

Kevin Sanchez, Ph.D.

(305) 878-9664 | kbsanchez15@gmail.com

EDUCATION

The University of Texas at Austin Austin, TX
Ph.D. in Pharmaceutical Sciences (Division of Pharmacology and Toxicology) May 2023
Dissertation Title: Targeting age-associated neuroimmune changes to improve brain health
Advisor: Dr. Laura Fonken

Florida State University Tallahassee, FL
B.S. in Chemistry with Honors (*Cum Laude*) May 2018
Minors: Mathematics and Physics
Honors Thesis Title: Analysis of somatic driver genes in pediatric medulloblastoma
Advisor: Dr. Qing-Xiang Sang

Florida State University Tallahassee, FL
B.S. in Exercise Physiology (*Cum Laude*) May 2018
Minor: Biology

RESEARCH EXPERIENCE

Brigham and Women's Hospital, Division of Women's Health Boston, MA
Postdoctoral Research Fellow (Supervisor: Dr. Kathryn M. Rexrode) Jan 2024 – Present

- Leveraged data from various study cohorts, such as the Nurses' Health Study, to address the gap in understanding of the biological processes mediating the increased risk of cardiovascular diseases (e.g., stroke) in women
- Analyzed metabolomic and proteomic data from study cohort participants' bloods in SAS, SQL, and R to identify novel biomarkers and pathways promoting cardiovascular disease development

The University of Texas at Austin, College of Pharmacy Austin, TX
Graduate Research Assistant (Supervisor: Dr. Laura K. Fonken) Aug 2018 – May 2023

- Developed, planned, and executed collaborative experiments in rodents that investigated factors which modulate the neuroimmune system and contribute to age-associated behavioral changes
- Investigated whether immunization with *Mycobacterium vaccae* induces beneficial shifts in immune cell populations in the aged central nervous system to prevent cognitive decline
- Analyzed single nucleus RNA sequencing data in R to identify sex differences in brain aging by determining differentially expressed genes and enriched pathways
- Discovered that estrogen loss in mice can sensitize inflammatory responses in the brain, promoting neuroinflammation and resultant impairments in cognitive function and mood
- Created and validated immunoreactivity assays in FIJI/ImageJ aimed at examining the morphology of microglia, the primary neuroimmune cell type
- Assessed toxicological parameters following drug administration, in tissues during necropsy, and via *ex vivo* immune stimulation of neuroimmune cells

Florida State University, Department of Chemistry & Biochemistry Tallahassee, FL
Undergraduate Research Assistant (Supervisor: Dr. Qing-Xiang Sang) May 2016 – May 2018

- Extracted brain tumor data from public databases like the Catalog of Somatic Mutations in Cancer (COSMIC) and Pediatric Cancer Genome Project (PCGP)
- Identified driver genes and aberrant signaling pathways using R in prevalent pediatric brain cancers to detect novel therapeutic targets

The University of Nebraska Medical Center, Eppley Institute for Research in Cancer Omaha, NE
Summer Research Intern (Supervisor: Dr. Pankaj K. Singh) Jun 2017 – Aug 2017

- Performed metabolomic studies using liquid chromatography-mass spectrometry to evaluate the synergistic effects of quercetin and gemcitabine on cell viability in pancreatic cancer cell lines

COLLABORATIONS

-
- The University of Texas MD Anderson Cancer Center** Houston, TX
Graduate Student Researcher (Supervisor: Dr. Claudio M. Aldaz) Sep 2019 – May 2023
- Determined the mechanisms behind *Wwox* gene loss of function with central nervous system pathologies, such as autism and Alzheimer's disease, in a novel mouse model
- The University of Texas at Austin, College of Pharmacy** Austin, TX
Graduate Student Researcher (Supervisor: Dr. Andrea C. Gore) Jan 2020 – Dec 2020
- Assessed the impact of perinatal exposure to polychlorinated biphenyls in rats on neuroimmune function and behavior during adolescence

PEER-REVIEWED PUBLICATIONS

-
1. LM Ince, JS Darling, **K Sanchez**, KS Bell, JK Melbourne, LK Davis, K Nixon, AD Gaudet, LK Fonken. (2023). Sex differences in microglia function in aged rats underlie vulnerability to cognitive decline. *Brain, Behavior, and Immunity*, 114, 438-452.
 2. **K Sanchez**, S Wu, R Kakkar, JS Darling, R Daniels, CS Harper, LK Fonken. (2023). Ovariectomy in adult mice primes hippocampal microglia to exacerbate behavioral sickness responses. *Brain, Behavior, and Immunity – Health*, 30, 100638.
 3. T Hussain, **K Sanchez**, J Crayton, D Saha, C Jeter, Y Lu, M Abba, R Seo, JL Noebels, LK Fonken, CM Aldaz. (2023). WWOX P47T loss-of-function mutation induces epilepsy, progressive neuroinflammation, and cerebellar degeneration. *Progress in Neurobiology*, 223, 102425.
 4. **K Sanchez**, JS Darling, R Kakkar, S Wu, A Zentay, CA Lowry, LK Fonken. (2022). *Mycobacterium vaccae* immunization in rats ameliorates age-associated microglia activation in the hippocampus. *Scientific Reports*, 12, 2165.
 5. JS Darling, **K Sanchez**, AD Gaudet, LK Fonken. (2020). The Role of Microglia in Brain Aging: A Focus on Sex Differences. *Oxford Research Encyclopedia of Neuroscience*.
 6. **K Sanchez**, SP Guerin, LK Fonken. (2019). Anxiety in obesity: Is neuroinflammation the critical link? *Brain, Behavior, and Immunity*, 78, 7-8.
 7. CJ Robbins, MJ Bou-Dargham, **K Sanchez**, MC Rosen, QX Sang. (2018). Decoding Somatic Driver Gene Mutations and Affected Signaling Pathways in Human Medulloblastoma Subgroups. *Journal of Cancer*, 9, 4596-4610.

PROFESSIONAL PRESENTATIONS

Invited Oral Presentations

K Sanchez. Impact of estrogen loss on neuroimmune function and behavior. *4th Annual Center for Molecular Carcinogenesis and Toxicology Symposium, Austin, TX, 2022.*

Abstracts and Poster Presentations (Undergraduate Student Mentees Underlined)

K Sanchez, LM Ince, R Kakkar, LK Davis, JS Darling, SL Wu, A Zentay, CA Lowry, LK Fonken. *Mycobacterium vaccae* immunization in aged rats inhibits neuroinflammation via the adaptive and innate immune systems. *Society for Neuroscience, San Diego, CA, 2022.*

T Hussain, **K Sanchez**, R Seo, J Crayton, C Jeter, Y Lu, M Abba, J Noebels, LK Fonken, CM Aldaz. WWOX P47T loss-of-function mutation induces epilepsy, progressive neuroinflammation, and cerebellar degeneration in mice phenocopying human SCAR12. *UT Austin and MD Anderson Collaborative Research Summit, Austin, TX, 2022.*

K Sanchez, JS Darling, R Kakkar, SL Wu, CS Harper, LK Fonken. Ovariectomy in mice primes microglia to exacerbate neuroinflammation and subsequent behavioral deficits. *4th Annual Center for Molecular Carcinogenesis and Toxicology Symposium, Austin, TX, 2022.* ***Poster award winner**

T Hussain, **K Sanchez**, R Seo, J Crayton, C Jeter, Y Lu, M Abba, J Noebels, LK Fonken, CM Aldaz. WWOX P47T loss-of-function mutation induces epilepsy, progressive neuroinflammation, and cerebellar degeneration in mice phenocopying human SCAR12. *4th Annual Center for Molecular Carcinogenesis and Toxicology Symposium, Austin, TX, 2022.*

K Sanchez, JS Darling, R Kakkar, SL Wu, CS Harper, LK Fonken. Ovariectomy in mice primes microglia to exacerbate neuroinflammation and subsequent behavioral deficits. *Society for Behavioral Neuroendocrinology, Atlanta, GA, 2022.* ***Society travel award winner**

R Kakkar, **K Sanchez**, SL Wu, JS Darling, LK Fonken. Estrogen loss sensitizes hippocampal microglia, resulting in a potentiated neuroinflammatory response. *College of Natural Sciences Undergraduate Research Forum, Austin, TX, 2022.*

SL Wu, **K Sanchez**, LK Fonken. Laparotomy induces cognitive deficits in a postoperative cognitive decline model in rats. *College of Natural Sciences Undergraduate Research Forum, Austin, TX, 2022.*

R Kakkar, **K Sanchez**, SL Wu, JS Darling, LK Fonken. Estrogen loss sensitizes hippocampal microglia, resulting in a potentiated neuroinflammatory response. *Longhorn Research Poster Session, Austin, TX, 2022.*

R Kakkar, **K Sanchez**, SL Wu, JS Darling, LK Fonken. Estrogen loss sensitizes hippocampal microglia, resulting in a potentiated neuroinflammatory response. *18th Annual Louis C. Littlefield Celebrating Pharmacy Research Excellence Day, Austin, TX, 2022.*

K Sanchez, SL Wu, R Kakkar, JS Darling, CS Harper, R Chen, LK Fonken. Estrogen deficiency in mice sensitizes hippocampal microglia to an immune challenge and alters behaviors. *Society for Neuroscience Virtual Meeting, 2021.* ***Society travel award winner**

LK Davis, **K Sanchez**, M Bell, LK Fonken, AC Gore. A two-hit model of early immune activation in rats reveals sex-dependent alterations in anxiety and sociability behaviors. *Society for Neuroscience Virtual Meeting, 2021.*

K Sanchez, SL Wu, R Kakkar, CS Harper, LK Fonken. Ovariectomized mice exhibit amplified expression of hippocampal *IL6* and sickness behaviors after an immune challenge. *Society for Behavioral Neuroendocrinology Virtual Meeting, 2021.*

K Sanchez, SL Wu, R Kakkar, CS Harper, LK Fonken. Ovariectomized mice exhibit amplified expression of hippocampal *IL6* and sickness behaviors after an immune challenge. *Psychoneuroimmunology Research Society Virtual Meeting, 2021.*

R Kakkar, **K Sanchez**, CA Lowry, LK Fonken. Hippocampal microglia are vulnerable to aging-induced pro-inflammatory morphological changes that are partly alleviated by *M. vaccae* immunization. *Psychoneuroimmunology Research Society Virtual Meeting, 2021.*

R Kakkar, **K Sanchez**, CA Lowry, LK Fonken. Hippocampal microglia are vulnerable to aging-induced pro-inflammatory morphological changes that are partly alleviated by *M. vaccae* immunization. *College of Natural Sciences Undergraduate Research Forum, Austin, TX, 2021.*

SL Wu, **K Sanchez**, LK Fonken. Estrogen does not regulate microglial soma characteristics in response to an immune challenge. *College of Natural Sciences Undergraduate Research Forum, Austin, TX, 2021.*

CS Harper, **K Sanchez**, LK Fonken. *M. vaccae* immunization leads to greater microglial branching in the hippocampus of adult rats compared to aged rats. *College of Natural Sciences Undergraduate Research Forum, Austin, TX, 2021.*

K Sanchez, SL Wu, R Kakkar, CS Harper, LK Fonken. Estrogen deficiency exacerbates neuroinflammation, raising vulnerability to affective disorders. *17th Annual Louis C. Littlefield Celebrating Pharmacy Research Excellence Day, Austin, TX, 2021.* *Poster award winner

R Kakkar, K Sanchez, CA Lowry, LK Fonken. Hippocampal microglia are vulnerable to aging-induced pro-inflammatory morphological changes that are partly alleviated by *M. vaccae* immunization. *17th Annual Louis C. Littlefield Celebrating Pharmacy Research Excellence Day, Austin, TX, 2021.* *Poster award winner

SL Wu, K Sanchez, LK Fonken. Estrogen does not regulate microglial soma characteristics in response to an immune challenge. *17th Annual Louis C. Littlefield Celebrating Pharmacy Research Excellence Day, Austin, TX, 2021.*

K Sanchez, S Wu, R Kakkar, LK Fonken. Estrogen deficiency causes an exaggerated microglial response, raising vulnerability to mood disorders. *16th Annual Louis C. Littlefield Celebrating Pharmacy Research Excellence Day, Austin, TX, 2020.*

K Sanchez, R Chen, LK Fonken. Endogenous and exogenous factors shift the neuroimmune environment, altering behaviors in mice. *Graduate Student Recruitment Poster Session, Austin, TX, 2020.*

SP Guerin, K Sanchez, R Chen, TT Li, LK Fonken. Effects of endogenous and exogenous factors on neuroimmunity and behavior in mice. *Graduate Student Recruitment Poster Session, Austin, TX, 2019.*

K Sanchez, V Gunda, KB Buettner, NV Chaika, PK Singh. Metabolic response to quercetin in pancreatic cancer cells. *Summer Undergraduate Research Program Symposium, Omaha, NE, 2017.*

SUPPLEMENTARY COURSEWORK

Environmental Health Risk: Analysis and Applications Harvard T.H. Chan School of Public Health	Mar 2023
Measuring Disease in Epidemiology Imperial College London	Jul 2022
Advanced Comprehensive Toxicology American College of Toxicology	Aug 2020

TEACHING & MENTORING EXPERIENCE

The University of Texas at Austin Undergraduate and High School Mentor	Austin, TX Aug 2019 – May 2023
<ul style="list-style-type: none"> – Mentored four undergraduate students and two high school students in neuroscience research – Trained students in brain sectioning, immunohistochemistry, brightfield/fluorescence/confocal imaging, microglia morphological analyses, behavioral scoring, data collection/analyses, and public presentations 	
The University of Texas at Austin Teaching Assistant, <i>Physiology, Pathophysiology, and Drug Targets</i>	Austin, TX Jan 2020 – May 2020
<ul style="list-style-type: none"> – Developed and administered weekly quizzes to \approx 120 pharmacy students using ExamSoft – Assisted with the redesign and facilitation of the course following the transition to an online format due to COVID-19 	

Florida State UniversityTeaching Assistant, *General Chemistry II Laboratory*

Tallahassee, FL

Jan 2016 – May 2016

- Taught 39 students how to follow experimental and safety procedures in a laboratory setting
- Assisted students for two hours every week by answering questions regarding their General Chemistry laboratory or lecture courses

MENTORED STUDENTS**Shwetha Sridhar** 2022 – 2023

Currently: Sales development representation at Starburst Data

Claire S. Harper 2020 – 2022

Currently: Undergraduate student at The University of Texas at Austin

Reha Kakkar 2019 – 2022

Currently: Undergraduate student at The University of Texas at Austin

Sienna L. Wu 2019 – 2022

Currently: Medical student at McGovern Medical School

Cara Fonken 2019

Currently: Undergraduate student at The University of Texas at Austin

SCIENCE OUTREACH**Letters to a Pre-Scientist** Austin, TX

Mentor Jul 2022 – Present

- Worked with middle school students in an underserved community to broaden their awareness of STEM careers and inspire them to explore a future in STEM
- Exchanged eight letters throughout the school year discussing higher education pathways, STEM career journeys, and overcoming obstacles

The Atomic Cosmos Austin, TX

Founder Oct 2017 – Jul 2020

- Generated a newsfeed and blog that reached thousands of individuals worldwide, discussing topics relevant to chemistry that influence our day-to-day lives
- Introduced subjects in ways that connected with the general population to raise awareness of the importance of science and its all-encompassing fields

Cancer Knowledge Tallahassee, FL

Blog Editor Jun 2017 – Jul 2018

- Discussed recent scientific findings, breakthroughs, and approved drugs in cancer research
- Increased awareness of cancer biology and communicated research advances to the general public

HONORS & AWARDS

Scientist Mentoring and Diversity Program for Biotechnology Scholar 2023

Johnson & Johnson Endowed Graduate Fellowship in Pharmacy 2022

Poster Presentation Winner, 4th Annual Center for Molecular Carcinogenesis and Toxicology 2022

Symposium

Center for Molecular Carcinogenesis and Toxicology Travel Award 2022

Society for Behavioral Neuroendocrinology Annual Meeting Travel Award 2022

Daniel and Patricia Acosta Graduate Endowment Travel Award 2022

F31 Diversity NRSA Fellowship (F31AG072867) 2022

Society for Neuroscience Trainee Professional Development Award 2021

Dr. Elaine S. Waller Endowed Graduate Scholarship 2021

Three Minute Poster Presentation Winner, 17 th Annual Louis C. Littlefield Celebrating Pharmacy Research Excellence Day	2021
Division of Pharmacology & Toxicology Fellowship, The University of Texas at Austin	2018 – 2019
American Chemical Society Certified Bachelor's Degree, Florida State University	2018
Undergraduate Research Award, Florida State University	2018
Outstanding Chemistry Teaching Assistant Award, Florida State University	2016
Dean's List, Florida State University	2015 – 2018
President's List, Florida State University	2014
Florida Bright Futures Scholarship	2014 – 2018

SERVICE

Advisory Committee Member	2024 – Present
Connors – Brigham Research Institute Center for Research on Women's Health and Sex/Gender Medicine	

Reviewer

<i>Physiology and Behavior</i>	2024 – Present
--------------------------------	----------------

Ad Hoc Reviewer

<i>Brain, Behavior, and Immunity</i>	2022 – 2023
<i>Cell and Molecular Neurobiology</i>	2022 – 2023
<i>Neurochemical Research</i>	2021 – 2023
<i>Behavioural Brain Research</i>	2020 – 2023
<i>Pharmacological Research</i>	2020 – 2023

PROFESSIONAL AFFILIATIONS

Member, Society for Neuroscience	2021 – 2023
Member, Psychoneuroimmunology Research Society	2021 – 2023
Member, American College of Toxicology	2020 – 2023
Member, Society for Behavioral Neuroendocrinology	2020 – 2023
Member, Society of Toxicology	2020 – 2023
Member, American Association for the Advancement of Science	2018 – 2020
Nationally Inducted Member, Alpha Epsilon Delta	2014 – 2018

SKILLS

Software

– R	– Database extraction
– SAS	– Data cleaning and pre-processing
– SQL	– Data analysis and visualization
– Adobe Illustrator, InDesign, Photoshop	– Big data (e.g., 'omics) and small data analysis
– GraphPad Prism	– High performance computing
– LaTeX	– <i>In vivo</i> , <i>ex vivo</i> , and <i>in vitro</i> drug administration
– Microsoft Office	– Cell culture seeding and passaging
	– DNA/RNA/protein extraction and expression
	– Flow cytometry

Technical Skills

– Parametric and non-parametric statistical analyses (descriptive statistics, <i>t</i> tests, ANOVAs, χ^2 , survival analyses, multivariate analyses)	– Immunohistochemistry
– Linear and non-linear regression analyses	– Epifluorescent and confocal microscopy
	– Project management (e.g., budgets, experimental design, prioritization)
	– Graphic design for publications
	– Manuscript writing

REFERENCES

Kathryn Rexrode, Professor and Division Chief — Postdoctoral supervisor

Division of Women's Health
Brigham and Women's Hospital
(617) 525-7588, krexrode@bwh.harvard.edu

Laura K. Fonken, Assistant Professor — Ph.D. advisor

Department of Pharmacology & Toxicology
The University of Texas at Austin
(512) 232-8331, laura.fonken@austin.utexas.edu

Andrea C. Gore, Professor — Collaborator and Ph.D. committee member

Department of Pharmacology & Toxicology
The University of Texas at Austin
(512) 471-3669, andrea.gore@austin.utexas.edu

Qing-Xiang (Amy) Sang, Professor — B.S. advisor

Department of Chemistry & Biochemistry
Florida State University
(850) 644-8683, qsang@chem.fsu.edu