oct4 regulate widespread zygotic gene activation during the maternal-to-zygotic transition. **Nature.** 2013 Sep 22. doi: 10.1038/nature12632.
3. Yoda M [#], Cifuentes D [#], Izumi N, Sakaguchi Y, Suzuki T, **Giraldez AJ[‡]** and Tomari Y[‡]. PARN mediates 3'-end trimming of Argonaute2-cleaved precursor microRNAs. **Cell Reports**, 5, 1–12, November 14, 2013
4. Lewellis SW, Nagelberg D, Subedi A, Staton A, LeBlanc M, **Giraldez A**, Knaut H. Precise SDF1-mediated cell guidance is achieved through ligand clearance and microRNA-mediated decay. **J Cell Biol.** 2013 Feb 4;200(3):337-55.
5. Stahlhut C, Suarez Y, Lu J, Mishima Y[‡], and **Giraldez AJ[‡]**. miR-1/206 regulate angiogenesis by modulating Vegf-A expression. **Development**, 2012.
6. Bazzini AA, Lee MT, **Giraldez AJ[‡]**. Ribosome Profiling Shows That miR-430 Reduces Translation Before Causing mRNA Decay in Zebrafish. **Science** 13 April 2012: 233-23
7. Zhu C, Smith T, McNulty J, Rayla AL, Lakshmanan A, Siekmann AF, Buffardi M, Meng X, Shin J, Padmanabhan A, Cifuentes D, **Giraldez AJ**, Look AT, Epstein JA, Lawson ND, Wolfe SA. Evaluation and application of modularly assembled zinc-finger nucleases in zebrafish. **Development.** 2011 Oct;138(20):4555-64.
8. Staton AA, Knaut H and **Giraldez AJ[‡]**. miRNA regulation of SDF1 chemokine signaling provides genetic robustness to germ cell migration. **Nature Genetics.** 2011. Mar;43(3):204-11. Epub 2011 Jan 23.
9. Sander JD, Dahlborg EJ, Goodwin MJ, Cade L, Zhang F, Cifuentes D, Curtin SJ, Blackburn JS, Thibodeau-Beganny S, Qi Y, Pierick CJ, Hoffman E, Maeder ML, Khayter C, Reyon D, Dobbs D, Langenau DM, Stupar RM, **Giraldez AJ**, Voytas DF, Peterson RT, Yeh JR, Joung JK. Selection-free zinc-finger-nuclease engineering by context-dependent assembly (CoDA). **Nat Methods.** 2011 Jan;8(1):67-9. Epub 2010 Dec 12.
10. Cifuentes D, Xue H, Taylor DW, Patnode H, Mishima Y, Cheloufi S, Ma E, Mane S, Hannon GJ, Lawson N, Wolfe S, **Giraldez AJ[‡]** A novel miRNA processing pathway independent of Dicer requires Argonaute2. **Science** 2010, Jun 25;328(5986):1694-8. Epub 2010 May 6
11. Mishima Y, Abreu-Goodger C, Staton AA, Stahlhut C, Shou C, Cheng C, Gerstein M, Enright AJ and **Giraldez AJ**. Zebrafish miR-1 and miR-133 shape muscle gene expression and regulate sarcomeric actin organization. **Genes & Development.** 2009 Mar 1;23(5):619-32. Epub 2009 Feb 24. PMID: 19240126

12. Choi PS, Zakhary L, Choi WY, Caron S, Alvarez-Saavedra E, Miska EA, McManus M, Harfe B, **Giraldez AJ**, Horvitz RH, Schier AF, and Dulac C. Members of the miRNA-200 Family Regulate Olfactory Neurogenesis. **Neuron** **2008**. Jan 10, 57, 1–15.
13. Choi WY, **Giraldez AJ**‡, Schier AF‡. Target Protectors Reveal Dampening and Balancing of Nodal Agonist and Antagonist by miR-430. **Science**. **2007**. Oct 12;318(5848):271-4. ‡Corresponding authors.
14. Schier AF, **Giraldez AJ**. MicroRNA function and mechanism: insights from zebra fish. **Cold Spring Harb Symp Quant Biol**. **2006**. 71:195-203.
15. **Mishima Y**#, **Giraldez AJ**#, Takeda Y, Fujiwara T, Sakamoto H, Schier AF and Inoue K. Differential regulation of germline mRNAs in soma and germ cells by zebrafish miR-430. **Curr Biol**, **2006**. Nov 7;16 (21):2135-42.
16. **Giraldez AJ**‡, Mishima Y, Rihel J, Grocock R, van Dongen S, Inoue, K, Enright A, and Schier AF‡. Zebrafish miR-430 promotes deadenylation and clearance of maternal mRNAs. **Science**. **2006** Apr 7;312 (5770):75-9.
17. **Giraldez AJ**‡, Cinalli RM, Glasner ME, Enright A, Thomson JM, Baskerville S, Hammond SM, Bartel D, and Schier AF‡. MicroRNAs regulate brain morphogenesis in zebrafish. **Science**. **2005** May 6;308(5723): 833-8.

‡ Corresponding authors.

Equal contribution

Ongoing Research Support

R01 GM101108-01

Pre-award 2/1/12 5/1/2012-2/29/2016

Role: (P.I. Giraldez)

Title: Molecular Characterization of the microRNA Processing Pathways

The major goals of this project aim to investigate the molecular mechanisms underlying Dicer independent microRNA processing, the identification of processing machinery and the characterization of the processing pathways for vertebrate miRNAs during development.

OVERLAP: none

MOD

6/1/2012-5/31/2015

Role: (P.I. Giraldez)

Title: The role of microRNAs during vertebrate development

The major goal of this project is to understand how microRNAs regulate gene expression to orchestrate vertebrate embryogenesis during the maternal to zygotic transition and axis specification using zebrafish as a model system.

OVERLAP: none

R21 HD073768-01

7/1/2012-6/31/2014

Role: (P.I. Giraldez)

Title: Development of RNA interference in zebrafish

The major goal of this project is to understand the steps required to apply the RNA interference technique to zebrafish, a technique not yet available in zebrafish, what will help us understand the function of vertebrate genes in development and disease.

OVERLAP: none

R01HD074078-01

Pre award 7/1/12 8/15/2012-4/30/2017

Role: (P.I. Giraldez)

Title: Functional analysis of the zebrafish genome through RNA-seq and ribosome profile

The major goals of this project is to improve functional genomics in zebrafish and provide two fundamental tools to the community. Improved annotation of the zebrafish genes including coding potential, translation start site and transcript structure and community defined, open access zebrafish expression atlas across embryonic/ larval stages and organogenesis.

OVERLAP: none

R01 GM 102251-01

8/10/2012-5/31/2016

Role: (P.I. Giraldez)

Title: Molecular mechanisms of Micro RNA mediated regulation

The major goal of this project is to understand the mechanism by which these microRNAs regulate other genes in the cell, what might help us develop specific ways to modulate their activity during human disease.

OVERLAP: none

R01GM103789-01

9/1/2012-8/31/2016

Role: (P.I. Giraldez)

Title: Analysis of the gene networks regulating the maternal to zygotic transition

The major goals of this project is to understand how gene expression is regulated in the early embryo during the maternal to zygotic transition to ultimately trigger the activation of the different developmental pathways during gastrulation and axis formation resulting in zygote development.

OVERLAP: none

R01GM081602

9/1/2013-8/31/2017

Role: (P.I. Giraldez)

Title: The Role of MicroRNAs in Vertebrate Development

The major goal of this project is to understand how miRNAs regulate gene expression to orchestrate early embryogenesis, using zebrafish as a model system.

OVERLAP: none

Pending

none

Completed Research Support**RC2 NIH Grant**

9/1/09-8/30/2011

Role: Co-PI (PI Mathew State)

Title: Rapid analysis of rare ASD-related mutations using a Zebrafish model system.

This project aims to generate mutant zebrafish in candidate genes for Autism and to validate the isoforms identified in human patients in the zebrafish model system to characterize their level of activity.

OVERLAP: none

MDA115608

1/1/09-12/31/11

Muscular Dystrophy Association

Role: (P.I., Giraldez)

Title: The role of microRNAs in muscle development and muscular dystrophy.

This project aims to uncover the gene regulatory network modulated by microRNAs in muscle development and their connection with muscular dystrophy.

OVERLAP: none

R01 GM081602-05

7/2007-6/2012

NIH

Role: (P.I. Giraldez)

Title: "The Role of microRNAs in Vertebrate Development"

This project aims to understand the role of microRNAs in the regulation of gene expression during germ line specification and gastrulation in zebrafish.

OVERLAP: none

Pew Scholars in the Biomedical Sciences. 7/1/08-6/30/2012

Pew Charitable Trusts

Role: (P.I. Giraldez)

Title: The role of microRNAs in vertebrate development.

This project aims to understand the role of microRNAs in early vertebrate development from small RNAs discovery to target identification with emphasis in gastrulation and early neural development.

OVERLAP: none