ALEJO EZEQUIEL RODRIGUEZ-FRATICELLI, PhD
alejo.rodriguez-fraticelli@childrens.harvard.edu
1 Blackfan Circle, Karp Research Building, 02115, Boston, MA.
+1 (617) 755-6007

EDUCATION

09/2009-07/2014	Ph.D. (*summa cum laude*)	Developmental Cell Biology (Dr. Fernando Martin-Belmonte)	Center for Molecular Biology "Severo Ochoa", Madrid, Spain
09/2008-08/2009	M. Sc.	Molecular Biology and Biomedicine	Autonomous University of Madrid, Spain
09/2003-08/2008	B.Sc. (valedictorian)	Biochemistry	Autonomous University of Madrid, Spain
09/1998-08/2002	High school diploma	Life Sciences orientation	Colegio Nacional de Buenos Aires, Buenos Aires, Argentina

RESEARCH EXPERIENCE

05/2021-	Group Leader	Laboratory of Systems Regenerative Medicine	IRB Barcelona, Barcelona, Spain
01/2020-04/2021	Instructor (non-tenure faculty)	Single cell methods for lineage tracing in native and premalignant hematopoiesis	Harvard Medical School (Boston Children's Hospital)
01/2015-12/2019	Postdoctoral research fellow	Lineage fate of stem cells *in vivo* (supervisor: Dr. Fernando D. Camargo)	Boston Children's Hospital/Harvard University
01/2009-12/2014	PhD fellow	Mechanisms of epithelial morphogenesis (supervisor: Dr. Fernando Martin-Belmonte)	Center for Molecular Biology "Severo Ochoa", Madrid, Spain

PROFESSIONAL SOCIETIES

2019-present	International Society for Stem Cell Research	Member
2018-present	American Society of Hematology	Member
2017-present	International Society of Experimental Hematology	Member (New Investigator Committee)

HONORS AND PRIZES

2019	New Investigator Award (Postdoctoral)	International Society of Experimental Hematology	Postdoctoral research
2017	New Investigator Award (Postdoctoral)	International Society of Experimental Hematology	Postdoctoral research
2014	Annual Best Thesis Award	Autonomous University of Madrid	PhD Thesis
2008	Valedictorian Award	Autonomous University of Madrid	Undergraduate studies

GRANTS, SCHOLARSHIPS AND OTHER FUNDING:

1. **NIH/NHLBI K99/R00 Transition to Independence Award K99HL146983-01** (Boston Children's Hospital, Boston, MA, USA)
   Mechanisms of in situ functional stem cell heterogeneity in native and transplantation hematopoiesis
   Amount: 1,083,010 USD -- Period: 04/19-03/24
   The goal of this project goal is to use clonal *in situ* lineage tracing technologies to dissect adult stem cell heterogeneity and its relationship to the origin of important blood disorders to facilitate the translation of drug-based and stem cell-based therapies.
2. **Leukemia & Lymphoma Society Career Development Program Special Award** (Boston Children's Hospital, Boston, MA, USA)
   In situ clonal dynamics of acute myeloid leukemia
   Amount: 201,000 USD – Period: 08/18-07/21
   The goal of this project is to use simultaneous transcriptome and lineage analysis using a novel mouse model to understand the dynamics of cancer stem cells in mouse models of acute myeloid leukemia.
3. **ASH Scholar Award in Basic Research** (Boston Children's Hospital, Boston, MA, USA)
   Clonal analysis of lineage fate in benign and pre-malignant hematopoiesis
   Amount: 100,000 USD – Period: 08/18-07/20
   The goal of this project is to perform simultaneous analysis of transcriptome and lineage information in steady state hematopoiesis in the presence of premalignant mutant clones.
4. **Life Sciences Research Foundation MERCK Fellowship** (Boston Children's Hospital, Boston, MA, USA)
   High throughput clonal analysis at the single cancer stem cell level using *in vivo* barcoding.

Amount: 180,000 USD – Period: 8/15-7/18
The goal of this project was to develop methods for performing transposon-based lineage tracing in combination with in situ sequencing.

5. **EMBO Long Term Fellowship** (Boston Children's Hospital, Boston, MA, USA)
High throughput clonal analysis at the single cancer stem cell level using in vivo barcoding and in situ sequencing.
Amount: Non-stipendiary – Period: 7/15-12/16
The goal of this project was to develop transposon-based lineage tracing in mouse models of acute myeloid leukemia.
6. **Spanish MINECO PhD Research Contract** ("Severo Ochoa" Center for Molecular Biology, Madrid, Spain)
Role of Plasmolipin in intestinal gut morphogenesis.
Amount: 19,000 euro – Period: 9/13-12/14
The goal of this project was to study the function of Plasmolipin during epithelial morphogenesis in the zebrafish gut system.
7. **JAE-CSIC PhD Fellowship** ("Severo Ochoa" Center for Molecular Biology, Madrid, Spain)
Novel pathways controling epithelial morphogenesis.
Amount: 72,000 euro – Period: 8/09-8/13
The goal of this project was to develop gene discovery tools to uncover new pathways involved in epithelial morphogenesis using 3D organoid models.
8. **"La Caixa" Foundation Master in Science Scholarship** ("Severo Ochoa" Center for Molecular Biology, Madrid, Spain)
Role of ITSN2 in regulation of symmetric cell division during epithelial lumen formation
Amount: 20,000 Euro – Period: 9/08-7/09
The goal of this project was to uncover the regulation of master polarity GTPase Cdc42, during acquisition of apicobasal epithelial polarity.

SELECTED LATEST RESEARCH

1. **Rodriguez-Fraticelli AE**, Weinreb CS, Wang SW, Migueles RP, Jankovic M, Usart M, Klein AM, Lowell S, Camargo FD. Single cell lineage tracing unveils a role for Tcf15 in haematopoiesis. Nature. 2020**.** Jul;583(7817):585-589. doi: 10.1038/s41586-020-2503-6. Epub 2020 Jul 15.
2. Weinreb CS*, **Rodriguez-Fraticelli AE*,** Camargo FD, Klein AM. Lineage tracing on transcriptional landscapes links state to fate during differentiation. Science. 2020 Feb 14;367(6479), eaaw3381. doi.org/10.1126/science.aaw3381
   *** equal contribution**
   --Preprint recommended in *preLights* by Yen-Chung Chen.
   --Comment in *Nat Rev Genet* by Burgess DJ.
   --Comment in *Nat Methods* by Tang L.
3. **Rodriguez-Fraticelli AE**, Samuel G. Wolock, Caleb S. Weinreb, Maja Jankovic, Jianlong Sun, Allon M. Klein, Fernando D. Camargo. Clonal analysis of lineage fate in unperturbed hematopoiesis. Nature. 2018 Jan 11;553(7687):212-216. doi: 10.1038/nature25168. PMID:29323290.
   --Recommended in *Faculty of 1000* by Pura Muñoz-Cánoves.

OTHER PUBLISHED INVESTIGATIONS

4. Bowling S*, Sritharan D*, Osorio FG, Nguyen M, Cheung P, **Rodriguez-Fraticelli AE**, Patel S, Fujiwara Y, Li BE, Orkin SH, Hormoz S, Camargo FD. An engineered CRISPR/Cas9 mouse line for simultaneous readout of lineage histories and gene expression profiles in single cells. Cell. 2020 (accepted March 5th). No doi available yet. *equal contribution
5. Hurley K, Ding J, Villacorta-Martin C, Herriges MJ, Jacob A, Vedaie M, Alysandratos KD, Sun Y, Lin C, Werder RB, Wilson AA, Mithal A, Mostoslavsky G, Caballero N, Guttentag SH, Ahangari F, Kaminski N, **Rodriguez-Fraticelli AE**, Camargo F, Bar-Joseph Z, and Kotton DN. Single-cell time-series mapping of cell fate trajectories reveals an expanded developmental potential for human PSC-derived distal lung progenitors. Cell Stem Cell. 2020 Jan 20. Doi.org/10.1016/j.stem.2019.12.009.
6. Bosch-Fortea M, **Rodriguez-Fraticelli AE**, Herranz G, Hachimi M, Barea MD, Young J, Ladoux B, Martin-Belmonte F. Micropattern-based platform as a physiologically relevant model to study epithelial morphogenesis and nephrotoxicity. Biomaterials. 2019 Oct;218:119339. doi: 10.1016/j.biomaterials.2019.119339.
7. **Rodriguez-Fraticelli AE**, Bagwell J, Bosch-Fortea M, Boncompain G, García-Leon MJ, Reglero-Real N, Andrés G, Millán J, Toribio ML, Perez F, Bagnat M, Martín-Belmonte F. Developmental regulation of apical endocytosis controls epithelial patterning in vertebrate tubular organs. Nat Cell Biol. 2015 Mar;17(3):241-50. doi: 10.1038/ncb3106. PMID:25706235.
   --Commented in "Plasmolipin—a new player in endocytosis and epithelial development." By Le Guelte A and Macara IG. EMBO J. 2015 May 5. doi: 10.15252/embj.201591448.
8. de Juan-Sanz J, Núñez E, Villarejo-López L, Pérez-Hernández D, **Rodriguez-Fraticelli AE**, López-Corcuera B, Vázquez J, Aragón C. Na+/K+-ATPase Is a New Interacting Partner for the Neuronal Glycine Transporter GlyT2 That Downregulates Its Expression In Vitro and In Vivo. J Neurosci. 2013 Aug 28;33(35):14269-81. doi: 10.1523/JNEUROSCI.1532-13.2013.
9. **Rodríguez-Fraticelli AE**, Auzan M, Alonso MA, Bornens M, Martín-Belmonte F. Cell confinement controls centrosome positioning and lumen initiation during epithelial morphogenesis. J Cell Biol. 2012 Sep 17;198(6):1011-23. Epub 2012 Sep 10.
   --Recommended in *Faculty of 1000* by Talila Volk.
10. Gálvez-Santisteban M*, **Rodriguez-Fraticelli AE***, Bryant DM, Vergarajauregui S,Yasuda T, Bañón-Rodríguez I, Bernascone I, Datta A, Spivak N, Young K, Slim CL, Brakeman PR, Fukuda M, Mostov KE, Martín-Belmonte F.Synaptotagmin-like proteins

control the formation of a single apical membrane domain in epithelial cells. Nat Cell Biol. 2012 Aug;14(8):838-49. doi:10.1038/ncb2541. Epub 2012 Jul 22. *** equal contribution**

11. Bryant DM, Datta A*, **Rodríguez-Fraticelli AE***, Peränen J, Martín-Belmonte F, Mostov KE. A molecular network for de novo generation of the apical surface and lumen. Nat Cell Biol. 2010 Nov;12(11):1035-45. Epub 2010 Oct 3. *** equal contribution**
--Recommended in *Faculty of 1000* by Richard Anderson and Kun Ling.

12. Madrid R, Aranda JF, **Rodríguez-Fraticelli AE**, Ventimiglia L, Andrés- Delgado L, Shehata M, Fanayan S, Shahheydari H, Gómez S, Jiménez A, Martín-Belmonte F, Byrne JA, Alonso MA. The formin INF2 regulates basolateral-to-apical transcytosis and lumen formation in association with Cdc42 and MAL2. Dev Cell. 2010 May 18;18(5):814-27.

13. **Rodriguez-Fraticelli AE**, Vergarajauregui S, Eastburn DJ, Datta A, Alonso MA, Mostov K, Martín-Belmonte F. The Cdc42 GEF Intersectin 2 controls mitotic spindle orientation to form the lumen during epithelial morphogenesis. J Cell Biol. 2010 May 17;189(4):725-38.

14. Martín-Belmonte F, Yu W*, **Rodríguez-Fraticelli AE***, Ewald AJ, Werb Z, Alonso MA, Mostov K. Cell-polarity dynamics controls the mechanism of lumen formation in epithelial morphogenesis. Curr Biol. 2008 Apr 8;18(7):507-13. *** equal contribution**

h-index (total): 16 (Google scholar)

Full list of publications (including reviews): https://scholar.google.com/citations?user=J8k5cVQAAAAJ&hl=en&oi=sra

Patents:

Muriel Auzan, Michel Bornens, Fernando Martin-Belmonte, Joanne Young, **Rodriguez-Fraticelli, A.E.** (2013/2/1). *Methods and a device for the formation of three-dimensional multicellular assemblies.* (WO2013014164)

PARTICIPATION IN PROFESSIONAL MEETINGS

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings:

2013 Consolider meeting 2013. Madrid, Spain. (selected oral presentation)
2013 European Zebrafish meeting 2013. Barcelona, Spain. (selected oral presentation)
2014 Queen's University Belfast. Belfast, UK. (invited talk)
2014 Gordon Research Conferences in Cell Polarity Signaling 2014. Waltham, MA. (selected oral presentation)
2016 Harvard Stem Cell and Regenerative Biology Department Retreat. Boston, MA. (selected oral presentation)
2017 Keystone Symposia Meeting B1 – Hematopoiesis 2017. Banff, Canada (travel award and oral presentation)
2017 International Society of Experimental Hematology 2017. Frankfurt, Germany (travel award, postdoctoral award and selected oral presentation)
2018 StemCellMath'18. Homerton College, Cambdrige, UK. (invited oral presentation)
2018 EMBO Fellows Meeting 2018. NYC, USA (selected oral presentation)
2019 Keystone Symposia Meeting L1 – Single cell biology. Breckenridge, USA (poster presentation)
2019 Gordon Research Conferences in Hematopoietic Stem cells to Platelets: Roles in Homeostasis and Disease (invited oral presentation)
2019 International Society of Experimental Hematology 2019. Brisbane, Australia (selected oral presentation, invited workshop session, postdoctoral award, travel award)
2019 Disease Modeling and Mechanisms Meetings 2019 – Blood Disorders: Models, Mechanisms and Therapies. Boston, USA (selected oral presentation)
2019 ASH Annual Meeting 2019 – Orlando, Florida, USA (selected oral presentation and abstract achievement award)
2020 Keystone Symposia Meeting B1 – Hematopoiesis 2020. Big Sky, Montana, USA (postponed due to COVID)

SCIENTIFIC SKILLS

- Organismal biology (zebrafish and mouse) – Husbandry, dissections and microdissections, surgery, transplantation, irradiation, embryology, embedding and sectioning, immunostaining.
- Molecular Biology – Molecular cloning, PCR amplification, RT-PCR, qPCR, microarrays (Affymetrix), whole genome (including single cell) library preparation, RNAseq (including droplet-based single-cell) library preparation, ChIPseq, CUT&TAG, Next-gen sequencing (Illumina MiSeq and NextSeq).
- Bioinformatics – Microarray, RNAseq, single-cell RNAseq, ChIPseq and ATACseq analysis
- Biochemistry – Protein and antibody isolation and preparation, protein expression, purification and analysis.
- Hematology (mouse) – Bone marrow and blood cell isolation, Fluorescence-activated cell sorting, bone marrow and stem cell (including single cell) transplantation.
- Organoid biology – Primary cell isolation, cell culture, organoid culture, organelle preparation, confocal microscopy and live cell imaging, image analysis (including high-throughput, CellProfiler).