




**MONICA GHOSH, Ph.D.** mghosh23@outlook.com +1 3305913219 <https://www.linkedin.com/in/monicaghosh/>**AREAS OF INTEREST:**

Cell Biology

Cell Signalling

Biochemistry

Molecular Biology

Microbiology

Protein Biology

**EDUCATION:**

|   |            |
|---|------------|
| <b>Ph.D.</b> in Cell & Molecular Biology, Kent State University (KSU)         | 2016- 2023 |
| <b>M.Sc.</b> in Microbiology, St. Xavier's College, Calcutta University India | 2012-2014  |
| <b>B.Sc.</b> in Microbiology, Calcutta University, India                      | 2009-2012  |

**RESEARCH EXPERIENCE:****PhD candidate** 2016 – 2023

- Studied essential oils isolated from *Monarda fistulosa*, their chemical composition and their role in activating Transient Receptor Potential A1 (TRPA1) Channels
- Investigated the role of TRPA1 in attenuating ischemia-induced cardiomyocyte cell death through an eNOS-dependent mechanism
- Evaluated the role of TRPA1 stimulation in enhancing murine cardiomyocyte contractility via a CaMKII-dependent pathway
- Designed and optimized protocols to study the effect of infra-red light on the sympathetic nervous system (P0-6 superior cervical ganglion and nodose ganglion neurons)
- Assisted in developing experiments to study calcium changes in rat carotid body glomus cells in the presence of S-nitroso L-cysteine
- Collaborated in a study, investigating disruption of ADAR-editing during Zika virus infection on intracellular calcium levels in Poly I:C infected neural progenitor cells
- Assisted in studying the effects of thiol-ester drugs on the reversal of opioid-induced respiratory depression in sympathetic neurons and pheochromocytoma PC12 cells
- Mouse and rat colony maintenance, breeding and weaning

**Masters program****2012 - 2014**

- Cloned promoters of *Brassica juncea* gene BjNRAMP4.1 utilizing fusion primer and nested integrated PCR (FPNI-PCR) technique and sequencing PCR
- Performed Yeast one hybrid interaction assays with *Arabidopsis thaliana* metallothionein genes AtMT2 and AtMT3. Spotting assay of cultures with  $\Delta$ cup 1 background (determining expression of metallothionein genes in presence of metals)
- Studied nucleolar ribonucleoprotein complexes in *Giardia lamblia* employing UV crosslinking and In-vitro transcription of snoRNAs.

**TECHNICAL SKILLS:**

- **Primary Animal Tissue Culture:** Isolation and experimental procedures of murine cardiomyocytes, isolation and maintenance of superior cervical ganglion, nodose ganglion and cortical neurons from P1-P6 rat pups.
- **Cell culture Techniques:** Maintenance, transfection and experimental manipulation of HEK 293, SHSY-5Y, PC12 adherent and non-adherent cell lines, and differentiation of Neural Progenitor cells.
- **Molecular Biology:** DNA and Plasmid (miniprep and maxiprep) isolation, Agarose gel electrophoresis, PCR and Colony PCR, FPNI PCR, Restriction Digestion, Cloning, Protein overexpression, Purification and Quantification of DNA and RNA, Gene Transfer techniques, Yeast 2 Hybrid interactions, in-vitro transcription system, SDS PAGE, Western Blotting, Immunocytochemistry, colorimetric/fluorometric assays.
- **Real time calcium imaging**
- **Biochemistry:** Chromatographic methods, Enzymatic assays and Enzyme kinetics
- **Microbiology:** Basic Plating Techniques, Morphological and functional screening of microbes, environmental monitoring of microbial load, antibiotic and antioxidant assays, protozoan culture maintenance.
- **Equipment/software:** Real time calcium imaging equipment, fluorescent and confocal microscopy, spectrophotometry, Graph Pad Prism 8.3.1, Easy Ratio Pro, Felix GX sarcomere protocol, Sigma Plot 8.0.

**TRANSFERABLE SKILLS:**

- Efficient project designing and execution
- Organization and time management on deadline bound projects
- Teamwork and leadership
- Mentoring undergraduate research assistants/colleagues and junior graduate students on individual projects and lab techniques
- Scientific communication
- Data analysis and interpretation

**PEER-REVIEWED PUBLICATIONS:**

1. **Essential Oils from *Monarda fistulosa*: Chemical Composition and Activation of Transient Receptor Potential A1 (TRPA1) Channels.** Monica Ghosh, Igor A. Schepetkin, Gulmira Özek, Temel Özek, Andrei I. Khlebnikov, Derek S. Damron, Mark T. Quinn. *Molecules* 2020 Oct 22;25(21):4873. doi: 10.3390/molecules25214873
2. **S-nitroso-L-cysteine increases intracellular calcium in prenatal rat carotid body glomus cells.** Paulina M Getsy, Gregory A Coffee, **Monica Ghosh**, Derek Damron, Stephen J Lewis. 01 April 2019 [https://doi.org/10.1096/fasebj.2019.33.1\\_supplement.551.13](https://doi.org/10.1096/fasebj.2019.33.1_supplement.551.13)
3. **Pharmacological modulation of prostaglandin E2 (PGE2) EP receptors improve cardiomyocyte function under hyperglycemic conditions.** Karin J. Bosma, **Monica Ghosh**, Spencer R. Andrei, Lin Zhong, Maureen Gannon. 2022 Apr 10. doi: 10.14814/phy2.15212
4. **Stimulation of TRPA1 attenuates ischemia-induced cardiomyocyte cell death through an eNOS-mediated mechanism.** Andrei SR, **Ghosh M**, Sinharoy P, Damron DS. *Channels (Austin)*. 2019 Dec;13(1):192-206. doi: 10.1080/19336950.2019.1623591.
5. **Modulation of TRPA1 channel activity by Cdk5 in sensory neurons.** Sulak MA, **Ghosh M**, Sinharoy P, Andrei SR, Damron DS. *Channels (Austin)*. 2018 Jan 1;12(1):65-75.doi: 10.1080/19336950.2018.1424282.
6. **TRPA1 ion channel stimulation enhances cardiomyocyte contractile function via a CaMKII-dependent pathway.** Andrei SR, **Ghosh M**, Sinharoy P, Dey S, Bratz IN, Damron DS. *Channels (Austin)*. 2017 Nov 2;11(6):587-603. doi: 10.1080/19336950.2017.1365206.

**POSTER PRESENTATIONS:**

1. Activation of TRPA1 channel attenuates ischemia induced cardiomyocyte cell death  
**Monica Ghosh M.S**, Spencer R. Andrei Ph.D. and Derek S. Damron Ph.D. Ohio Physiological Society, Dayton, Ohio, 2019.
2. S-nitroso-L-cysteine increase Intracellular Calcium in Neonatal Rat Carotid Body Glomus Cells” Paulina M. Getsy, Gregory A. Coffee, **Monica Ghosh**, Derek S. Damron, Stephen J. Lewis. Experimental Biology, Orlando, 2019.
3. Zika virus disrupts ADAR-editing landscapes during brain development. Plonski, N-M., **Ghosh M**, Meindl, R., Damron. D., Piontkivska, H. Midwest Virology Symposium, Ohio State University, 2019.
4. Essential Oils Isolated from *Ferula iliensis* Modulate Transient Receptor Potential Ion Channels. Erik Hopkins, **Monica Ghosh M.S**, Mark Quinn PhD, Derek Damron PhD. Undergraduate Research Symposium, Kent State University, 2018.

5. TRPA1 Ion Channel Stimulation Enhances Cardiomyocyte  $[Ca^{2+}]_i$  and Contractile Function via a CaMKII-dependent Pathway. **Monica Ghosh M.S**, Spencer R. Andrei Ph.D., Derek S. Damron Ph.D. Graduate Research Symposium, Kent State University, 2018.
6. Targeting Cardiac TRPA1 Ion Channels as a Novel Therapeutic Approach to Treating Heart Failure. **Monica Ghosh M.S**, Spencer R. Andrei B.S., Ian N. Bratz Ph.D., and Derek S. Damron Ph.D. Graduate Research Symposium, Kent State University, 2017.
7. TRPA1 Ion Channel Stimulation Enhances Cardiomyocyte Contractile Function via a CaMKII-dependent Pathway. **Monica Ghosh M.S**, Spencer R. Andrei, Ph.D. and Derek S. Damron, Ph.D. Ohio Physiological Society, Northeast Medical University, Ohio, 2017.
8. TRPA1 Ion Channels Stimulation Enhances Cardiomyocyte  $[Ca^{2+}]_i$  and Contractile Function via a CaMKII-dependent Pathway. **Monica Ghosh M.S**, Michael A. Garrison, B.S., Spencer R. Andrei Ph.D. and Derek S. Damron Ph.D. American Heart Association, Anaheim, 2017.
9. TRPA1 Activation Elicits Post-Translational Modifications of Akt and eNOS in Cardiomyocytes. Ryan Pasquino, Spencer Andrei, **Monica Ghosh**, Manasi Agrawal, and Derek S. Damron. Undergraduate Research Symposium, Kent State University, 2017.
10. Delineating a Cardioprotective Pathway for TRP Channel-Induced Nitric Oxide Production in Diabetic Cardiomyocytes. Erik Hopkins, Spencer R. Andrei, Manasi A. Agrawal, **Monica Ghosh**, and Derek S. Damron. Undergraduate Research Symposium, Kent State University, 2017.
11. Analyzing Essential Oils Extracted from *Ferula iliensis* – Novel TRP Channel Modulators? Madison Shindorf, Spencer Andrei, Manasi Agrawal, **Monica Ghosh** and Derek S. Damron. Undergraduate Research Symposium, Kent State University, 2017.
12. Poster Presentation in the National Conference on Current Research in Microbiology hosted by Department of Botany, University of Calcutta, 2014.
13. Urban extremophiles from industrial effluent with possible use as bioremediating agents. **Monica Ghosh**, Arup Kumar Mitra. Oral Presentation in the 4th International Conference on Ecotoxicology & Environmental Sciences, 2014.
14. Poster Presentation in the 100th Science Congress hosted by University of Calcutta, 2013.
15. Oral Presentation in “Modern Trends in Microbiology, Chapter X” hosted by Department of Microbiology, St. Xavier’s College, Kolkata. Abstract Title: Radiation Eating Fungi; 2012

**HONORS & AWARDS:**

- Graduate Student Research Award, KSU 2020
- Outstanding Graduate Student Teaching Assistant Award, KSU 2020
- Domestic Travel Award, Graduate Student Senate, KSU 2019
- Domestic Travel Award, Graduate Student Senate, KSU 2017
- Outstanding Graduate Student Teaching Assistant Award, KSU 2017
- Global Travel Grant for meritorious scholars, University of Calcutta 2017

**TEACHING & MENTORING:**

| <u>Semester</u> | <u>Course</u>          | <u>Students</u> |
|-----------------|------------------------|-----------------|
| Spring 2020     | Cell Biology           | 24              |
| Fall 2019       | Biological Foundations | 60              |
| Spring 2018     | Cell Biology           | 26              |
| Fall 2017       | Biological Foundations | 56              |
| Spring 2017     | Biological Foundations | 60              |
| Fall 2016       | Cell Biology           | 30              |

- Mentored 12 Undergraduate students on lab techniques, individual projects and poster presentations.
- Trained new graduate students on cell culture protocols, molecular biology and real time calcium imaging techniques.
- Guest Lecturer at Calcutta University, India 2015-2016
- Guest Lecturer at THK Jain College, India 2015-2016

**COMMUNITY SERVICE:**

64<sup>th</sup> Annual STEM EXPO Judge, Akron, Ohio 2020

**PROFESSIONAL AFFILIATIONS:**

Graduate Research Award Committee 2019

The American Society for Cell Biology Member 2019

Brain Health Research Institute Member 2019

American Heart Association Member 2017