

Trang Kimberly Nguyen, PhD

Pharmacologist with expertise in brain GPCRs

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EDUCATION

2015 – 2021

Doctor of Philosophy (PhD)

Molecular and Systems Pharmacology

Emory University, Atlanta, GA

Dissertation title: "Investigating the role of astrocytic and seizure-associate receptor GPR37L1 in brain through proteomic and transcriptomic analyses"

2009 – 2013

Bachelor of Science (BS)

Psychology (neuroscience concentration), Chemistry and French minors

Boston College, Chestnut Hill, MA

WORK EXPERIENCE

Apr 2024 – present

Postdoctoral Fellow

Emory University School of Medicine

Advisors: Stephen F. Traynelis, PhD and Dennis Liotta, PhD

Summary:

My postdoctoral studies are focused on screening drug compounds at NMDA receptors and characterizing their physiological and pharmacological properties *in vitro* and *ex vivo*. We work closely with chemists in the Liotta Group to optimize lead compound structures and pharmacology based on functional biological studies and assays developed by our lab.

Mar 2022 – Dec 2023

Freelance Medical Writer

Freelancer/Self-Employed

Contracted company: CH-1 Consulting, Chicago, IL (remote)

Summary:

Worked in a matrixed environment and was responsible for creating and quality checking deliverables for biopharmaceutical clients that include the creation, revision, annotation, and fact checking of strawmen, transcripts, and storyboards that will be created into sales training materials, e-zines, eLearning modules, and slide decks.

Key responsibilities and achievements:

- Collaborate and interface with external medical, legal, and regulatory teams and internal graphics and fact checking teams to achieve high quality and rigorous scientific communications materials to meet client needs
- Conceptualize, write, and revise annotated strawmen, transcripts, and storyboards for development into eLearning modules
- Conduct in-depth literature reviews for annotation and fact checking via Google Scholar and PubMed
- Led development of 9 eLearning modules and evaluations from conception to final learning program for 4 biopharmaceutical clients to train sales reps on multiple disease states and drug mechanisms

Oct 2021 – Jun 2022

Postdoctoral Scholar

University of California, Los Angeles, Los Angeles, CA

Advisor: Baljit S. Khakh, PhD

Summary:

My postdoctoral studies were focused on characterizing the response of striatal astrocytes to ATP via ATP G protein-coupled receptors (GPCRs). ATP is known to be

secreted along with neurotransmitters during neuronal activity, however, the effect of ATP on astrocytes is still poorly characterized.

Key responsibilities and achievements:

- Performed stereotaxic surgery on mice for intracranial AAV injections
- Developed, performed, and optimized a fluorescent live cell imaging protocol in *ex vivo* mouse brain slices expressing fluorescent GRABATP (GPCR) sensor
- Characterized dose-response relationship of a new GRABATP sensor in striatal astrocytes in response to puffed ATP
- Quantitative data analyses of real-time fluorescence imaging data

Sept 2015 – Sept 2021
Pre-doctoral Fellow

Emory University, Atlanta, GA

Advisor: Randy A. Hall, PhD

Summary:

I investigated the role of orphan GPCR GPR37L1 in astrocyte development and brain function using cellular and biochemical techniques, proteomics, and transcriptomics. The results of my research showed that GPR37L1 plays a role in regulating secretion of homologous S100A calcium-binding proteins from heterologous cells and loss of GPR37L1 resulted in the loss of astrocytic morphological complexity and organization during development in the mouse cortex. This work resulted in the publication of 2 first author publications and 2 co-author publications.

Key responsibilities and achievements:

- Managed multiple ongoing projects and maintained collaborative relationships with mentors and colleagues
- Set up, optimized, and wrote newly established standard lab protocols:
 - Primary astrocyte cell culture via immunopanning
 - GloSensor assay
 - Cell secretion immunoassays
 - Protein-protein interaction assays
 - Recombinant protein expression and purification
 - Proteomic sample preparation
 - RNA-seq sample preparation
- Standardized data analysis methods for Western blot and imaging data
- Designed a pipeline for RNA-seq data analysis
- Managed general lab functions including maintaining lab mouse lines, ordering supplies, and organization
- Received scholarship for and presented work as an invited short talk and poster at a Keystone Symposium
- Closely mentored 2 undergraduate students over 3 years

Sept 2013 – Jul 2015
Postbaccalaureate IRTA
Fellow

National Institute of Neurological Disorders and Stroke, Bethesda, MD

Advisors: Emily Foran, PhD; Kenneth Fischbeck, MD

Summary:

I investigated the role of astrocytes in Spinal Muscular Atrophy (SMA) pathology by implementing cellular and molecular techniques. SMA is a debilitating congenital neuromuscular disease that is caused by the mutation or deletion of the SMN gene, resulting in reduced levels of the ubiquitous SMN protein. While the SMN protein is expressed in all cell types and tissues, the loss of this protein leads to the specific degeneration of motor neurons in the spinal cord. In the published study, we showed that astrocytes have an altered secretion profile and that there is a specific reduction in secretion of several cytokines, including MCP-1. This alteration in secretion profile leads to reduced support for motor neurons resulting in shortened neurite outgrowth.

Key responsibilities and achievements:

- Established protocols to create primary astrocyte and primary motor neuron cultures
- Investigated astrocyte-neuron interactions via co-culture experiments, protein secretion profiling (ELISA), and IHC/ICC staining and imaging
- Conducted experiments for a proof-of-concept drug study in SMA mice to assess whether the administration of a protease inhibitor (bortezomib) and

ABC drug efflux pump inhibitor (elacridar) could increase SMN protein levels in the SMA mouse brain

Jan 2011 – May 2013
Undergraduate Research Fellow

Boston College, Chestnut Hill, MA
Advisor: Eranthie Weerapana, PhD

Summary:

I investigated the functional significance of putative reactive cysteine residues in cell surface expression of chloride intracellular channels (CLIC1 and CLIC4) through a structure-function study implementing site-directed mutagenesis utilizing independent primer design, site-directed mutagenesis, PCR, isolation, and Western blot. We found that the loss of the reactive cysteine residues did not alter expression of the ion channels on the cell surface.

Key responsibilities and achievements:

- Assessed breast cancer cell line viability in the presence of various nanoparticles via MTT assays
- Maintained cell cultures of MCF-7 and MDA-MB-231 breast cancer cell lines
- Independently designed primers for use in site-directed mutagenesis

ADDITIONAL RESEARCH EXPERIENCE

Rotation Student

Laboratory of Randy A. Hall, Ph.D.

Department of Pharmacology, Emory University School of Medicine, Aug-Nov 2015

Identification of novel protein binding partners of orphan receptors GPR37 and GPR37L1 through proteomic analysis via mass spectrometry following immunoprecipitation of endogenous receptors from mouse brain tissue.

Rotation Student

Laboratory of Yue Feng, M.D., Ph.D.

Department of Pharmacology, Emory University School of Medicine, Nov 2015-Feb 2016

Investigated the role of long non-coding RNA Gomafu in the regulation of splice variants of ErbB4, a receptor that is involved in schizophrenia.

Rotation Student

Laboratory of Gary J. Bassell, Ph.D.

Department of Cellular Biology, Emory University School of Medicine, Feb-May 2016

Developed and assessed a cell-based model of myotonic dystrophy for the study of DM *in vitro*.

Rotation Student

Laboratory of Haian Fu, Ph.D.

Department of Pharmacology, Emory University School of Medicine, June-July 2016

Utilized computational biochemistry and docking software to assess the reliability of Autodock Vina in reproducing virtual screen results reported in literature in order to conduct virtual screens of 14-3-3 protein inhibitors.

TECHNICAL SKILLS SUMMARY

Molecular Biology

• PCR • gel electrophoresis • RT-qPCR • bacterial transformation • subcloning • mini/maxi preps • RNA and DNA isolation and purification • RNA synthesis • BioRad CFX thermal cycler • NanoDrop UV-Vis

Cellular Biology

• mammalian cell culture • primary cell culture (neurons, astrocytes) • immunopanning (CNS cells) • cellular transfection (siRNA, plasmids) • cell-based fluorescent assays • cell-based luminescence assays • aseptic technique

Biochemical Techniques

• SDS-PAGE • Western blot • protein-protein interaction assay • cell surface biotinylation assay • co-immunoprecipitation • recombinant protein production and purification • ELISA • cell secretion assays •

luciferase GPCR signaling assays (96-well plate) • GloSensor cAMP assay (96-well plate) • BMG FLUOstar Omega (UV/vis spectrometer) • BioRad Chemidoc Imaging System

Imaging

• immunohistochemistry • immunocytochemistry • *in situ* hybridization • RNAscope • live cell imaging • confocal microscopy • 2-photon microscopy • sectioning and mounting tissues for staining

Electrophysiology

• two-electrode voltage clamp (TEVC)

Animal Handling (mouse)

• *ex vivo* mouse brain slice preparation • stereotaxic mouse brain surgery • intracranial AAV injection • mouse and rat animal handling • CNS tissue dissection and sectioning • animal behavioral studies (rotarod, wire hang)

Bioinformatics

• proteomics (sample preparation and data analysis) • RNA-seq (sample preparation and data analysis)

General Software and Bioinformatics Tools

• STAR • DESeq2 • BLAST • ExpASy • SnapGene • ImageJ/NeuronJ • R Studio • GraphPad Prism • OriginLab • Coreldraw • EndNote • Microsoft Office • EasyOocyte

PUBLICATIONS

1. **Nguyen, T.T.**, Camp, C.R., Traynelis, S.F., Sloan, S.A., Hall, R.A. (2023) GPR37L1 controls maturation and organization of cortical astrocytes during development. *Glia* 71(8):1921-1946. PMID: 37029775
2. Owino, S., Giddens, M.M., Jiang, J., **Nguyen, T.T.**, Shiu, F.H., Lala, T., Gearing, M., McCrary, M.R., Gu, X., Wei, L., Yu, S.P., Hall, R.A. (2021) GPR37 modulates progenitor cell dynamics in a mouse model of ischemic stroke. *Experimental Neurology* 113719. PMID: 33839144
3. **Nguyen, T.T.**, Dammer, E., Owino, S., Giddens, M.M., Madaras, N., Duong, D., Seyfried, N.T., Hall, R.A. (2020) Quantitative proteomics reveal an altered pattern of expression in brain tissue from mice lacking GPR37 and GPR37L1. *Journal of Proteome Research* 19:744-755. PMID: 31903766
4. Smith, B.M., Giddens, M.M., Neil, J.E., Owino, S., **Nguyen, T.T.**, Duong, D., Li, F., Hall, R.A. (2017). Mice lacking GPR37 exhibit decreased expression of the myelin-associated glycoprotein MAG and increase susceptibility to demyelination. *Neuroscience* 1(358):49-57. PMID: 28642167
5. **Nguyen, T.T.***, Martin, J.*, Nofzinger, J.H., Grunseich, C., Lee, P.R., Fields, R.D., Fischbeck, K.H., Foran, E. (2017). Decreased motor neuron support by SMA astrocytes due to diminished MCP1 secretion. *Journal of Neuroscience* 37(21): 5309-5318. PMID: 28450545 (*co-first author)

TALKS AND POSTERS

Oral Presentations

1. (Invited) Short talk: Proteomic analyses reveal that glia-specific and seizure-protective receptors GPR37L1 and GPR37 regulate S100A calcium-binding protein expression and secretion. *Keystone Symposia – Neural Environment in Disease: Glial Responses and Neuroinflammation*. (June 2019).

Abstracts and Poster Presentations

1. **Nguyen, T.T.***, Dammer, E., Giddens, M.M., Duong, D., Hall, R.A. Proteomic analyses reveal that glia-specific and seizure-protective receptors GPR37L1 and GPR37 regulate S100A calcium-binding protein expression and secretion. *Keystone Symposia – Neural Environment in Disease: Glial Responses and Neuroinflammation*. (June 2019)
2. **Nguyen, T.T.***, Giddens, M.M., Duong, D., Hall, R.A. Seizure-protective receptors GPR37L1 and GPR37 regulate calcium-binding protein S100A5 expression and secretion. *ASPET - Experimental Biology*, San Diego, CA. (April 2018).

3. **Nguyen, T.T.***, Giddens, M.M., Duong, D., Hall, R.A. Regulation of S100A5 expression and secretion by seizure-associate receptors GPR37L1 and GPR37. *Neuroscience 2017 (Society for Neuroscience)*, Washington, D.C. (November 2017).
4. **Nguyen, T.T.***, Giddens, M.M., Duong, D. Hall, R.A. Regulation of S100A5 expression by seizure-associated receptors GPR37L1 and GPR37. *MSP Research Symposium*, Atlanta, GA. (June 2017).
5. Foran, E.^*, **Nguyen, T.***, Lee, P.R., Grunseich, C., Nofzinger, J., Burnett, B., Fischbeck, K.H. SMN-deficient astrocytes negatively impact motor neuron neurite outgrowth. *Cure SMA – SMA Researcher Meeting*, Kansas City, MO. (June 2015).
6. **Nguyen, T.***, Foran, E., Lee, P.R., Grunseich, C., Nofzinger, J., Burnett, B., Fischbeck, K.H. The altered secretion profile of SMN-deficient astrocytes leads to decreased motor neuron growth. *NIH Postbac Poster Day*, Bethesda, MD. (April 2015).
7. Foran, E.*, **Nguyen, T.***, Lee, P.R., Grunseich, C., Nofzinger, J., Arnold, E., Burnett, B., Fischbeck, K.H. Astrocytes isolated from transgenic $\Delta 7$ SMA mice have altered protein secretion. *Society for Neuroscience 44th Annual Meeting*, Washington, D.C. (November 2014).
8. Foran, E.*, **Nguyen, T.**, Lee, P.R., Grunseich, C., Nofzinger, J., Arnold, E., Burnett, B., Fischbeck, K.H. Astrocytes isolated from transgenic $\Delta 7$ SMA mice have altered protein secretion. *18th International Spinal Muscular Atrophy Research Meeting*, Washington, D.C. (June 2014).

(^ oral presenter, * poster presenter)

GRANTS AND FELLOWSHIPS

2019 – 2020	Emory Advanced Graduate Teaching Fellowship \$2,500 Emory University
2017 – 2018	Pharmacological Sciences Predoctoral T32 Training Grant (2T32GM008602-21) \$279,669 National Institutes of Health/Emory University
2016 – 2017	Pharmacological Sciences Predoctoral T32 Training Grant (4T32GM008602-20) \$270,517 National Institutes of Health/Emory University

AWARDS AND SCHOLARSHIPS

2019	Scholarship to Keystone Symposia – Neural Environment in Disease Conference (\$1,500)
2018	Merit-based Travel Award – ASPET EB 2018 Conference (\$800)
2015	Outstanding Poster Award (top ~20% of NIH)
2012	Undergraduate Research Fellowship
2011	Dean's List
2011	Sr. Thea Bowman Scholar

TEACHING AND MENTORING

2019-2020 School Year **Emory Advanced Graduate Teaching Fellowship** – this competitive fellowship provided training in the form of a semester of pedagogical seminars led by a small group of faculty with pedagogical expertise and culminated in the development and implementation of a novel pedagogical project relevant to my dissertation research.

- April 2019* **Undergraduate poster feedback session** – led and coordinated a 1-hour session on poster set-up and presentation to undergraduate students in Biology 499R Research class at Emory
- Sept 2018-May 2021* **Mentorship of 2 undergraduate students and 1 PhD student in lab** – Mentorship of undergraduate students on independent research projects for Biology 499R, Biology for Research Credit Program; mentorship of 1st year PhD student in the lab
- 2017-2018 School Year* **1915 Scholars Program** – a program where first-generation graduate students serve as mentors to first generation undergraduate students. Responsibilities included biweekly contacts with an alumni mentor, the peer mentor, and sending a biweekly report to the Graduate Student Liaison
- May 2017* **Grant mentorship** for NBB470: Special Topics in NBB – Glial Bio: Brain Beyond Neurons

LEADERSHIP AND SERVICE

- Feb 2020, 2021*
Committee Member **Summer Undergraduate Research Experience (SURE) Application Review Committee, Emory University**
- Reviewed undergraduate applications for the SURE program at Emory
 - This is a competitive, fully funded 10-week summer program for undergraduates to conduct full-time independent research under the direction of a faculty member.
- Spring 2019*
Organizer **Molecular and Systems Pharmacology (MSP) Research Symposium, Emory University**
- Part of a committee of three students who put together, organized, and planned the MSP Student Research Symposium, which consisted of a talk by an invited guest speaker and poster session
- Summer 2018*
Organizer **MSP Alumni Symposium Committee, Emory University**
- Organized and put together the annual MSP Alumni Symposium which featured 4 graduates of the MSP program who came to talk about their careers and career paths.
- Fall 2017*
Student Representative **Curriculum Committee, Emory University**
- Met with faculty members and served as one of two student representatives to provide input and help create a new curriculum and class topics for the MSP program's first year classes starting in fall of 2018
- 2016-2017*
Student Representative **Graduate Website Advisory Committee, Emory University**
- Provided quarterly feedback and worked with a faculty member of the executive board to improve and make the MSP website easier to navigate and more reflective of the program
- 2016-2017*
Social Chair **Students in Pharmacology Executive Board, Emory University**
- Coordinated and set up social events for students in pharmacology and the MSP program
- 2016, 2017*
Committee Member **MSP Program Recruitment Committee, Emory University**
- Assisted in the planning, organization, and execution of the MSP recruitment weekend
- 2012-2013*
Co-President **Vietnamese Students' Association, Boston College**
- Chief executive officer and official representative of VSA
 - Conducted and presided over meetings

- Maintained contact with the Office of the Dean for Student Development, faculty club advisor, Asian Caucus, and the AHANA Leadership Council
- Delegated duties to other officers