Dominic Saiz
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Arizona State University
Molecular and Cellular Biology
School of Life Sciences

EDUCATION

2020- Ph.D., Molecular and Cellular Biology, Arizona State University
2020 B.S., Biological Sciences (*Cum Laude*), Arizona State University
2020 B.S., Biological Sciences (*Cum Laude*), Arizona State University

RESEARCH EXPERIENCE

2023- Ph.D. Candidate, Arizona State University
Mentor: Dr. Miyeko Mana
Committee: Dr. Noah Snyder-Mackler, Dr. Robin Harris, Dr. Min Hyun-Kim
Thesis Title: Chromatin accessibility of intestinal stem cells in obesity and cancer
Project Overview: Investigating changes in chromatin accessibility of intestinal stem cells under various conditions, including high-fat diet, genetic knockouts of transcription factors (PparD and PparA), and an APC knockout model. The project aims to discover/define the molecular mechanisms underlying intestinal stem cell response to diet and susceptibility to tumorigenesis.
Key Responsibilities:
- Maintained a colony of genetically engineered C57BL/6 mice, performed genotyping, and managed complex breeding strategies to generate specific genetic models.
- Collected and analyzed intestinal tissue samples through histological techniques (H&E, IHC, IF) and imaging.
- Isolated intestinal crypts and generated and cultured organoids to study cellular responses in vitro.
- Conducted flow cytometry (FACS) to isolate specific cell populations for downstream molecular analyses, including RNA-seq and ATAC-seq.
- Executed bioinformatics analyses on HTC/HPC clusters, including ATAC-seq data processing, differential accessibility analysis, and integration with public datasets (TCGA, ENCODE).
- Developed and implemented bash scripts for automating genomic data workflows, enhancing the efficiency and reproducibility of data analysis.

2020- Ph.D. Student (Graduate Research Assistant), Arizona State University
Mentor: Dr. Miyeko Mana

2019-2020 Undergraduate Research Assistant, Arizona State University
Mentor: Dr. Jeanne Wilson-Rawls
Key Responsibilities:
- Examined developmental differences that lead to variances in ovarian follicle maturation in the absence of select Fringe family genes.
- Performed histological staining and analysis on skeletal muscle samples in muscular dystrophy mouse models.
- Perform literature reviews for lab subjects and avenues that were related to the research scope of the lab.

2019 Student Collaborator/Field Assistant, Arizona State University
Mentor: Dr. Alexandra Brewis-Slade
Key Responsibilities:
- Fall 2019 Global Ethnohydrology Study (a multinational, multi-university social science study of citizen perceptions of water issues): conducted literature review; assisted with protocol design as part of a large, diverse team; piloted data collection using cognitive interviewing techniques; recruited citizen participants; completed informed consent procedures; interviewed participants using both survey and open-ended questions; data

entry; analysis using R's statistical software to compute datasets; a professional presentation of research results.

PUBLICATIONS

Peer-Reviewed Journal Articles

Dominic R. Saiz, Thomas Hartley-McDerrmott, Yesenia Barrera-Millan, Karla Fabiola Castro-Ochoa, Abhigyan Shukla, Matthew Torel, Miyeko D. Mana "**PPARsing Epigenetic Memory in Intestinal Stem Cells: High-Fat Diet and Oncogenic Susceptibility**" *(Abstract Publication) AACR* 10.1158/1538-7445.AM2024-1247

Conference Proceedings

Miyeko D. Mana, Amanda M. Hussey, Constantine N. Tzouanas, Shinya Imada, Yesenia Barrera Millan, Dorukhan Bahceci, **Dominic R. Saiz**, Anna Webb, Caroline A. Lewis, Peter Carmeliet, Maria M. Mihaylova, Alex K. Shalek, Omer H. Yilmaz (2021). "**High-fat diet-activated fatty acid oxidation mediates intestinal stemness and tumorigenicity**" *Cell Reports* 10.1016/j.celrep.2021.109212

PRESENTATIONS

Invited Talks

2024	PPARsing Epigenetic Memory in Intestinal Stem Cells: High-Fat Diet and Oncogenic Susceptibility. (American Association of Cancer Research, Annual Meeting 2024)
2023	Eat, Remember, Repeat: Determining an epigenetic memory of diet in intestinal stem cells. (Regenerative Medicine Seminar Series: "Research in Progress", ASU)
2023	Determining an epigenetic memory of diet in intestinal stem cells. (Molecular and Cellular Biology Colloquium, ASU)
2022	Finding memories hidden within the crypt: The long-term impact of a high-fat diet on intestinal stem cells. (Regenerative Medicine Seminar Series: "Research in Progress", ASU)

Poster presentations

2022	Finding memories hidden within the crypt: The impact of a high-fat diet on intestinal stem cells. (Annual Regenerative Medicine Symposium, ASU)
2021	Do you remember what you ate? Your stem cells might. (Annual Regenerative Medicine Symposium, ASU)

AWARDS / GRANT SUBMISSIONS / ACHIEVEMENTS

Current

2024	SACNAS Travel Scholarship.

Submitted/Pending

2024	NIH "Unraveling the Metabolic and Epigenetic Links: Understanding the Role of Lipid Metabolism in Diet-Induced Intestinal Stem Cell Function and Colorectal Cancer Initiation" (1F31CA290959-01A1) Role: PI. $95,388.00 total, 2024-2026.
2023	NIH "Unraveling the Metabolic and Epigenetic Links: Understanding the Role of Lipid Metabolism in Diet-Induced Intestinal Stem Cell Function and Colorectal Cancer Initiation" (1F31CA290959-01). **NOT DISCUSSED.** [Role: PI. $133,994.00 total and to Saiz, 2023-2025.]

Past

2024	AACR Epigenetics in Cancer Mini-symposium speaker
2024	ASU-GPSA "GPSA Travel Grant". $950 total.
2020	Graduated Cum Laude with Bachelors of Science Degrees in Biological Sciences
2020	Graduated Cum Laude with Bachelors of Science Degrees in Anthropology
2016-2020	New American Scholars - Dean's Award
2016	University Grant / Arizona State University
2016	Solutions Grant / Arizona State University

TEACHING EXPERIENCE

2020- 2024 Graduate Teaching Assistant – Arizona State University

Course	*Semester(s)*	*Format*
Developmental Biology	2020 - Fall 2021 - Spring 2022 - Spring 2023 - Summer 2023 - Fall	Online
General Genetics	2020 - Fall 2022 - Summer 2023 - Fall 2024 - Spring 2024 - Summer	Online
General Genetics	2022 - Fall	In Person
General Biology I	2022 - Spring	Online
General Biology I	2024 - Fall	In Person
General Biology II	2021 - Spring	Online

SKILLS

Laboratory Techniques and Animal Handling

- **Model Organism Work**: Extensive experience working with C57BL/6 mice, including colony maintenance, genotyping via PCR, and creating complex genetic mouse models (e.g., Cre-loxP, CreER systems).
- **Mouse Handling and Procedures**: Skilled in mouse tagging, tissue collection, and administering intraperitoneal injections (BrdU for proliferation assays, tamoxifen for genetic activation).
- **Tissue Collection and Histology**: Proficient in harvesting and isolating intestinal tissue, performing histological analysis using Hematoxylin and Eosin (H&E) staining, Immunohistochemistry (IHC), and analyzing samples using Keyence and Leica confocal microscopy systems.
- **Organoid Culture**: Expertise in isolating intestinal crypts and generating crypt-derived organoids. Experienced in hESCs/iPSCs culture, trained at Stemcell Technologies Workshop.
- **Flow Cytometry and FACS**: Proficient in isolating specific cell types from intestinal crypts using flow cytometry (FACS), and collecting pure cell populations for downstream applications such as protein extraction (Western blot), RNA extraction (qPCR, RNA-seq), and ATAC-seq.

Molecular and Cellular Biology Techniques

- **Genotyping and PCR**: Conducted tissue collection and PCR-based genotyping for mouse models with complex genetic backgrounds.
- **Cell and Tissue Analysis**: Performed various staining techniques (H&E, IHC, IF), analyzed histological and immunofluorescent samples using advanced microscopy techniques.
- **Organoid and Stem Cell Culture**: Specialized in maintaining and manipulating crypt-derived organoids, and hESCs/iPSCs cultures.

Software and Programming

- **R**: Advanced use in statistical modeling, data analysis, and visualization, particularly in multi-covariate designs for accessibility data.
- **bash**: Proficient in writing and executing bash scripts for automating data processing pipelines, including sequence alignment, data QC, and custom analyses on high-performance computing clusters.
- **Python**: Experienced in using deepTools and other Python-based packages for genomic data analysis.

- **Bioinformatics Tools**: Familiar with HOMER, Bowtie2, Samtools, Picard, MACS3, and related bioinformatics software.

Bioinformatics and Data Analysis

- **High-Throughput Computing (HTC/HPC)**: Proficient with ASU's AGAVE and SOL computing clusters for large-scale data processing and analysis.
- **Sequencing Data Analysis**: Experience in QC of ATAC-seq data using FastQC, adapter trimming with NMerge, alignment with Bowtie2 and Samtools, duplicate removal using Picard, and peak calling with MACS3.
- **Statistical Analysis**: Skilled in R programming for differential accessibility analysis, building complex statistical models using limma, edgeR, DESeq2, sva, and employing annotation and data visualization packages.
- **Motif Enrichment and Integration Analysis**: Experienced in using HOMER for motif enrichment and integrating data from TCGA and ENCODE databases.

PROFESSIONAL MEMBERSHIPS

2024- Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS), Role: Student Member

2023- American Association for Cancer Research (AACR), Role: Associate Member

2021- International Society for Stem Cell Research (ISSCR), Role: Student Member

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SERVICE

2023- Lecture Series Co-Coordinator - Regenerative Medicine, ASU

Coordinating the "Regenerative Medicine: Research in Progress" lecture series at Arizona State University. This series provides a platform for graduate students from diverse scientific backgrounds to present their ongoing research in regenerative medicine. The lecture series fosters an interdisciplinary environment, encouraging collaboration and knowledge-sharing among peers, faculty, and the broader scientific community.

2021- Undergraduate Mentor, ASU

Actively mentor undergraduate students newly joining the lab, providing guidance on research techniques, experimental design, and data analysis. Focus on fostering their academic and professional development to ensure their success in the lab and beyond.

2023 Graduate Program Information Liaison - School of Life Sciences, ASU

Collaborated with faculty at Arizona State University's School of Life Sciences to connect students with research opportunities. Represented the program at the Annual Biomedical Research Conference for Minoritized Students (ABRCMS), providing valuable information and guidance to prospective students interested in research careers.

2021-2022 Grant Reviewer - Graduate & Professional Student Association, ASU

Reviewed and evaluated internal grant applications for the Graduate & Professional Student Association at Arizona State University, contributing to the allocation of funding to support graduate and professional student research initiatives.

2019 Group member - Camp Kesem

Raised money for parents with cancer to allow their children to experience a cost-free summer camping experience for one week.