

Dr. Jiwasmika Baishya

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Education

Ph.D. in Microbiology Texas Tech University Texas, USA	2017-2022
Master of Science (M.Sc.) in Cell Biology IISER Kolkata West Bengal, India	2014-2016
Bachelor of Science (B.Sc.) in Biology IISER Kolkata West Bengal, India	2011-2014

Professional Experience

Postdoctoral scientist, Northwestern University Feinberg School of Medicine, Chicago USA 2022-2023

- Served as a lead researcher for NIH-funded projects in the areas of Microbiology and Immunology focusing on the investigation of the role of the microbial accessory genome in the degree of virulence exhibited by the opportunistic bacterial species, *Pseudomonas aeruginosa* under *in vitro* conditions.
- Spearheaded projects that involved experiments with infections caused by *P. aeruginosa* clinical isolates, meticulously documenting patient sample data.
- Developed a workflow for using a less-established infection model organism, *Galleria mellonella*, to explore *P. aeruginosa*'s virulence against its immune system.
- Established Laboratory protocols and Standard Operating Protocols (SOP)s for *G. mellonella* experiments aimed at assessing its susceptibility and infection stages with varying degrees of *P. aeruginosa* infection.
- Developed modified spectrophotometry protocols and procedures to capture meaningful data reflecting the impact of *P. aeruginosa* on *G. mellonella* health.
- Utilized R programming for effective analysis of large Molecular Biology datasets, ensuring timely and accurate results.
- Designed experiments employing culture-based techniques, NGS as well as R programming to compare phenotypic and genotypic variations amongst clinical strains of *P. aeruginosa*.
- Standardized dose-dependent and time-dependent survival experiments to study *P. aeruginosa* infections.
- Proficient in using GraphPad Prism and Adobe software for data analysis and presentation.
- Collaborated with interdisciplinary scientists to devise a comprehensive pipeline for project objectives.
- Demonstrated leadership in troubleshooting experimental failures and coordinating team efforts for effective solutions.

PhD Student and Teaching Assistant, Texas Tech University, Texas USA 2017-2022

- Conducted Microbiology research focusing specifically on the role of Calprotectin, a metal chelating innate immune protein, in combating chronic infections caused by the highly pathogenic bacterial species, *P. aeruginosa* and *Staphylococcus aureus*.
- Investigated the antimicrobial mode of action of the immune protein through immunofluorescence, confocal microscopy, SEM imaging, SDS-PAGE, and western blotting on *in-vitro* and *ex-vivo* microbial samples.
- Standardized protocols for immunohisto-chemistry (IHC) and Confocal imaging of microbial biofilms grown on coverslips and infecting murine epithelial cells.
- Gained expertise in working with BSL2-designated pathogens and conducting antibiotic/drug/chemical tests.
- Designed and executed multi-colored confocal microscopy panels, performing fluorescence image analysis for bacterial and eukaryotic samples.
- Conducted gene studies using PCR and RT-qPCR and molecular cloning.
- Trained in handling and analyzing *in-silico* data from bacterial whole-genome sequencing and RNA sequencing.
- Published 3 first-authored and 2 second-authored research papers, additional manuscripts in various stages of publication.
- Mentored 10+ Master's students in Cell and Molecular Biology techniques and trained fellow graduate students in western blotting, SEM and confocal microscopy for generating reproducible research data.

- Served as a Teaching Assistant for graduate and undergraduate courses (class-size ranging from 25-80 students) in the Department of Biological Sciences at Texas Tech University.

Master's Student, IISER Kolkata, West Bengal India

2014-2016

- Conducted Cell Biology research, specifically Stem Cell Biology, focusing on characterization of spontaneous differentiation of Wharton's jelly-derived mesenchymal stem cells (WJ-MSCs).
- Expertise in isolating cells via explant culture methods, working extensively with human umbilical cords collected after full-term births.
- Trained in managing and maintaining records of large-scale patient samples.
- Demonstrated WJ-MSC differentiation to different connective tissue cell lines using cell staining assays and Bright-field microscopy.
- Conducted gene expression studies using RT-qPCR to identify up/down-regulation of cell differentiation gene markers.
- Developed expertise in cell culture and maintenance, transfection, cytotoxicity assays and bright-field microscopy.

Additional Research Projects

Immunophenotyping of monocyte sub-populations in human whole blood

Summer 2013

- This project was undertaken as part of the Indian Academy of Sciences Summer Research Fellowship program, a grant jointly awarded by IASc-INSA-NASI to support summer internships for undergraduate and postgraduate students in laboratories across the country
- Developed an innovative flow cytometry-based negative exclusion gating strategy to precisely identify diverse monocyte subpopulations in human whole blood
- Explored and compared the functions of monocyte populations in both normal and diseased states, shedding light on potential variations associated with health conditions.
- Executed multiple antibody titrations to optimize experimental conditions for flow cytometry, ensuring robust and accurate data collection.

Study of species coexistence by niche partitioning using Drosophila

Summer 2014

- Developed a comprehensive pipeline for setting Drosophila fly traps over a diverse geographic expanse, streamlining the systematic collection of data on various Drosophila species
- Conducted regular maintenance activities within the Drosophila fly room, meticulously monitoring and evaluating the health and behavior of the flies. This continuous oversight yielded essential data for behavioral studies, contributing to a deeper comprehension of the nuances in fly behavior
- Implemented a systematic approach to the identification and categorization of collected flies, focusing on traits intricately linked to their physical appearance. This meticulous process facilitated a nuanced understanding of the diverse characteristics exhibited by different species.
- Employed the R software package for data analysis, uncovering trends related to the survival and existence of each Drosophila species. This analytical approach provided valuable insights into the dynamics of species-specific survival patterns

Awards and Scholarships

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- INSPIRE 5-year Fellowship, Department of Science & Technology, Government of India, 2011-2016
 - IASc-INSA-NASI Summer Research Fellowship, National Science Academies of India, 2013
 - Joint CSIR -UGC NET qualified for Lectureship/Assistant Professor, 2019
 - Summer Thesis Dissertation Award, Texas Tech University, 2022
 - Doctoral Dissertation Completion Fellowship, Texas Tech University, 2022

Publications

1. **Baishya, J.**, Everett, J. A., Chazin, W. J., Rumbaugh, K. P. and Wakeman, C. A. The Innate Immune Protein Calprotectin Interacts with and Encases Biofilm Communities of *Pseudomonas aeruginosa* and *Staphylococcus aureus* (2022) *Frontiers in Cellular and Infection Microbiology*. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9325956/>
2. Al Mahmud, H., **Baishya, J.** & Wakeman, C. A. Interspecies Metabolic Complementation in Cystic Fibrosis Pathogens via Purine Exchange (2021) *MDPI Pathogens*. <https://doi.org/10.3390/pathogens10020146>
3. **Baishya, J.**, *et al.* The Impact of Intraspecies and Interspecies Bacterial Interactions on Disease Outcome. *Pathogens* (2021) *MDPI Pathogens*. <https://doi.org/10.3390/pathogens10020096>
4. Bisht, K., **Baishya, J.**, Wakeman, C. A. *Pseudomonas aeruginosa* polymicrobial interactions during lung infection (2020) *Current Opinion in Microbiology*. <https://doi.org/10.1016/j.mib.2020.01.014>
5. **Baishya, J.**, Wakeman, C. A. Selective pressures during chronic infection drive microbial competition and cooperation (2019) *Nature npj Biofilms Microbiomes*. <https://doi.org/10.1038/s41522-019-0089-2>