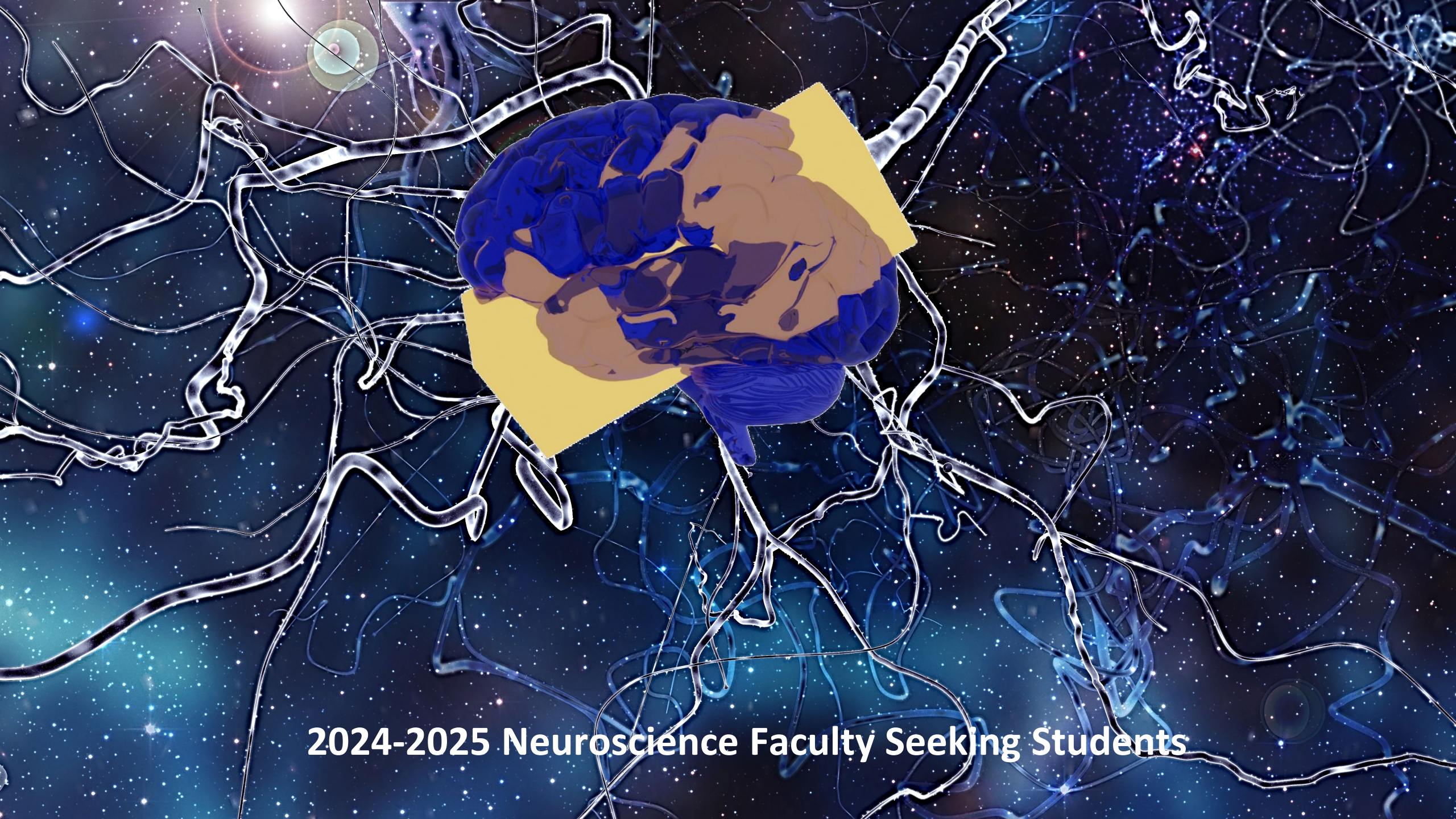

2024-2025 Neuroscience Faculty Seeking Students

2024-2025 Neuroscience Faculty Seeking Students

Faculty Name	Seeking Students
Alejandro Aballay	PhD
Moran Amit	Both
Michael Beierlein	PhD
Wei Cao	Both
Anjali Chauhan	MS
John H. Byrne	PhD
Julio Cordero-Morales	PhD
Pramod Dash	PhD
Carmen W. Dessauer	PhD
Fabricio H. Do Monte	PhD
Kristin L. Eckel-Mahan	Both
Laura Goetzl	Both
David R. Grosshans	Both
Ruth Heidelberger	PhD
Jian Hu	Both
Vasanthi Jayaraman	PhD
Wen Li PhD	PhD
Eunhee Kim	Both
Gab Seok Kim	Both
Jung Hwan Kim	Both
Keran Ma	Both
Sean P. Marrelli	PhD
Rodrigo Morales	Both
Louise D. McCullough	PhD
Yuan Pan	PhD
Chirag Patel	PhD
Andrew Pickering	Both
Xuefang Sophie Ren	Both
Rodney Ritzel	Both
Yanning Rui	PhD
Andrea Stavoe	PhD
Nitin Tandon	Both
Qingchun Tong	PhD
Andrey S. Tsvetkov	PhD
Akihiko Urayama	Both
Valeria Vasquez-Robaina	Both
Kartik Venkatachalam	Both
Edgar T. Walters	PhD
Jiaqian Wu	PhD
Jiusheng Yan	Both
Long-Jun Wu	Both
Sheng Zhang	PhD

Amit Laboratory

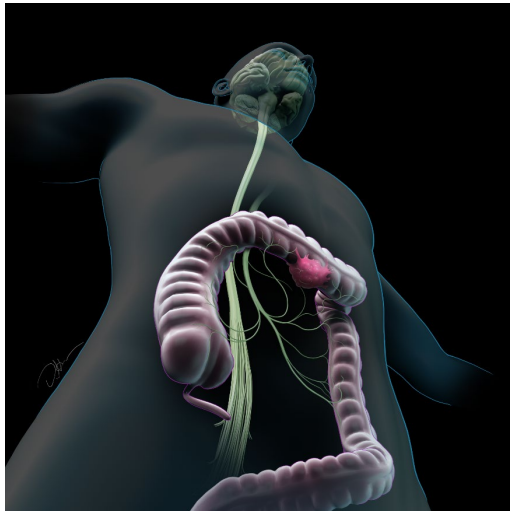
Cancer takes a nerve, *where Cancer Biology and Neuroscience meet*

Research Focus:
The Amit Laboratory at MD Anderson Cancer Center is dedicated to understanding the nervous system's contribution to cancer. Our research is divided into three main areas:

1. **Experimental Cancer Cell Biology:** We investigate the cellular and molecular mechanisms by which the nervous system influences cancer development and progression.
2. **Tumor Microenvironment Subpopulations:** Using advanced computational biology techniques, we study the diverse cell populations within the tumor microenvironment to uncover their roles in cancer biology.
3. **Psychedelic Research in Cancer:** We explore the therapeutic potential of psychedelics, such as psilocybin, in alleviating psychiatric distress and improving the quality of life for cancer patients, including conducting clinical trials to assess their efficacy.

Approaches and Techniques:

- **Computational Biology:** Leveraging computational tools to analyze complex biological data and model tumor microenvironment interactions.
- **Molecular Biology:** Employing cutting-edge molecular biology techniques to dissect the pathways involved in neuro-cancer interactions.
- **Cell Biology:** Utilizing experimental approaches to study cancer cell behavior and the influence of neural factors on these cells.
- **Clinical Trials:** Conducting clinical trials to evaluate new therapeutic approaches, including psychedelic-assisted therapy, for cancer patients.



- **Access to Clinical Facilities:**

Our lab benefits from access to MD Anderson's state-of-the-art clinical facilities and operating rooms (OR), enabling us to translate our research findings into clinical applications and provide comprehensive care to our patients.

- **Recent Publications and Achievements:**

Our lab has made significant contributions to the field, with numerous publications in high-impact journals. For a detailed list of our recent work, please visit our publications page.

- **Opportunities for Trainees:**

We are always looking for motivated students and postdoctoral fellows to join our dynamic team. Trainees in the Amit Lab will have the opportunity to work on cutting-edge research projects, gain expertise in both experimental and computational techniques, and contribute to impactful discoveries in cancer biology.

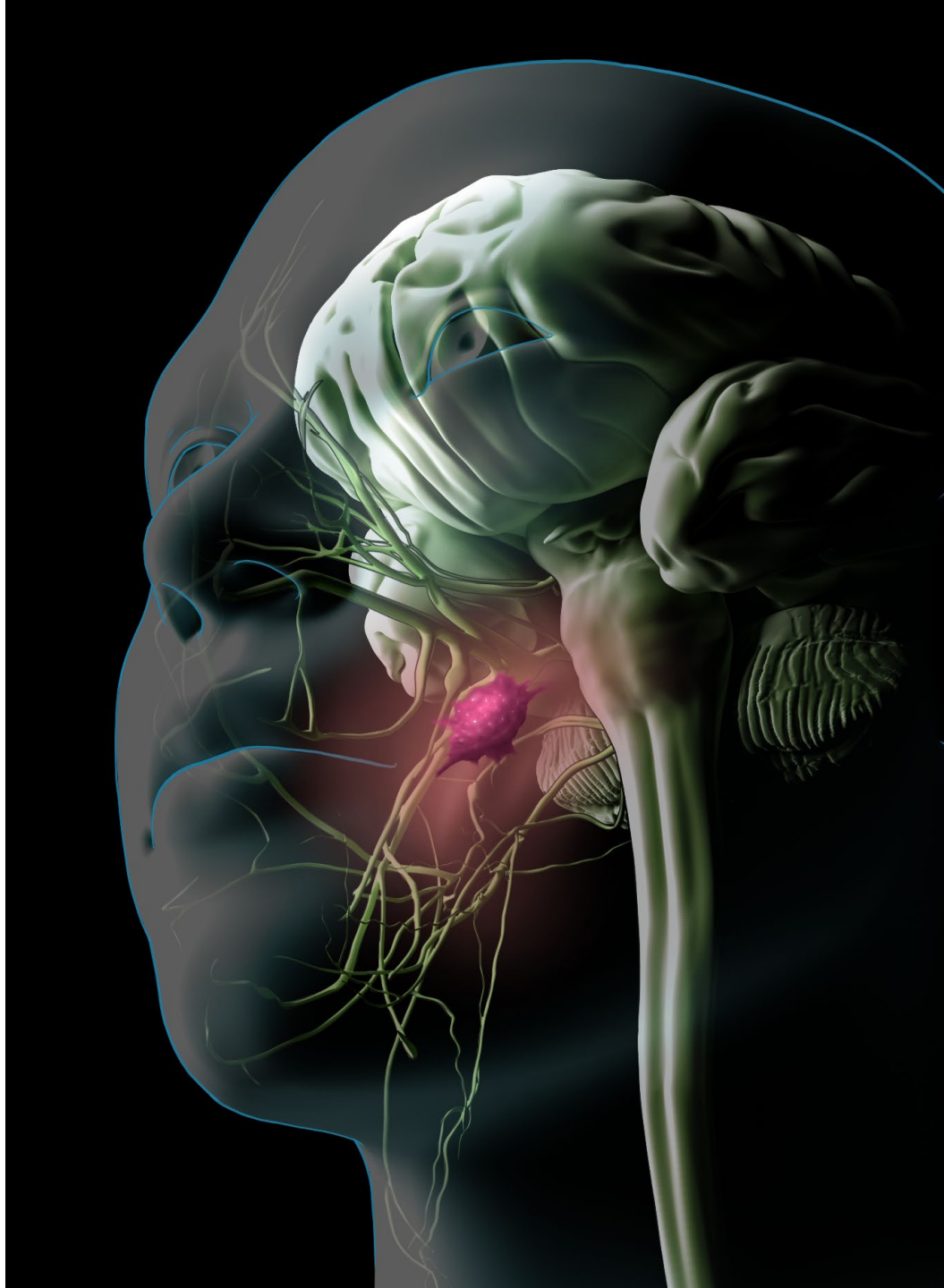
- **Contact Information:**

For more information or to express interest in joining our lab, please visit our Join Our Lab page.

- **Lab Members:**

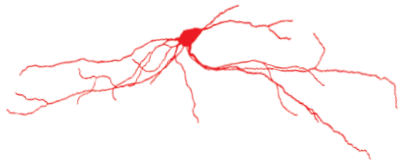
Our team is composed of dedicated researchers with diverse backgrounds in neuroscience, cancer biology, and computational biology. To meet our lab members, please visit our Lab Members page.

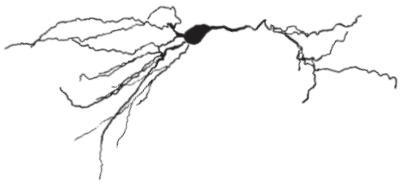
- We look forward to welcoming new members who are passionate about advancing our understanding of the nervous system's role in cancer.



Synaptic and Network Dynamics in the Thalamocortical System

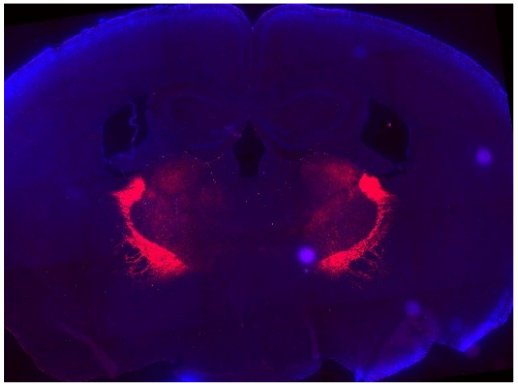
Michael Beierlein, PhD

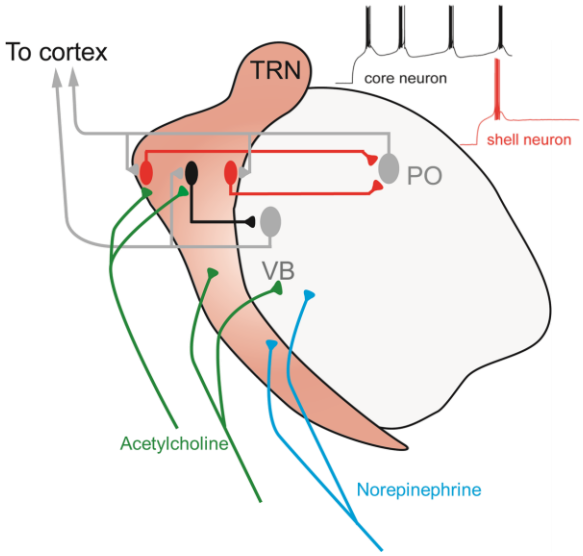


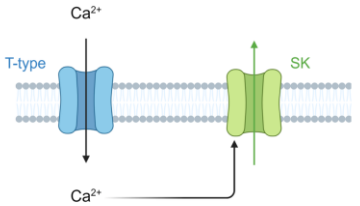


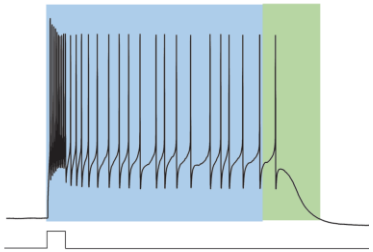
Research Questions

- How do thalamic neurons integrate cortical and sub-cortical synaptic inputs to generate behaviorally relevant output?
- How do the neuromodulators Noradrenaline and Acetylcholine control local circuits, brain state, and behavior?
- What are the mechanisms that underlie thalamic dysfunction during early stages of Alzheimer's disease?



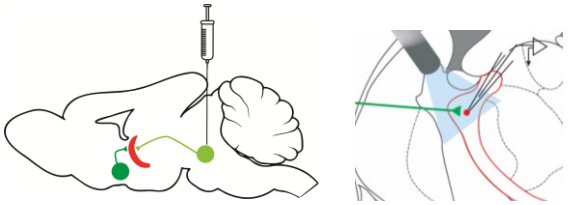


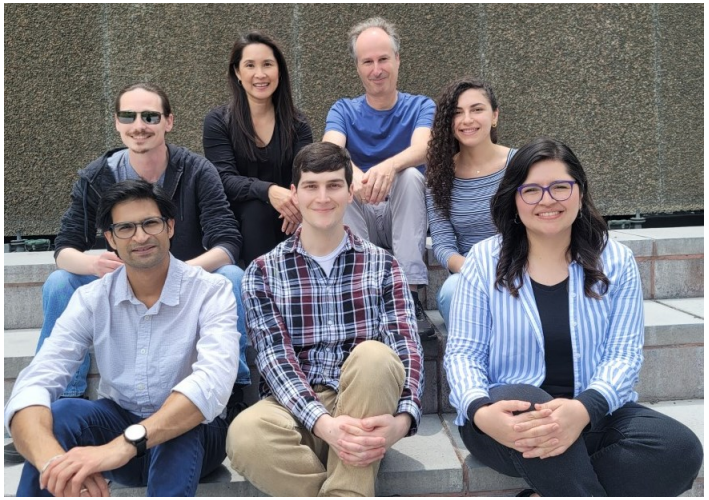




Approaches

- Brain slice electrophysiology
- Optogenetics





Contact us for further info

Michael michael.beierlein@uth.tmc.edu
Dounya dounya.jalloul@uth.tmc.edu
Nayeli nayeli.j.riveraramirez@uth.tmc.edu

Lab funding

NIH National Institutes of Health
Turning Discovery Into Health

BNDC

Jack Byrne, Department of Neurobiology and Anatomy
Systems, Circuit, Cellular and Molecular Mechanisms of Simple Forms of Memory

Project 1. Empirical and computational analyses of neuronal circuits underlying rhythmic motor behavior and their modifications by learning.
The issue is addressed by studying ubiquitous forms of associative learning (i.e., classical and operant conditioning) and exploiting the technical advantages of the simple nervous system of the marine mollusk *Aplysia* (Fig. 1). Techniques include extra- and intra-cellular electrophysiological recording (Fig. 2A), large-scale single-neuron resolution recording techniques using voltage-sensitive dyes (Fig. 3A,B), computational modeling, and information theory (Fig. 3C) to infer the underlying neuronal circuity (Fig. 2B, 3D) and how it is modified by learning.

Fig. 1

Fig. 2

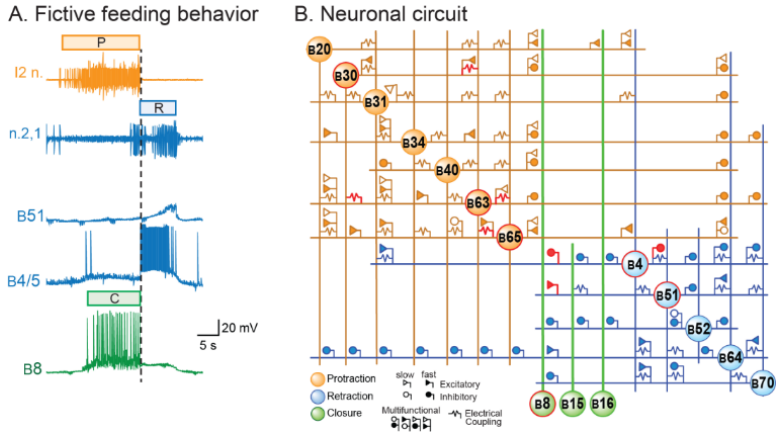
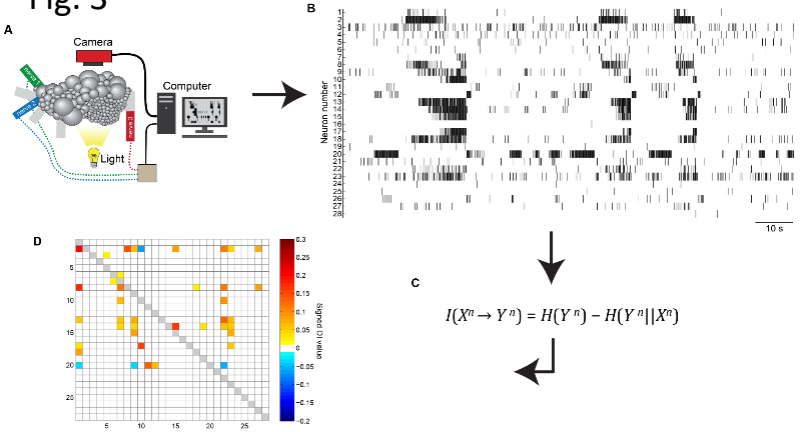
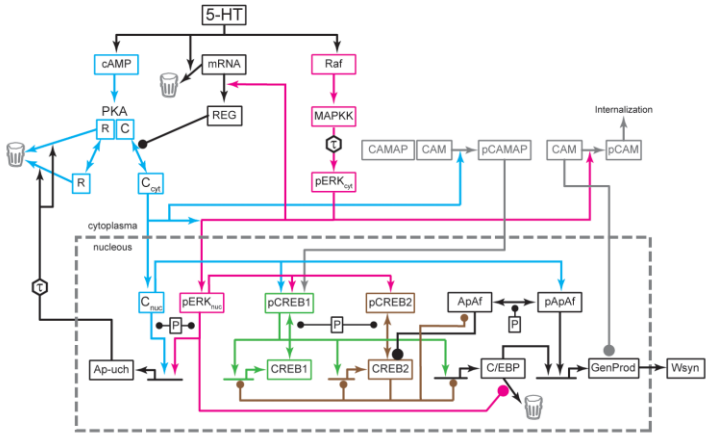


Fig. 3



Project 2. Empirical and computational analyses of biochemical and genetic networks underlying long-term memory formation.
Techniques include electrophysiological, biochemical and molecular approaches (e.g., laser confocal microscopy, western blots, gene expression analyses, siRNA), mathematical models of the molecular circuitry (Fig. 4), and use of computer simulations to identify optimal training protocols, and optimal pharmacological targets, for enhancement of normal memory and rescue of memory deficits.

Fig. 4



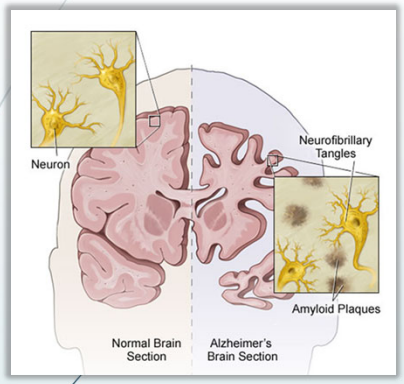
Lab Web page: https://med.uth.edu/nba/faculty-labs/byrne-lab/
Wikipedia: https://en.wikipedia.org/wiki/John H._Byrne
Neurotree: https://neurotree.org/beta/tree.php?pid=899
YouTube Biography: https://www.youtube.com/watch?v=-y6sZJt_EiU
CV and Publications: https://med.uth.edu/nba/wp-content/uploads/sites/29/2014/08/Byrne-John_CV_2022_June.pdf

The Cao Laboratory

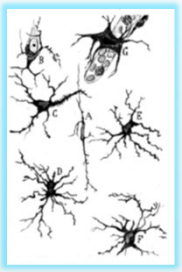
@ McGovern Medical School, UTHealth

Research Focus: Neuroinflammation in Alzheimer's Disease

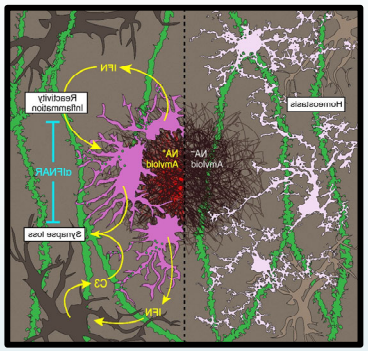
AD



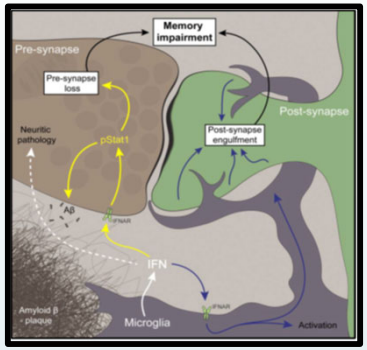
Microglia



Neuroinflammation drives AD pathogenesis

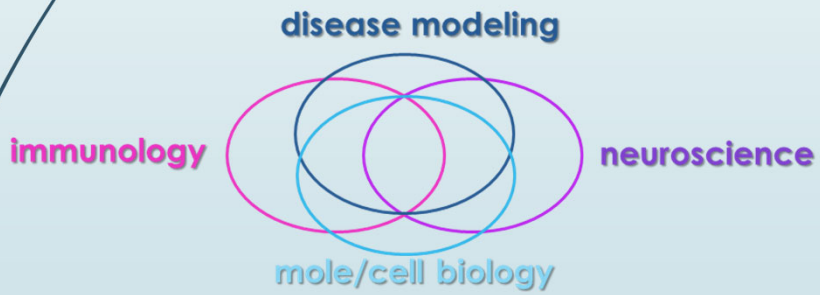


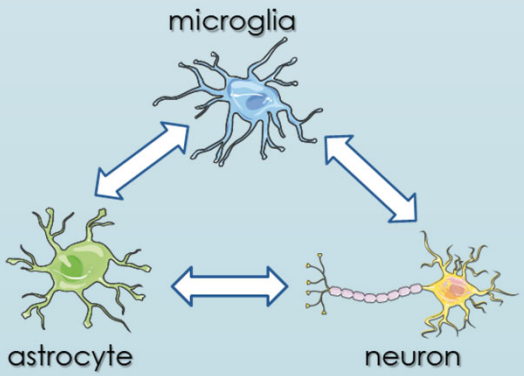
Roy et al, ***J Clin Invest*** 2020



Roy et al, ***Immunity*** 2022

Research Area





Major Techniques

Alzheimer's disease modeling: development of AD pathologies in live mice and cell cultures
High-resolution confocal microscopy: synaptic integrity and glia activity
Transgenic mice: cell-type specific gene knockout & signaling tracking
AAV-mediated gene transduction: targeted gene expression in brain
Glia isolation, culture, and selective ablation: role of glia cells in the brain
Neuronal culture and manipulation: pathways critical for neurodegeneration
Stereotaxic injection: direct delivery into the brain
RNAseq and proteomic analysis: pathway delineation

Who and where we are

Our lab is on the 5th floor of MSB in room 5.034. Currently, we have 3 PhD-level fellows and 2 technicians.

Website https://med.uth.edu/anesthesiology/research/research-labs/cao-lab/

Wei Cao
Professor, Dept of Anesthesiology wei.cao@uth.tmc.edu

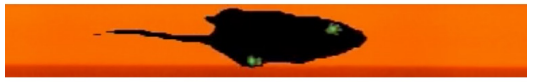
Cordero Vásquez

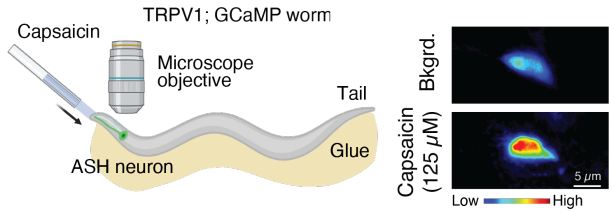
Research Group at UT Health Houston

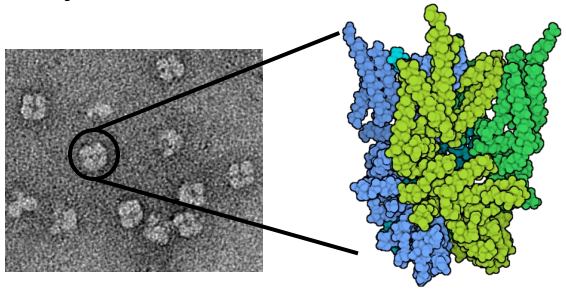
The laboratory of Dr. Julio Cordero-Morales studies the molecular basis of sensory ion channel regulation (e.g., mechanosensitive and transient receptor potential ion channels) by membrane lipids and the cytoskeleton, as well as the structure-function relationship of ion channels involved in neurological disorders. We combine electrophysiology, molecular biology, biochemistry, animal behavior (*C. elegans* and mice), and structural biology. Publications from the group that represent ongoing projects:

- Romero LO, Caires R, *et al.* 2023. Linoleic acid improves PIEZO2 dysfunction in a mouse model of Angelman Syndrome. *Nature Communications*.
- Caires R, *et al*. 2022. Genetic- and diet-induced ω-3 fatty acid enrichment enhances TRPV4-mediated vasodilation in mice. *Cell Reports*.
- Caires R, *et al*. 2021. Deficiency of inositol monophosphatase activity decreases phosphoinositide lipids and enhances TRPV1 function *in vivo*. *Journal of Neuroscience*.
- Sierra-Valdez F, *et al*. 2018. Structure-function analyses of the ion channel TRPC3 reveal that its cytoplasmic domain allosterically modulates channel gating. *Journal of Biological Chemistry.*

Group members can expect individualized mentorship and a team-oriented environment. All work is supported by recently awarded federal and institutional funding.

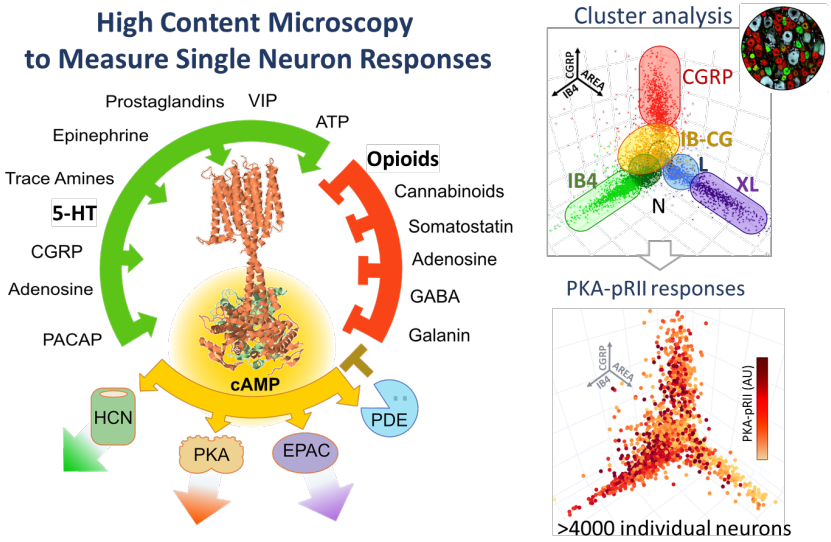






Carmen Dessauer Lab: Cyclic AMP Signaling in Heart Disease and Chronic Pain

Research interests: Our lab performs basic research on the mechanisms that drive heart disease/arrhythmias and chronic pain due to the production and localization of the second messenger cyclic AMP. In heart we examine how scaffolding proteins organize and regulate adenylyl cyclase to achieve localized cyclic AMP signaling for cardiac function. In sensory neurons within the dorsal root ganglia, we investigate the synergy between pathways elicited by cyclic AMP and growth factors and/or cytokines to maintain chronic pain states. After injury, we found that inhibition by opioids is blunted due to alterations of adenylyl cyclase by Ras/C-Raf signaling. We use high content microscopy to understand mechanisms driving pain.



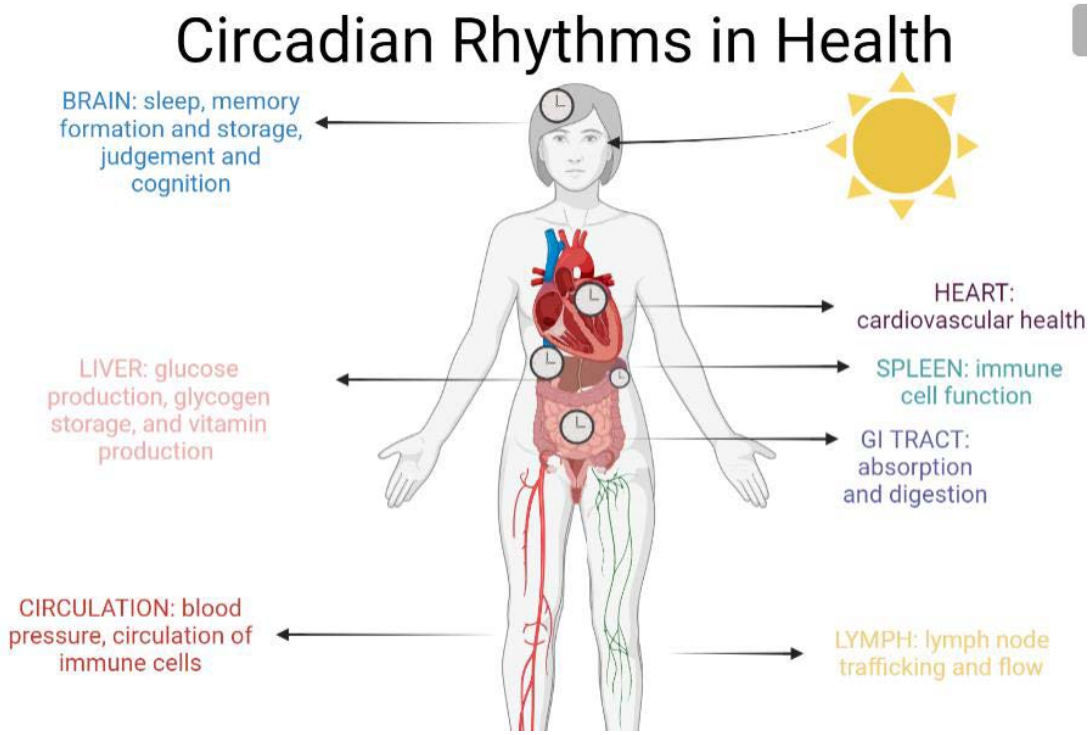
Techniques: Biochemistry (protein purification and structure-function assays), mouse genetic models, fluorescence-based imaging approaches (FLIM-FRET, BiFluorescence Complementation, Proximity ligation assays, High content imaging, real-time cellular cAMP measurements), Proximity-dependent biotin identification (BioID) proteomics, and in collaboration with E. Terry Walters, electrophysiology and behavioral assays

Current and Past Trainees: ***Chrystine Gallegos*** (current PhD student), ***Elia Lopez*** (former student, F30 and T32 recipient, currently at NIH / FDA), ***Tanya Baldwin*** (former student, T32 recipient, 6 papers for PhD, currently a postdoc at Cleveland Clinic), ***Cameron Brand*** (former student, T32 recipient, published 7 papers for PhD, now Process Development Scientist at Abzena), ***Sam Berkey*** (former student, now Scientific Liason at Hologic, Inc.)

Contact PI: Carmen Dessauer, PhD. Carmen.W.Dessauer@uth.tmc.edu
Office: 713-500-6308 **Lab website:** www.Dessauer-lab.com
Student contact: Chrystine Gallegos, M.S. Chrystine.Gallegos@uth.tmc.edu

THE ECKEL-MAHAN LABORATORY: CIRCADIAN RHYTHMS IN DISEASE PREVENTION

The goals of my lab center on the role of the circadian clock in health and disease. Circadian rhythms, which are endogenous, self-perpetuating oscillations of 24-hr periodicity, are present in almost all cells of the body. When the circadian clock is disrupted genetically or environmentally, several deleterious outcomes result, including accelerated aging, cancer, and metabolic imbalance. We are trying to understand why circadian disruption produces these effects.



While the central pacemaker of the brain is entrained by light, circadian oscillations in peripheral organs are heavily influenced by other zeitgebers ("time-givers") such as food. When clocks across the body are desynchronized, metabolic disease results. Our current experiments include those designed to reveal which zeitgebers are most important for tissue-specific clock function and the mechanisms underlying their zeitgeber properties. In addition, we are interested in how disrupted peripheral clocks communicate back to the brain and alter neuronal function within the central pacemaker, the suprachiasmatic nucleus, as well as other regions of the CNS.

Current projects in the lab include:

1)the circadian mechanisms by which specific hepatic nuclear receptors prevent liver diseaseand carcinogenesis

2)mechanisms linking the clock to metabolic function in adipose tissue and adipocyteprogenitor cells

3)links between circadian disruption and obesity and insulin resistance

4)mechanisms by which the suprachiasmatic nucleus and hypothalamus orchestrate rhythmsin physiology and metabolism

These experiments depend on several mouse models of circadian disruption as well as in vitro approaches.

Link to PubMed manuscripts: https://pubmed.ncbi.nlm.nih.gov/?term=eckel-mahan&sort=date Come join the great people in my laboratory: Baharan Fekry PhD (Assistant Professor), Rachel Van Drunen (Neurobiology PhD Candidate and Fulbright Scholar), Ruwaida Ahmed(Research Technician), and Sina Noori (Research Technician)
Lab website: https://www.eckel-mahanlab.org/

Goetzl Lab

The University of Texas Health Science Center at Houston
McGovern Medical School
Department of Obstetrics & Gynecology
laura.goetzl@uth.tmc.edu

The Goetzl lab focuses on translational research in perinatal brain injury. Specifically, we explore mechanisms of fetal brain alterations related to three major areas of exposure: 1) Hypoxia/Ischemia 2) Viral infections such as Zika and Cytomegalovirus (CMV) and 3) Exposure to psychoactive drugs and medications commonly taken by women of childbearing age, especially selective serotonin uptake inhibitors (SSRIs), marijuana (THC), opiates, and amphetamines. Typically we utilize either clinical specimens collected from pregnant women or neonates or, in collaboration, preclinical specimens collected from non-human primates, ovine or rodent models. Our testing platform is based on a novel innovation discovered and patented by Dr. Goetzl that fetal neuronally derived exosomes/extracellular vesicles (ECVs) can be isolated from both maternal and neonatal serum or plasma samples. This allows a non-invasive window into the intracellular alterations associated with the exposures of interest. Typically we partner with clinicians who have existing samples from prospective cohorts or clinical trials so that we can link changes in ECV biomarkers with clinically relevant outcomes such as imaging (MRI) results or neurobehavioral outcomes. Graduate student projects might focus on a specific protein, mitochondrial or miRNA marker to determine its potential for detecting injury or drug effects. End products of projects might include predictive clinical tests that would either identify a population requiring treatment, discover new therapeutic targets, or provide prognostic information for parents and clinicians.

The Hu Laboratory

Research focus: Brain Tumor, Glia Biology, Lipid Metabolism

Major techniques

- **Mouse genetics**: Cre-loxP technology to achieve neural cell type specific manipulations
- **Mouse modeling of neurological diseases**: Generation of faithful mouse models for brain tumors, demyelinating diseases, and neurodegenerative diseases
- **Biochemical and cellular biology**: Chromatin structure, transcription regulation, membrane biology, lipid metabolism, subcellular organelle trafficking, immune cell biology

Major Research Directions

- Brain Tumor Stem Cell Biology and Immune Microenvironment
- Demyelinating Diseases Such as Multiple Sclerosis
- Lipid metabolism in the Central Nervous System (CNS) and Peripheral Nervous System (PNS)
- Chemotherapy-Induced Neurological Sequelae
- Neurodegenerative Diseases

More information? Jian Hu: jhu3@mdanderson.org
Lab website: https://www.mdanderson.org/research/departments-labs-institutes/labs/hu-laboratory.html

Recent Student Publications

- **Shin S**…Hu J. Qki activates Srebp2-mediated cholesterol biosynthesis for maintenance of eye lens transparency. *Nat. Comm.* 2021;
- Zhou X., **Shin S**. ….Hu J. Qki regulates myelinogenesis through Srebp2-dependent cholesterol biosynthesis. *eLife*, 2021;
- Shingu T., **Ho AL**…Hu J. Qki deficiency maintains stemness of glioma stem cells in suboptimal environment by downregulating endolysosomal degradation. *Nat. Genetics.* 2017.

Recent Graduates

- Seula Shin: PhD 2021, President's Scholarship; postdoc at Denali
- Daniel Zamler: PhD 2022, T32 Award; postdoc at Stanford
- Fatma Yasar: PhD 2023, CCE scholar; postdoc at MD Anderson

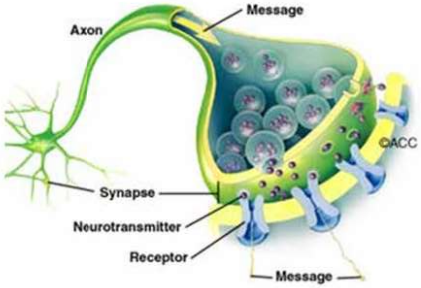
Current Graduate Students

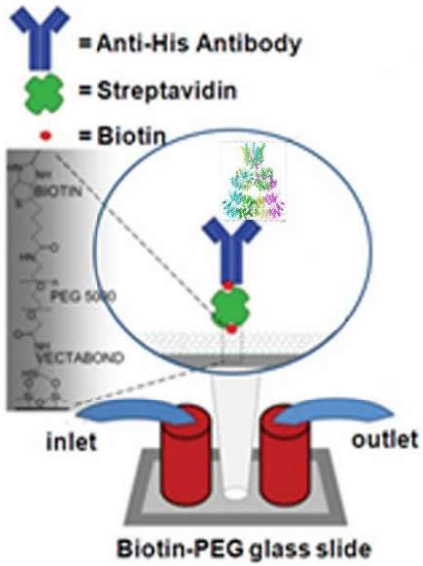
Joseph Barnes-Vélez (TL1 award, F31 award), Rocio Zorrilla-Veloz, Bridgitte Palacios (TL1 award), Takese Mckenzie (Kopchick scholar), Yating Li, Kaylene Lu (Kopchick scholar), Shaolin Mei, Spring Hwang, Ece Kilinc, Abhijeet Patil, Cheng-En Shen

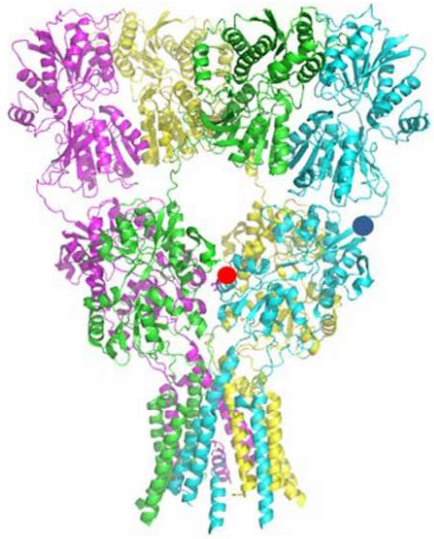
Structure and function of membrane proteins in the brain – Dr. Jayaraman

MSB 6.174, vasanthi.jayaraman@uth.tmc.edu, 713-500-6236

Image source: https://i.ytimg.com/vi/_h-14hcLbO0/hqdefault.jpg







Communication between nerve cells serves as the basis of all brain activity, and one of the fundamental steps involved in signal transmission between the nerve cells, is the conversion of a "chemical" signal liberated at the end of one nerve cell, into an "electrical" signal at the second nerve cell. This step is mediated by a class of membrane bound proteins known as ligand gated ion channels Our laboratory is interested in gaining an understanding of molecular motions underlying the function of these proteins. This is achieved by using various cutting edge biochemical methods that allow the characterization of the dynamic state structure of the proteins.

The ultimate goal is to use this information for the rational design of drugs targeting this group of important proteins that are involved in diverse neuropathologies, such as Alzhimer's, epilepsy and ischemia

1. Durham RJ, Paudyal N, Carrillo E, Bhatia NK, Maclean DM, Berka V, Dolino DM, Gorfe AA, Jayaraman V. Conformational spread and dynamics in allostery of NMDA receptors. Proc Natl Acad Sci U S A. 2020 Feb 18;117(7):3839-3847.
2. Dolino DM, Chatterjee s, Maclean DM Flatebo C, Landes CF, Jayaraman V. Nat Chem Biol. 2017 Dec;13(12):1232-1238.
3. Landes, C.F., A. Rambhadran, J.N. Taylor, F. Salatan, and V. Jayaraman, Nat Chem Biol, 2011. 7(3): p. 168-73.

UTHealth McGovern Medical School
The University of Texas Health Science Center at Houston

Mischer Neuroscience Institute
MEMORIAL HERMANN

Kim Lab (*PI: Gab Seok Kim, Ph.D.*)

Currently supported by *UTH Startup*, *NIH R21AG072488* and *NIH R01NS133324*

Seeking MS and PhD students

Brain • Rejuvenation • Aging • Inflammation • Neurodegeneration • Stroke

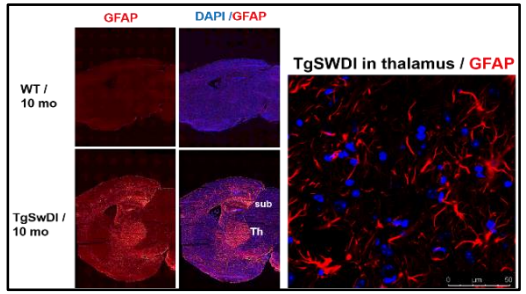
The BRAINS Research Laboratory

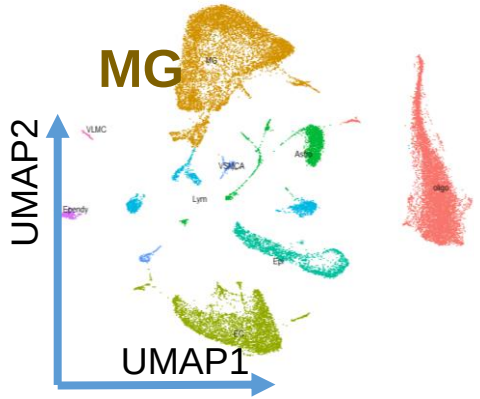
Projects Interferon signaling in immune cells in aged brains and in neurodegenerative diseases.

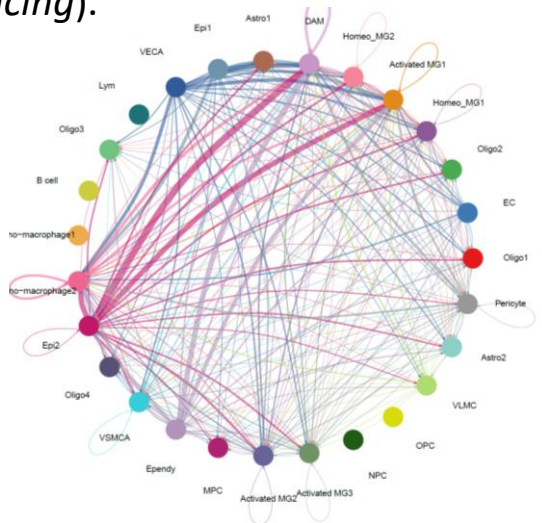
Project 1. The goal of this project is to explore the novel role of IFN signaling in regulating MG phagocytic function and Aβ clearance using a mouse model, which demonstrates both vascular and parenchymal Aβ deposits (TgSwDI).

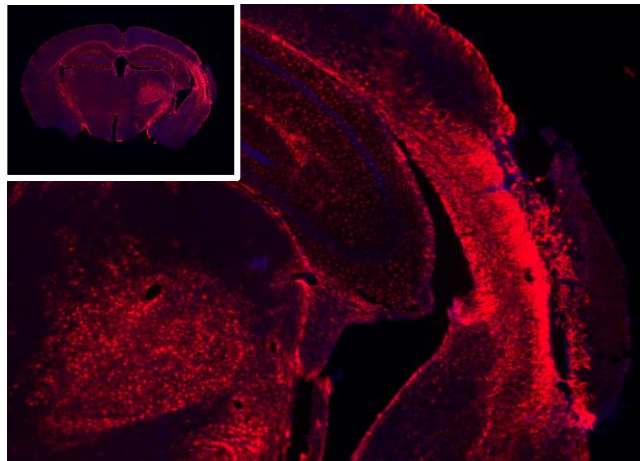
Project 2. Our aims will test the overall hypothesis that increased MG IFN signaling contributes to an exaggerated inflammatory response to ischemic stroke and that reducing interferon-stimulated gene (Isg) expression can attenuate neuroinflammation, reduce BBB disruption, and improve outcome following stroke.

We employ *animal disease models* (aging, stroke, and Alzheimer's disease/cerebral amyloid angiopathy), *primary cell cultures* (mouse microglia, astrocytes, and neurons), *virus injections* (lentivirus and adeno-associated virus), *histology*, *gene editing* (CRISPR/Cas9), and *transcriptomic analyses* (*single-cell RNA sequencing and RNA sequencing*).







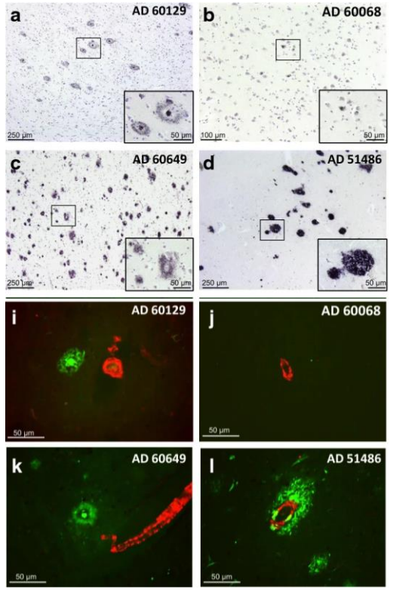


NIH National Institute on Aging

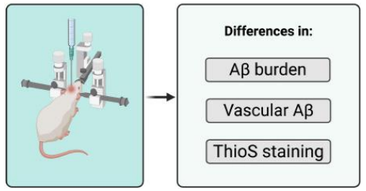
NIH National Institute of Neurological Disorders and Stroke

Rodrigo Morales Laboratory
Department of Neurology
UTHealth

Aβ strains and their role in AD clinical subtypes



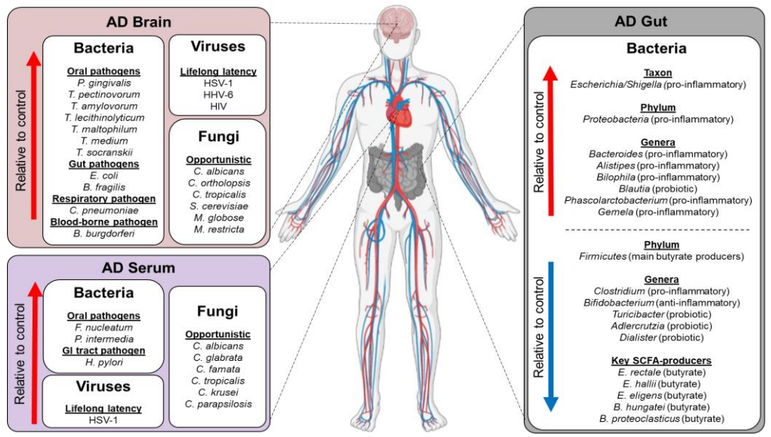
Differential amyloid pathology in patients



Induction of different pathology in mouse models

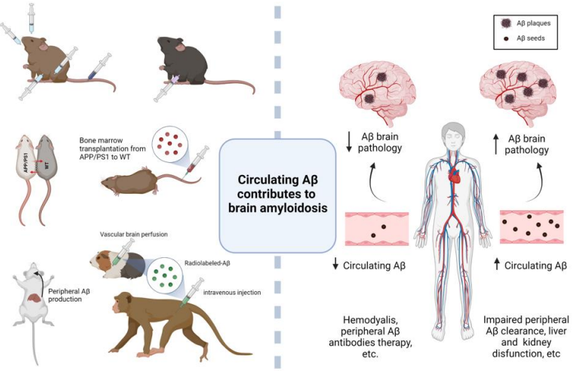
Long-term goal: Aβ strain-specific classification of Alzheimer's disease subtypes. This will lead to personalized diagnosis, prognosis and therapy.

Microbial infections (sepsis, meningitis, COVID-19) as potential risk factors for AD



Long-term goal: Evaluate the likelihood of bacterial infections to lead to Alzheimer's disease in the long term. This will allow for early interventions to delay or eliminate the chances to get Alzheimer's disease.

Role of peripheral Aβ in brain amyloidosis



Long-term goal: Understand the contribution of peripheral tissues and blood to Alzheimer's disease. This may open non-invasive avenues for diagnosis and treatment.

Other AD projects at the Morales' Lab

- Role of bacterial amyloids in the progression of Alzheimer's and Parkinson's pathologies.
- Amyloid-contaminated surgical tools and risks for iatrogenic infections.
- Alzheimer's pathology in the eye: mechanistic and diagnostic implications.
- Use of blood from younger individuals as means to decelerate aging: implications for Alzheimer's disease.

Pan Lab

Department of Symptom Research
UT MD Anderson Cancer Center

PI: Yuan Pan, PhD
Email: YPan4@mdanderson.org

Scan and visit
our website!

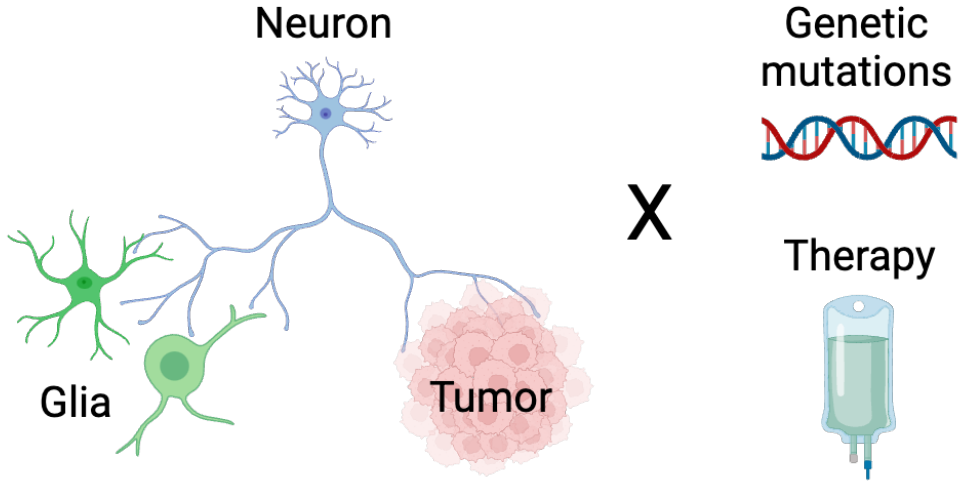
Research Interests

Cancer Neuroscience

Neurofibromatosis

Neuron-glia crosstalk

Nervous system tumors



Approaches

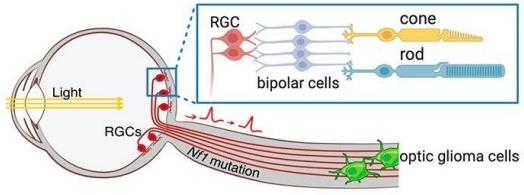
Neuromodulation assays

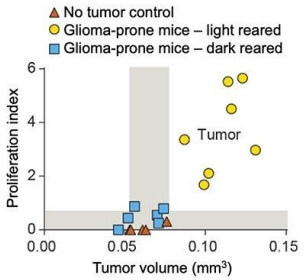
Mouse behavioral assays

Neuron-cancer cell co-culture, glial cell culture

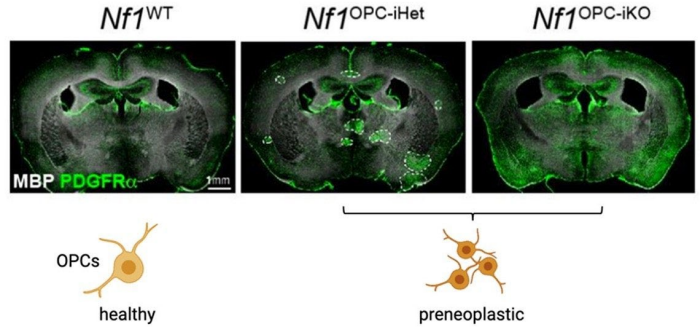
Nervous system cancer models (CNS and PNS tumors)

Previous studies





Pan, et al. *Nf1* mutation drives neuronal activity-dependent initiation of optic glioma. *Nature, 2019*

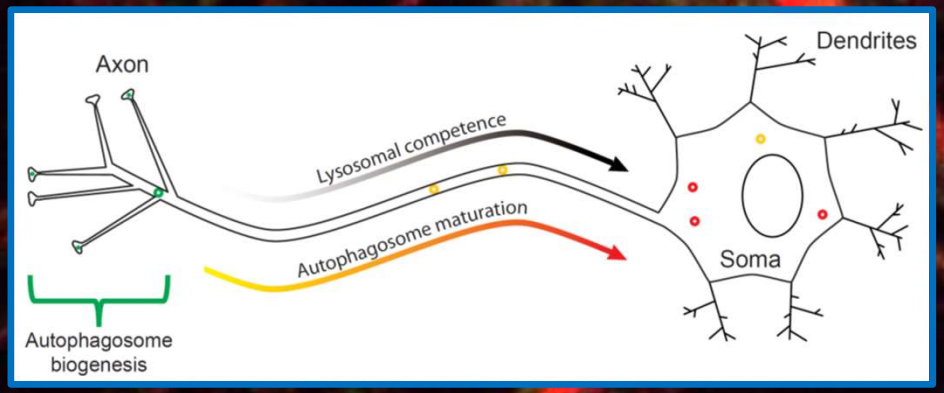


Pan, Hysinger, Yalcin, Lennon, et al., *Nf1* mutation impairs activity-regulated oligodendroglial responses and motor learning in mice. *Nat Neurosci*, 2024

Stavoe Lab

Website:
https://sites.google.com/uth.edu/stavoe-lab

Autophagy is implicated in all major age-related neurodegenerative diseases

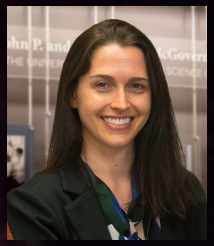


Current Funding:

afar
american federation for AGING RESEARCH

NIH
National Institutes of Health

How is neuronal autophagy regulated during aging and disease?

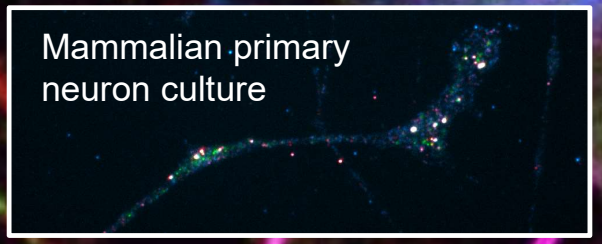


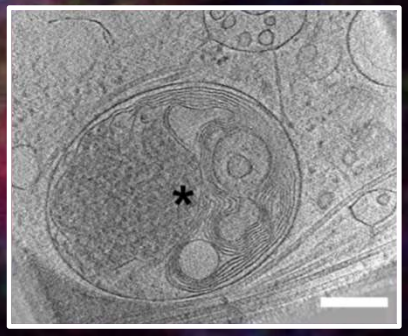
Major Research Questions:

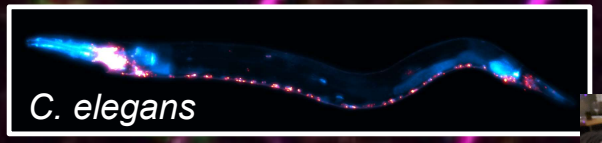
How does autophagy change with age in neurons?

How can we ectopically modulate autophagy in neurons?

Can we extend nervous system healthspan?

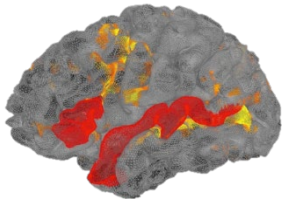






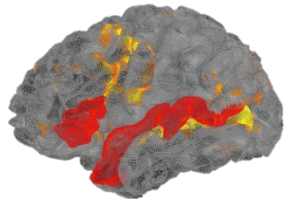
Current students:

Heather Tsong, Mya Rodriguez



The Tandon Lab

Human Neuroimaging and Electrophysiology



Research Topics and Techniques

- We study cognitive functions, especially language processing, using intracranial electrophysiology, functional and structural neuroimaging and computational models for neural decoding
- Epilepsy and tumor patients provide us with a unique opportunity to record from multiple units in various cortical areas
- We use intracortical electrophysiological techniques such as ECoG and direct cortical stimulation, along with fMRI, EEG and DTI

People and Funding

- Our lab is composed of eager and curious graduate students, postdocs, med students, residents, undergrads and research assistants
- We are currently expanding our work as part of the Texas Institute for Restorative Neurotechnologies (TIRN - uth.edu/tirn)
- Our lab is well funded including U01, UH3 and UG3 Brain Initiative grants from the NIH, as well as institutional and private support

Conferences

- Our graduate students attend the annual Society for Neuroscience (SfN) and Society for the Neurobiology of Language (SNL) meetings
- And other basic & clinical conferences related to their research topics

Current Graduate Students

- **Meredith McCarty:** PhD student; Project: Neural mechanisms of cognitive control in rapid visual categorization.
- **Kathryn Snyder:** MD/PhD student; Project: Mapping the meaning of words in the brain: Cortical network dynamics of language production. Award: Osborne Endowed Scholarship.
- **Aditya Singh:** newest MD/PhD student; Thesis: Neural decoding and brain control interfaces (BCI) for language processing.

Recent Student Publications

- **McCarty MJ** … Tandon N. Intraoperative cortical localization of music and language reveals signatures of structural complexity in posterior temporal cortex. *iScience*, 2023.
- **McCarty MJ** … Tandon N. The listening zone of human ECG field potential recordings. *eNeuro, 2022.*
- **Snyder KM** … Tandon N. Critical role of the ventral temporal lobe in word retrieval. *Epilepsia*, 2023.
- Woolnough O, **Snyder KM**…Tandon N. Intraoperative localization and preservation of reading in ventral occipitotemporal cortex. *J Neurosurg*, 2022.

More information?
Email: Eliana.Klier@uth.tmc.edu

Lab Website: tandonlab.org
Email: Nitin.Tandon@uth.tmc.edu

The Tong Laboratory

Neurocircuity for feeding, behavior and metabolism

Major Research Directions

● **To examine key neurons for feeding and metabolism, related to obesity development**;

Aim to identify neural basis for leptin resistance and come up ways to overcome diet-induced obesity, the cause of the current obesity epidemic

● **To unravel the brain mechanism regulating glucose homeostasis related to diabetes pathogenesis**;

Aim to identify neural basis for both type 1 and type 2 diabetes: a common neural basis responsible for both diabetes

●**To identify novel neurons and circuits for innate behaviors (aversion, anxiety and aggression) related to psychiatric disorders and mental illness**;

Aim to elucidate brain mechanisms for co-morbidity between eating disorders and psychiatric disorders

●**To examine the role of glial cells in feeding and metabolic control**

● **Novel creative projects from yourself**

Major techniques

Mouse genetics: Cre-loxP technology to achieve neuron specific manipulations;

Optogenetics and chemogenetics: acute and reversible manipulation of specific groups of brain neuron;

Stereotaxic viral delivery: specific gene expression in highly selected groups of brain neuron;

Fiber photometry and GRIN lens imaging: real time monitoring of neuron activity and neurotransmitter release in behaving animals;

Two photo microscopy: real time neuron activity monitory in behaving animals

Recent Graduates

●**Leandra Mangieri:** PhD 2018, an F31 and UTHealth Best Dissertation awardee; postdoc at UW; now Medical Science Liaison at AbbVie.

●**Ryan Cassidy:** MD/PhD 2019, an F30 and UTHealth Best Dissertation awardee; resident at Vanderbilt, now Assist Professor at Department of Psychiatry and Behavioral Sciences here

●**Jessie Morrill**: PhD 2022, now Assistant Professor at U. Nebraska.

●**Jing Cai**: PhD 2023, Postdoc at NYU.

Contact: Qingchun Tong, PhD Qingchun.tong@uth.tmc.edu

Aki Lab | Blood-Brain Barrier Laboratory

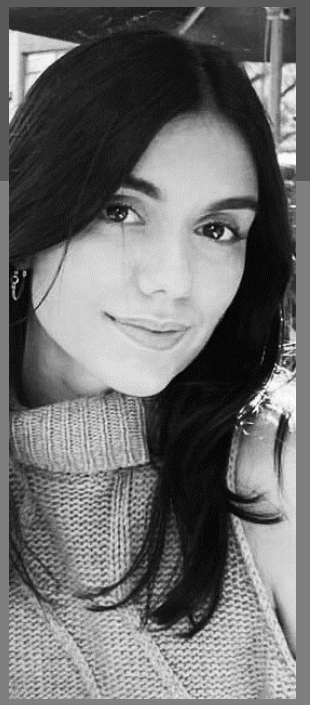
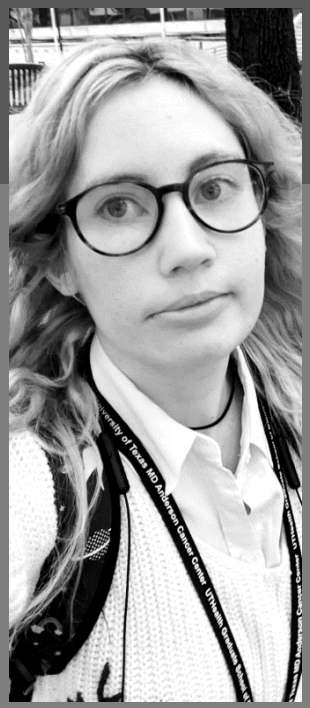
B4B
BRAINS for BRAIN

Current Research

- **Regulation of transport processes across the BBB**
- **Glymphatic to lymphatic clearance from the brain**
- **Biomechanics of vascular basement membrane and endothelial cytoskeleton**

Alzheimer's Disease / Cerebral Amyloid Angiopathy / Lysosomal Storage Disease / Single cell transcriptomics based approaches



Major Techniques

***In vivo* Multi-photon Microscopy**: Live animal imaging of neuro-glia-vascular events in knock-in AD/CAA mice and Cre-loxP models for vascular endothelial cell specific manipulations.

Atomic Force Microscopy: Biophysical assessment for the plasma membrane topography, adhesion, tension, and elasticity.

Primary culture of human brain cells: Live cell imaging of intracellular vesicle trafficking and cytoskeletal organization.

Advantages in joining ?

Proven excellence in mentorship. Helps prototype research ideas. Enjoy discovery processes. Your journey here leads to future opportunities in academia and industry. **Please write: Akihiko.Urayama@uth.tmc.edu**

Brains for Brain: Current Lab Members

- **Vasilia Kyriakopoulos, MS** (Research Assistant)
- **Kiersten Scott** (GSBS PhD program)
- **Kimberly Anderson** (Research Assistant)
- **Aki Urayama, PhD** (PI)

Lab Alumni

- **Onur Sahin, PhD** (McGovern Medical school)
- **Hannah Thompson** (McGovern Medical School)
- **Matthew Howe: MD/PhD** (R25 Research-track resident, Brown Univ. SOM)
- **Michael Maniskas, PhD** (BRAINS Program manager)
- **Caroline Reynolds** (Tufts Univ. PhD Program)
- **Alexis Mack** (Emory Univ. MD/PhD program)

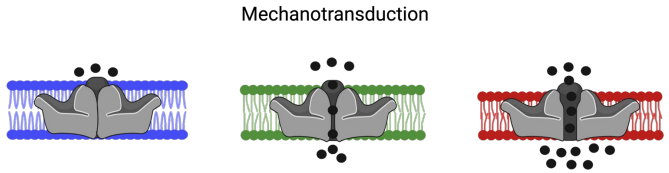
Cordero Vásquez

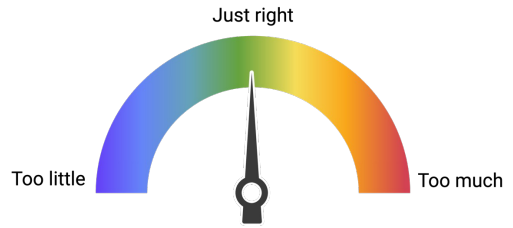
Research Group at UT Health Houston

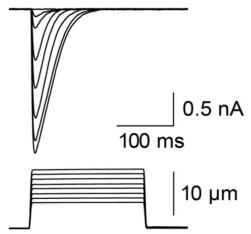
The laboratory of Dr. Valeria Vásquez works towards understanding how the function of the mechanosensitive ion channels PIEZO1 and PIEZO2 are modulated by **membrane lipid composition** in health and disease. To this end, we combine electrophysiology, molecular biology, biochemistry, biophysics, and animal behavior (*C. elegans* and mice). Publications from our group that represent ongoing projects:

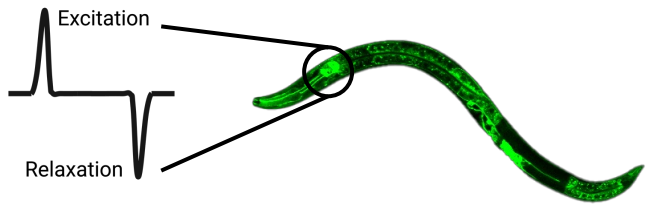
- Romero LO, Caires R, *et al.* 2023. Linoleic acid improves PIEZO2 dysfunction in a mouse model of Angelman Syndrome. *Nature Communications*.
- Ma S, *et al*. 2023. Excessive mechanotransduction in sensory neurons causes joint contractures. *Science*.
- Millet JRM *et al*. 2022. *C. elegans* PEZO-1 is a mechanosensitive ion channel involved in food sensation. *Journal of General Physiology.*
- Romero LO, *et al*. 2020. A dietary fatty acid counteracts neuronal mechanical sensitization. *Nature Communications*
- Romero LO, *et al*. 2019. Dietary fatty acids fine-tune PIEZO11 mechanical response. *Nature Communications.*

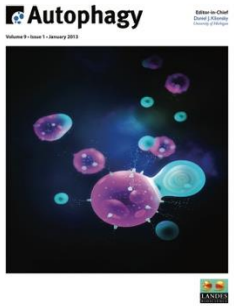
Group members can expect individualized mentorship and a team-oriented environment. All work is supported by recently awarded federal and institutional funding.

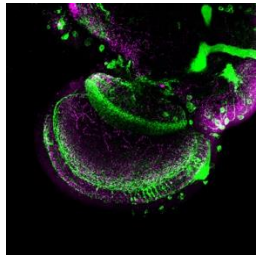


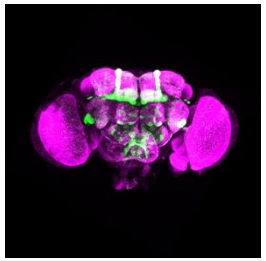


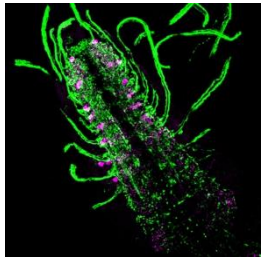


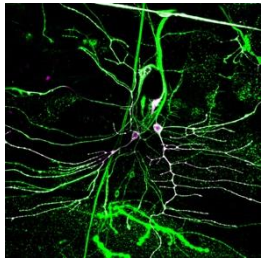




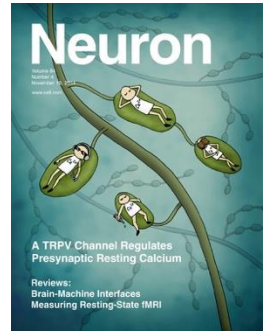


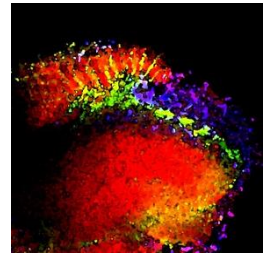


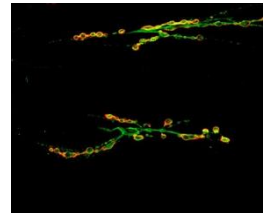


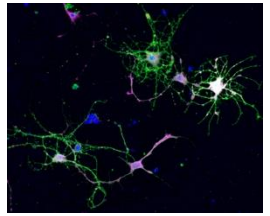


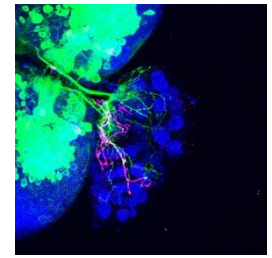
Venkatachalam lab at the McGovern Medical School







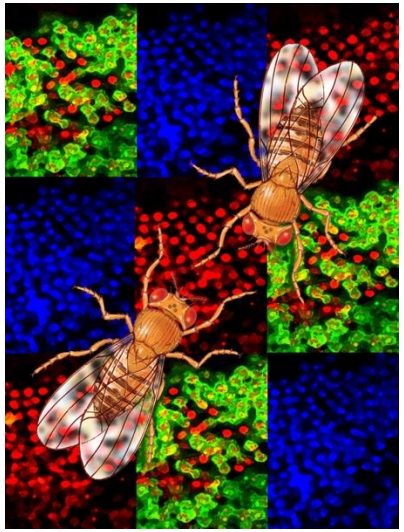




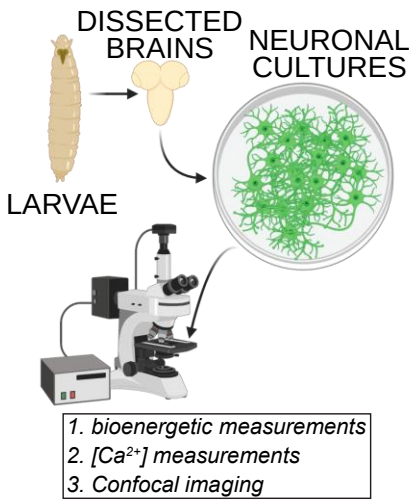
Questions of interest:

1. *What are the mechanisms underlying dysregulation of neuronal excitability in neurodegenerative diseases?*
2. *How do neurons manage dynamic responses to changes in bioenergetic demand?*
3. *What is the role of the nervous system in the regulation of aging and longevity?*

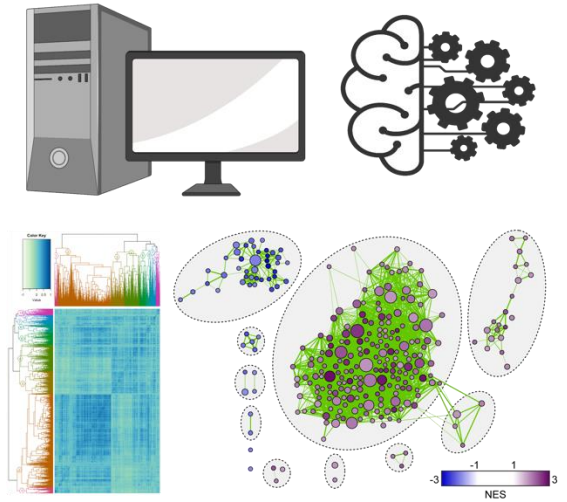
Approach:



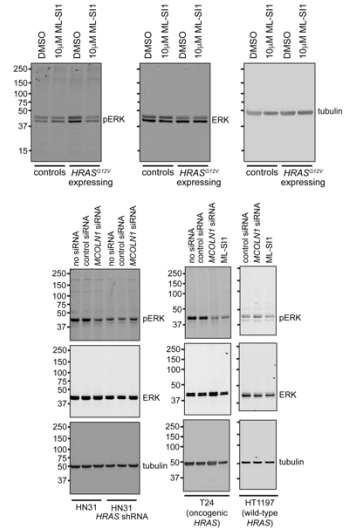
Drosophila genetics



Live imaging of dissociated neurons



Computational biology



Biochemistry and molecular biology

GSBS students in the lab

publications and website

Current funding:

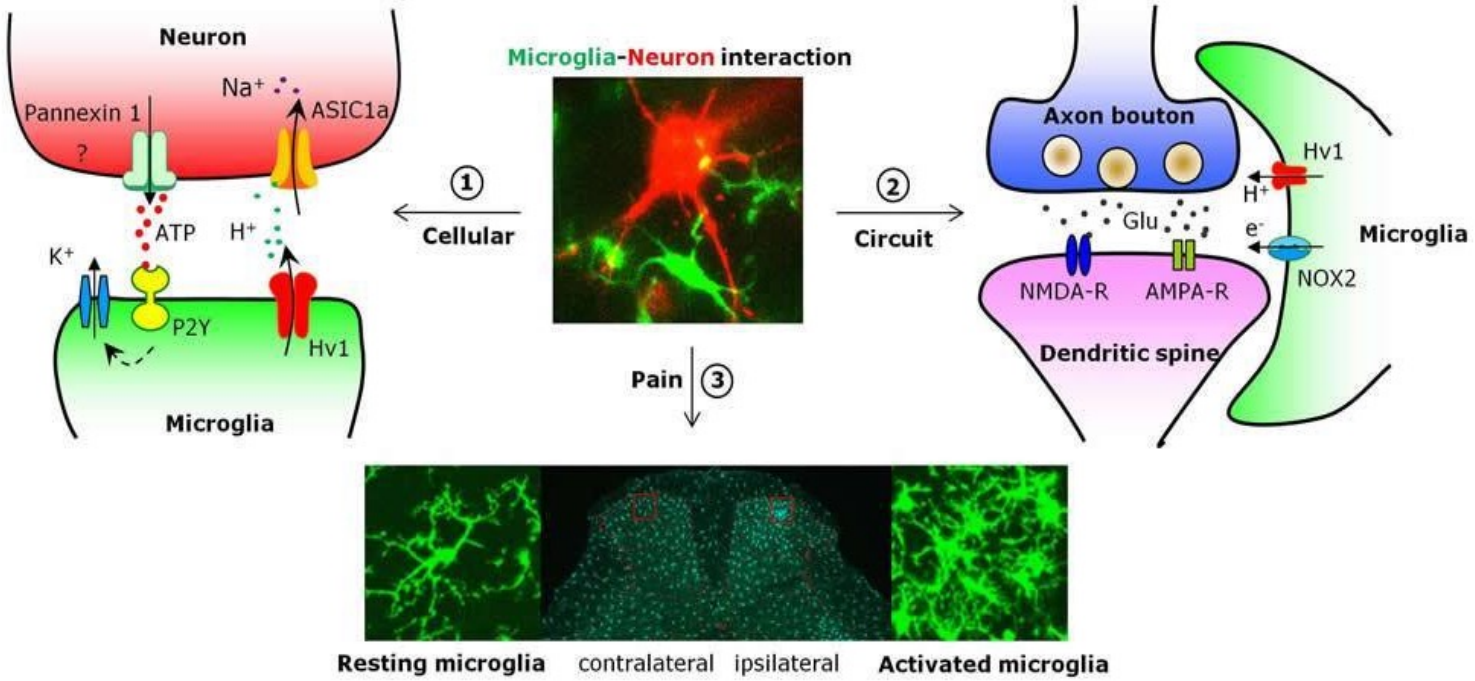
NIH 1RF1AG069076 PI: Kartik Venkatachalam "NEUROPATHOLOGY IN TAUOPATHIES STEM FROM DEPOLARIZATION-INDUCED ALTERATIONS IN THE PLANAR DISTRIBUTION OF PHOSPHOINOSITIDES"	NIH 1RF1AG072176-01 PI: Kartik Venkatachalam "ALTERATIONS IN SOMATODENDRITIC BIOENERGETICS IN DROSOPHILA MODELS OF TAUOPATHY"

Email: kartik.venkatachalam@uth.tmc.edu

Wu Lab: Neuroimmune Interaction in Health and Disease

IMM-Center for Neuroimmunology and Glial Biology

UTHealth Houston McGovern Medical School



Research Topics at the Wu Lab

- Molecular signaling of microglia-neuron interaction
- Microglia in synaptic function and neuronal circuits
- Neuroimmune mechanisms of neurological disorders

http://med.uth/imm/wu-lab/; longjun.wu@uth.tmc.edu; Twitter/X: @LongJun_Wu

Approaches

1) Two-photon in vivo imaging
2) In vivo and slice electrophysiology
3) Mouse genetics and behaviors
4) Mouse model of brain diseases

Current Funding

R35 NS132326; RF1 AG082314; R01 NS088627; R01 ES033892; U19 AG069701; R01 NS112144; R01 NS110949; R01 NS110825; R33 AT021544

Selected Publications

1) Haruwaka et al., *Nature Neuroscience*, 2024
2) Wang et al., *Cell Reports*, 2024
3) Umpierre et al. *Neuron*, 2024
4) Zhao et al., *Molecular Psychiatry*, 2023
5) Xie et al., *Nature Neuroscience*, 2022
6) Eyo et al., *Cell Reports*, 2021
7) Yi et al., *PLoS Biology*, 2021
8) Chen et al., *Journal of Clinical Investigation*, 2020
9) Umpierre et al., *eLife*, 2020
10) Liu et al., *Nature Neuroscience*, 2019

Cellular Homeostasis Mechanisms in Neurodegeneration

Sheng Zhang Lab, IMM & NBA, UTHealth

Questions we are studying

- **Why different neurons die in different neurodegenerative diseases?**
- **How to prevent and remove plaques/tangles in brain diseases?**

Research Projects

- **Functions of neurodegenerative disease genes (i.e., Huntingtin, Parkin)**
- **Cellular homeostasis mechanisms (i.e., chaperones, endolysosomal pathways and autophagy) against protein misfolding (Fig. 1)**
- **Subcellular package of dopamine in Parkinson's disease (Fig. 2).**

Approaches

- ***Drosophila***
- **Cell biology and biochemistry in cultured mammalian cells**
- **Collaborations (yeast and mouse models)**

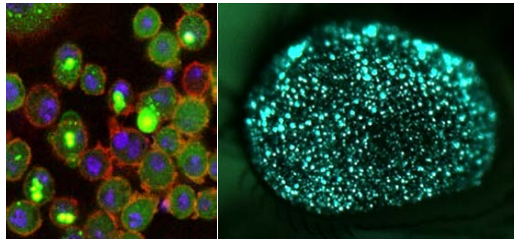


Fig. 1. Protein Aggregates formed by mutant **Huntingtin** in cells (left) and in adult fly eye (right)

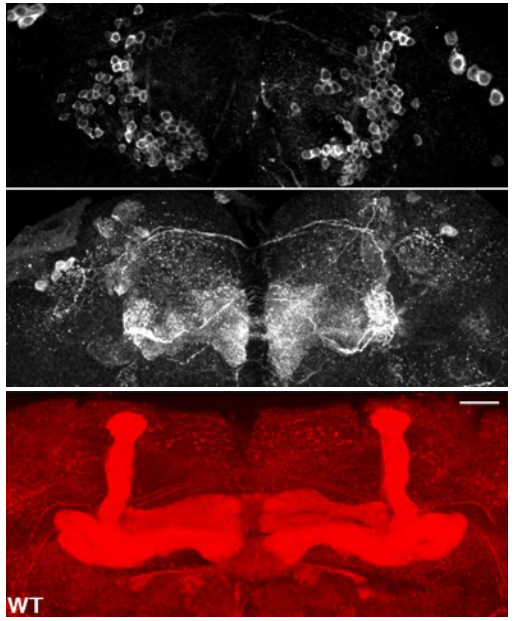
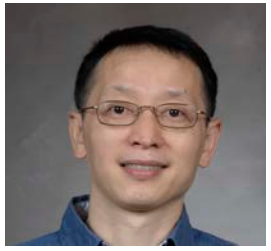


Fig 2. Dopamine neuron cell bodies (top) and the neurotransmitter **dopamine** (middle) they produce, which are projected into the learning and **memory center** (red, bottom) in *Drosophila* brain.

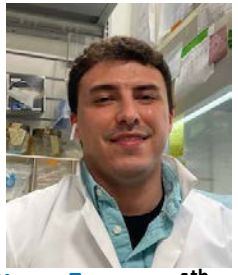


Sheng Zhang

Shiyu Xu Fly guru

Xin Ye, Lab master

Amanda Solbach 6th year



Steve Farmer, 4th year

Beatriz Rios, 3rd year

Lili Ye, Hero behind