SUMIT MUKHERJEE, PhD

SUMMARY

I have fourteen years of experience as a molecular and cell biologist, working at the interface of microbial pathogenesis, and host-pathogen interactions. I approach problems creatively, efficiently, and with a multidisciplinary toolkit, including spanning molecular genetics, cell culture, biochemical assays, and immunofluorescence microscopy. I thrive in a team environment and have collaborated with others to access key technologies. I am eager to apply my expertise to developing diverse tools to solve problems pertinent to human illness.

EDUCATION AND TRAINING

Ph.D., Biology, Texas Tech University, Lubbock, TX, USA — December 2018
Advanced Diploma in Biophysics, University of Calcutta, India. — October 2008
M.Sc. Botany, Cell and Molecular Biology, University of Calcutta, India — July 2007
B.Sc. Botany, Zoology and Chemistry, University of Calcutta, India — June 2005

PROFESSIONAL EXPERIENCE

Assistant Professor, Texas State University — Jan 2025-current
Department of Biology

Postdoctoral research associate, Washington University in St. Louis, MO — 2019-2024
Advisor: Prof. Daniel E. Goldberg, M.D., Ph.D.
Research focus: Understanding the roles of malaria proteases in parasite dissemination during the blood stage of infection.
Techniques: Molecular cloning, CRISPR-Cas9 genome editing, parasite culture, recombinant protein production (bacterial and mammalian systems, *in vitro* systems), gel filtration, circular dichroism spectroscopy, enzyme assays, confocal microscopy, immunoprecipitation, flow cytometry
Support: American Heart Association postdoctoral fellowship

Graduate Student, Texas Tech University, Lubbock, TX — 2009-2018
Advisor: Prof. Kai Zhang, Ph.D.
Research focus: Understanding the role of sterol biosynthesis in *Leishmania* virulence.
Techniques: Molecular cloning, parasite culture, murine primary macrophage culture, enzyme assays, mouse handling, flow cytometry, immunofluorescence microscopy, immunoprecipitation, and ELISA
Support: Doctoral Dissertation Fellowship, Texas Tech University

Advisor: Dr. William Boyd Butler, M.D., Ph.D.
Research focus: Cytoskeletal regulations in human natural killer cells.
Techniques: Molecular cloning, isolation, and culture of natural killer cells from human blood, mammalian cell line culture, confocal microscopy, flow cytometry, Western blots and immunoprecipitation, qRT-PCR

Project Scientist, Indian Institute of Chemical Biology, Kolkata, India — 2008-2009
Advisor: Prof. Siboprasad Mukhopadhyay, Ph.D.
Research focus: Extraction of alkaloids from indigenous medicinal plants
Techniques: organic extraction of alkaloids, chromatography

HONOURS AND AWARDS

Postdoctoral fellowship, American Heart Association 2023
Doctoral Dissertation Fellowship, Texas Tech University 2018
Best poster presentation, Annual Biological Sciences Symposium Texas Tech University 2013
Best graduate teaching assistant, Dept. of Biology, Texas Tech University 2011
Advanced Diploma Fellowship, Government of India 2007
National Merit Scholarship for master's level studies, Government of India 2007
Foundation Subsistence Fellowship for master's level studies, University of Calcutta 2006
Swati Bose Memorial Scholarship for bachelor's education, University of Calcutta 2006

PUBLICATIONS AND PREPRINTS

Rubiano K, Morris A, Vitorino V, Garcia BA, **Mukherjee S**, and Goldberg D, A role for the poly-asparagine repeat in the Plasmodium histone acetyltransferase, PfGCN5. *Natue Communications*, 2025.Under review.

Moitra S, **Mukherjee S**, Hernandez V, Zhang K. Reduced stress tolerance and heightened drug sensitivity in Leishmania major C14DM-null mutants. *International Journal of Molecular Sciences*. 2025. Under revision.

Mukherjee S, Nasamu A, Rubiano K, Goldberg DE. Activation of the *Plasmodium* egress effector subtilisin-like protease 1 is achieved by plasmepsin X destruction of the propiece. *MBIO*, 2023. doi: 10.1128/mbio.00673-23.

Hasan MM, Polino AJ, **Mukherjee S**, Vaupel B, Goldberg DE. The mature N termini of *Plasmodium* effector proteins confer specificity of export. *MBIO*, *2023*. doi:10.1128/mbio.01215-23

Mukherjee S, Nguyen S, Sharma E, Goldberg DE: Maturation and substrate processing topography of the Plasmodium falciparum invasion/egress protease plasmepsin X. *Nature Communications*, 2022, doi: 10.1038/s41467-022-32271-7.

Polino AJ, Miller JJ, Bhakat S, **Mukherjee S**, Bobba S, Bowman GR, Goldberg DE: The nepenthesin insert in the *Plasmodium falciparum* aspartic protease plasmepsin V is necessary for enzyme function. *Journal of Biological Chemistry*, 2022, doi: 10.1016/j.jbc.2022.102355.

Karamysheva ZN, Moitra S, Perez A, **Mukherjee S**, Tikhonova EB, Karamyshev AL, Zhang K: Unexpected role of sterol synthesis in RNA stability and translation in *Leishmania. Biomedicines*, 2021, doi: 10.3390/biomedicines9060696.

Mukherjee S, Moitra S, Xu W, Hernandez V, Zhang K: Sterol 14-α-demethylase is vital for mitochondrial functions and stress tolerance in *Leishmania major*; *Plos Pathogens*, 2020, doi: 10.1371/journal.ppat.1008810.

Mukherjee S, Basu S and Zhang K: Farnesyl pyrophosphate synthase is essential for the promastigote and amastigote stages in *Leishmania major. Mol Biochem Parasitol*, 2019. doi: 10.1016/j.molbiopara.2019.03.001.

Mukherjee S, Xu W, Fsu F, Patel J, Huang J and Zhang K: Sterol methyltransferase is required for optimal mitochondrial function and virulence in *Leishmania major. Molecular Microbiology*, 2018. doi: 10.1111/mmi.14139.

Xu W, **Mukherjee S**, Ning Y, Fsu F and Zhang K: Cyclopropane fatty acid synthesis affects cell shape and acid resistance in *Leishmania mexicana*. *International Journal of Parasitology*, 2017. doi: 10.1016/j.ijpara.2017.09.006.

BOOK CHAPTER

Mukherjee S and Goldberg DE: Plasmodial plasmepsins. *Proteolytic Enzymes and their Inhibitors in Infectious Pathogens*. Elsevier, 2023. In press.

SELECTED PRESENTATIONS

Washington University Infectious Diseases/ Microbiology Conference, 2023
Talk: "Activation of the egress effector subtilisin-like protease 1 (SUB1) in malaria parasite *Plasmodium falciparum*"
Molecular Parasitology Meeting, Woods Hole, 2022
Poster: "Plasmepsin X-mediated removal of the inhibitory prodomain from the PD-p54 intermediate complex is the crucial step in activation of the *Plasmodium* egress effector subtilisin-like protease 1"
Molecular Parasitology Meeting, Woods Hole, 2021
Talk: "Maturation of plasmepsin X (PM X) in *Plasmodium falciparum*"
Washington University Infectious Diseases/ Microbiology Conference, 2021.
Talk: "Maturation and substrate specificity of plasmepsin X: an essential protease in the malaria parasite *Plasmodium falciparum*"
Molecular Parasitology Meeting, Woods Hole, 2018
Poster: "Sterol methyltransferase is required for optimal mitochondrial function and virulence in *Leishmania major*"
Texas Tech annual graduate student research symposium, 2018
Poster: "Δ24-Sterol methyltransferase in *Leishmania major* is critical for maintaining mitochondrial
Kinetoplastid Molecular Cell Biology Meeting, Woods Hole, 2017
Poster: "Ergosterol synthesis in *Leishmania major*: protecting parasites in face of danger"
Texas Tech Annual Biological Science Symposium, 2013
Poster: "Priming of natural killer cells mediated by specific cytokines and chemokines"
American Society of Cell Biology, 2012
Poster: "Priming of natural killer cells following transendothelial migration mediated by specific cytokines and chemokines"

OUTREACH ACTIVITIES (TEACHING, MENTORING, REVIEWING)

WUSTL molecular microbiology graduate students qualifying examination mentor (2023)**:**
Mentoring students for preparing research proposals for their PhD qualifying examinations.
Teaching assistant and guest lecturer:
Labs (2010-2018): Cell Biology for Biology major, Immunobiology for Microbiology major, Microbiology for Microbiology major and minor, Immunofluorescence Microscopy for Biology graduates. Human physiology and anatomy laboratory for Biology major
Lectures: Immunobiology, Advanced Cell Biology
Student mentoring (2012-2022): trained 2 graduate and 6 undergraduate students to design and perform experiments at bench.
Peer mentoring (2021-2022): for incoming postdoctoral fellows, Washington University in Saint Louis Postdoctoral association.
Coordinator for Return2India mentoring program, Sci-ROI Global, (2021-2022)
Judge: South Plains Regional Science Fair, Lubbock TX (2011-2016)
Peer-Review Journal Reviewer:

Scientific Reports (2021-present)
The EMBO Journal (2020-present)
MDPI (2020-present)

Professional Societies

American Heart Association (2021-Current)
American Society for Microbiology (2016-Current)
WashU Postdoctoral Association (2019-Current)

References

Daniel E. Goldberg, M.D., Ph.D.
David M. and Paula L. Kipnis Distinguished Professor
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