

Ryo Higuchi-Sanabria, Ph.D.
ryo.sanabria@usc.edu

Leonard Davis School of Gerontology
University of Southern California
3715 McClintock Ave. University Park Campus
Los Angeles, CA 90089

EDUCATION

- **Columbia University** – 2015, New York, NY
Ph.D., M.A., M.Phil.; Nutrition and Metabolic Sciences, GSAS Commencement Student Speaker
Dissertation: A Mother's Sacrifice: Asymmetric cell division promotes mitochondrial quality control and lifespan in *S. cerevisiae*.
- **CUNY Hunter College** – 2011, New York, NY
B.A., M.A.; Biotechnology, Salutatorian

GRANTS AND AWARDS

- **NIA R01: Stephen I. Katz Early Stage Investigator Research Project Grant**
National Institute of Health, pending, 7th percentile
- **John S. Spice Distinguished Research Scientist Award in Aging**
Larry Hillblom Foundation, 2023
- **Navigage Foundation Award**
University of Southern California, 01/2023-12/2023
- **Faculty Teaching Award**
University of Southern California, 2023
- **Glenn Foundation/AFAR New Investigator Award**
University of Southern California, 07/22-06/24
- **Larry Hillblom Foundation Startup Grant**
University of Southern California, 07/22-06/25
- **Pathway to Independence Award (NIA, K99/R00)**
University of California Berkeley, 05/20-07/21
University of Southern California, 08/21-04/24
- **Medical Research Fellowship in Aging Research**
Glenn Foundation/AFAR, University of California Berkeley, 07/19-04/20
- **Ruth L. Kirschstein Postdoctoral Individual National Research Service Award (NIA, F32)**
University of California Berkeley, 07/16-06/19
- **Training and Education, TRANSFORM TL1**
Columbia University, 09/13-07/14
- **SPOT Award for Community Outreach**
University of California Berkeley, 2020
- **Bernard F. Erlanger Award for Excellence in Basic Science Research**
Columbia University, 2016 – Rank 1 dissertation for IHN department
- **Titus M. Coan Prize for Excellence in Basic Science Research**
Columbia University, 2016 – Rank 2 dissertation for all doctoral candidates of university

RESEARCH EXPERIENCE

- **University of Southern California, Leonard Davis School of Gerontology**, 2021-present
Assistant Professor
 - Research program dedicated to studying the interaction between stress and aging with an emphasis on neuronal signaling of stress.

- Strong dedication to increasing diversity in STEM through competitive programs, including the NIA MSTEM R25 application (submitted for 2021 cycle).
- Plans to design and run a Nutrition and Exercise Physiology course studying the impact of nutrition and exercise on stress and aging biology.
- Leadership and mentorship of postdocs, graduate students, and undergraduates in experimental research, scientific writing, and career development for all career paths.
- **University of California, Berkeley, 2016-2021**
Postdoctoral Fellow, Advisor: Andrew Dillin
 - Developed and managed highly innovative research projects with complete autonomy.
 - Synthesized a novel large-scale screening paradigm fusing the strengths of genome-wide screening using CRISPR-Cas9 and model organism genetics.
 - Leadership: mentored postdocs, graduate students, undergraduates, and staff in experimental research, scientific writing & communication, and career development (>30 trainees to date).
 - Secured laboratory funds through grant applications having secured over \$2 million in funding.
 - Proactively drove highly collaborative work.
- **Columbia University, 2011-2015**
Graduate Research Aide, Advisor: Liza Pon
 - Synthesized advanced imaging technologies including super-resolution SIM and STORM and established quantitative fluorescent imaging for measuring cellular health.
 - Identified novel mechanisms of asymmetric cell division that have direct implications in cellular aging and promoting stemness in dividing cells.
 - Trained and mentored >10 students across all career levels.
- **CUNY Hunter College, 2010-2012**
Research Technician, Advisor: Paul Feinstein
 - Managed and maintained laboratory and staff, including mouse husbandry, inventory, synthesis of reagents/buffers, hiring/training staff, and maintenance of cell lines and iPSCs.
 - Familiarity with mouse techniques including husbandry, ITT/GTT, and tissue harvesting.

TEACHING EXPERIENCE

- **University of Southern California, 2021-Present**
Assistant Professor – Physiology of Aging, Multidisciplinary Research Seminar in Aging (60+ students per semester).
- **University of California, Berkeley, 2019-Present**
Recreational Sports Facility Group Fitness Instructor – in-class instruction of Yoga, Barre, and Pilates; manager of zoom-based online fitness program providing 40+ free classes per week (20+ instructors trained on how to provide efficient zoom instruction).
- **College of Mount Saint Vincent, 2014-2015**
Adjunct Professor – Molecular Genetics, Human Genetics, and Human Nutrition (30-35 students per semester).
- **Columbia University, 2012-2015**
Lecturer – co-taught course on scientific reading (5-week responsibility; 60+ students per semester).

MANAGEMENT EXPERIENCE

- **Menchanko-Tei, Restaurant Manager, 2010-2011**
 - Operated the opening of 42nd St., Grand Central Terminal store in NYC; brought store to profitable margins, organized all inventory purveyors, and hired/trained all new staff.
- **Starbucks, Assistant Store Manager, 2008-2010**
 - Assisted in the management and operation of the highest grossing store in Queens, NY area, managing 30+ staff members.
- **Burger King, General Store Manager, 2004-2008**

- Operated and managed 40-person staff, food and labor costs, and inventory of Astoria, Queens store; converted the lowest performing store to rank #2 in the district in 2 years.

PUBLICATIONS

• Research Papers

- **Higuchi R**, Vevea JD, ...Boldogh IR, Pon LA (2013). Actin dynamics affects mitochondrial quality control and aging in budding yeast. *Curr. Biol.* 23, 2417-2422. doi: 10.1016/j.cub.2013.10.022. *This paper selected as an F1000Prime.*
- **Higuchi-Sanabria R**, Charalel JK, ...Rafelski S, Pon LA (2016). Mitochondrial anchorage and fusion contribute to mitochondrial inheritance and quality control in the budding yeast, *Saccharomyces cerevisiae*. *Mol Biol Cell.* doi: 10.1091/mbc.E15-07-0455.
- **Higuchi-Sanabria R**, Garcia EJ, ...Feinstein P, Pon LA (2016). Characterization of fluorescent proteins for three- and four-color live-cell imaging in *S. cerevisiae*. *PLoS One.* doi: 10.1371/journal.pone.0146120.
- **Higuchi-Sanabria R**, Vevea JD, Charalel JC, Sapar ML, Pon LA (2016). The transcriptional repressor Sum1p counteracts Sir2p in regulation of the actin cytoskeleton, mitochondrial quality control, and replicative lifespan in *Saccharomyces Cerevisiae*. *Microbial Cell.* doi: 10.15698/mic2016.02.478.
- **Higuchi-Sanabria R**, Paul JW III, ...Dillin A (2018). Spatial regulation of the actin cytoskeleton by HSF-1 during aging. *Mol. Biol. Cell.* doi: 10.1091/mbc.E18-06-0362.
- Anderson EC, Frankino PA, **Higuchi-Sanabria R**, ...Dillin A, Meyer BJ (2019). X chromosome domain architecture regulates lifespan, but not dosage compensation. *Dev. Cell.* doi: 10.1016/j.devcel.2019.08.004.
- Garcia EJ, de Jonge J, ... **Higuchi-Sanabria R**, Boldogh IR, Pon LA (2019). Reciprocal interactions between mtDNA and lifespan control in budding yeast. *Mol Biol Cell.* doi: 10.1091/mbc.E18-06-0356.
- Schinzel R*, **Higuchi-Sanabria R***, Shalem O*, ... Dillin A (2019). The hyaluronidase, TMEM2, promotes ER homeostasis and longevity independent of the UPR^{ER} in metazoans. *Cell.* doi: 10.1016/j.cell.2019.10.018. *equal contributions. *This selected as an F1000Prime.*
- Daniele JR*, **Higuchi-Sanabria R***, ... Dillin A (2020). UPR^{ER} promotes lipophagy independent of chaperones to extend lifespan. *Sci. Adv.* doi: 10.1126/sciadv.aaz1441. *equal contributions.
- Bar-Ziv R*, Frakes AE*, **Higuchi-Sanabria R***, ... Dillin A (2020). Measurements of physiological stress responses in *C. elegans*. *J Vis Exp.* doi:10.3791/61001. *equal contributions.
- **Higuchi-Sanabria R***, Shen K*, ... Zoncu R, Dillin A (2020). Lysosomal recycling of amino acids impacts ER quality control. *Sci Adv.* doi: 10.1126/sciadv.aaz9805. *equal contributions.
- **Higuchi-Sanabria R***, Durieux J*, ...Dillin A (2020). Divergent nodes of non-autonomous UPR^{ER} signaling through serotonergic and dopaminergic neurons. doi: Cell Rep. 10.1016/j.celrep.2020.108489. *equal contributions.
- Tharp KM, **Higuchi-Sanabria R**, ...Dillin A, Weaver VM (2021). Adhesion-mediated mechanosignaling forces mitohormesis. doi: Cell Metab. doi: 10.1016/j.cmet.2021.04.017.
- Vlassakis J, Hansen LL, **Higuchi-Sanabria R**, ...Herr AE (2021). Quantifying cytoskeletal heterogeneity via single-cell protein-complex fractionation. *Nat Comm.* doi: 10.1038/s41467-021-25212-3.
- Moehle EA*, **Higuchi-Sanabria R***, ...Shalem O, Dillin A (2021). Cross-species screening platforms identify EPS-8 as a critical link for mitochondrial stress and age-related actin stabilization. *Sci Adv.* doi: 10.1126/sciadv.abj6818. *equal contributions.
- Sing CN, ...**Higuchi-Sanabria R**, Pon LA (2022). Identification of a modulator of the actin cytoskeleton, mitochondria, nutrient metabolism and lifespan in yeast. *Nat Commun.* doi: 10.1038/s41467-022-30045-9.
- Frankino PA, ...**Higuchi-Sanabria R**, Dillin A (2022). SKN-1 regulates stress resistance downstream of amino catabolism pathways. *iScience.* doi: 10.1016/j.isci.2022.104571.

- Castro Torres T*, Moaddeli D*,...**Higuchi-Sanabria R** (2022). Surveying Low-Cost Methods to Measure Lifespan and Healthspan in *Caenorhabditis elegans*. *J Vis Exp*. doi: 10.3791/64091.
- Garcia G*, Bar-Ziv R*, Averbukh M*,...**Higuchi-Sanabria R** (2023). Large-scale genetic screens identify BET-1 as a cytoskeleton regulator promoting actin function and lifespan. *Aging Cell*. doi: 10.1111/ace1.13742. *equal contributions.
- Garcia G, Zhang H,...**Higuchi-Sanabria R**, Dillin A (2023). Lipid homeostasis is essential for a maximal ER stress response. *eLife*. doi: 10.7554/eLife.83884.
- Bar-Ziv R, Dutta N, Hraby A,...**Higuchi-Sanabria R**, Dillin A (2023). Glial-derived mitochondrial signals affect neuronal proteostasis and aging. *Sci Adv*. doi: 10.1126/sciadv.adi1411.
- Dutta N, Gerke JA,...**Higuchi-Sanabria R** (2023). Investigating impacts of marine sponge derived mycothiazole and its acetylated derivative on mitochondrial function and aging. *Geroscience – Under Revision*. bioRxiv. doi: 10.1101/2023.11.27.568896.
- **Reviews**
 - **Higuchi-Sanabria R**, Pernice WM,...Pon LA (2014). Role of asymmetric cell division in lifespan control in *Saccharomyces cerevisiae*. *FEMS Yeast*. 14 (8), 1133-1146. doi: 10.1111/1567-1364.12216.
 - **Higuchi-Sanabria R**, Frankino PA,...Dillin A (2018). A futile battle? Cellular quality control throughout the stress of aging. *Dev. Cell*. doi: 10.1016/j.devcel.2017.12.020.
 - Metcalf MG*, **Higuchi-Sanabria R***,...Dillin A (2020). Beyond the cell factory: homeostatic regulation of and by the UPR^{ER}. *Sci Adv*. doi: 10.1126/sciadv.abb9614. *equal contributions.
 - Stefan Homentcovschi, **Higuchi-Sanabria R** (2022). Sensing and signaling ER stress. *Neural Regen Res*. doi: 10.4103/1673-5374.317967.
 - Dutta N, Garcia G, **Higuchi-Sanabria R** (2022). *Front Aging*. doi: 10.3389/fragi.2022.860404.
 - Johns A, **Higuchi-Sanabria R**, Thorwald MA, Vilchez D (2023). doi: 10.1016/j.conb.2022.102673
 - Averbukh M, Garcia G, **Higuchi-Sanabria R** (2023). *Aging*. doi: 10.18632/aging.204746
- **Chapters**
 - Srivastava P, Alessi Wolken DM, Garcia-Rodriguez LJ, **Higuchi-Sanabria R**, Pon LA (2015). Organelle inheritance in yeast and other fungi. *The Mycota*.
 - **Higuchi-Sanabria R**, Swayne TC, Pon LA. Live-cell imaging of mitochondria and the actin cytoskeleton in budding yeast (2016). *Methods Mol Biol*. doi: 10.1007/978-1-4939-3124-8_2.
 - **Higuchi-Sanabria R**, Swayne TC, Boldogh IR, Pon LA (2016). Imaging of the actin cytoskeleton and mitochondria in fixed budding yeast cells. doi: 10.1007/978-1-4939-3124-8_3.
 - Liao P*, **Higuchi-Sanabria R***, Swayne TC, Sing CN, Pon LA (2020). Live-cell imaging of mitochondrial motility and interactions in *Drosophila* neurons and yeast. *Methods Mol Biol*. doi: 10.1016/bs.mcb.2019.11.011. *equal contributions.
 - Garcia G, Homentcovschi S, Kelet N, **Higuchi-Sanabria R**. Imaging of actin cytoskeletal integrity during aging in *C. elegans* (2022). *Methods Mol Biol*. doi: 10.1007/978-1-0716-1661-1_5.

Invited Talks

- **Invited Seminars**
 - Berkeley City College Biology Department, 2019.
 - UCSC Molecular, Cell, and Developmental Biology Seminar, 2020.
 - Vanderbilt University Cell and Developmental Biology Seminar Series, 2023.
 - CSU Northridge Biology Colloquium, 2023.
- **Conference Presentations**
 - Keystone Symposia on pushing the limits of cellular quality control, 2013.
 - Academic Retreat and 19th Wu Lectureship, Invited Speaker, 2017.
 - UCSF Diabetes and Metabolism Retreat, Invited Speaker, 2020.
 - Aging Seminar Series, 2020.
 - QB3 Research Seminar, UCB, 2020.

- UCSF Bay Area Cytoskeleton Symposium, Invited Speaker, 2020.
- Cold Spring Harbor Labs Protein Homeostasis in Health and Disease, 2020.
- *C. elegans* Metabolism, Aging, Pathogenesis, and Stress, 2022.
- Wild Worms as Model Organisms, 2022.
- JoVE Research Seminar, 2023.
- Fusion Aging, 2023.
- Larry Hillblom Scientific Meeting, 2023.