Arpita Chakravarti, Ph.D

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.

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NAME: ARPITA CHAKRAVARTI

eRA : COMMONS USER NAME (credential, e.g., agency login): ARPITA\_CHAKRAVARTI

POSITION TITLE: RESEARCH SCHOLAR

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Start Date  MM/YYYY | Completion Date  MM/YYYY | FIELD OF STUDY |
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| Bhaskaracharya College of Applied Sciences, New Delhi  Jawaharlal Nehru University, New Delhi  University of Illinois at Urbana-Champaign  Memorial Sloan Kettering Cancer Center | B.Sc (HON)  M.Sc  Ph.D | 06/2009  07/2012  05/2015  08/2022 | 06/2012  07/2014  05/2022  - | Biomedical Sciences  Life Sciences  Biochemistry  Structural Biology |
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**A. PERSONAL STATEMENT**

After completing my B.Sc and M.Sc in interdisciplinary backgrounds from New Delhi, India, I decided to pursue my PhD in Biochemistry from the University of Illinois at Urbana-Champaign. My interest in defensive strategies utilized by eukaryotes and prokaryotes throughout evolution enabled me to take up multiple projects revolving around antiviral and antibacterial proteins including the virus-induced protein, Viperin, the antibacterial protein of the Toxin-antitoxin system, RtcB and the much more recently characterized proteins of the antiphage CBASS systems. With the aim of deciphering more of such defensive strategies employed by bacteria and eukaryotes, I decided to pursue my post doctorate from Memorial Sloan Kettering Cancer Center in Structural Biology, which has provided me with a platform to undertake structure-guided approaches towards uncovering various mechanisms along with an excellent collaboration with leading scientists in the field. These mechanisms are part of a recently characterized universe of novel and elusive antiphage protective operons present in the dynamic pan-genomic defense islands of bacteria. By employing innovative structural and functional studies both at MSKCC and with its collaborators, I seek to add to my repertoire of uncovering mechanisms of phage-induced robust measures employed by bacteria which might have evolutionary links with the eukaryotic immune system.

**B. Positions, Scientific Appointments and Honors**

2023 Awarded the Anne. A Johnson Outstanding PhD Student Award

2022 Robert L. Switzer award in Excellence in teaching, Department of Biochemistry, University of Illinois,

Urbana-Champaign

2021 Nature Communications Editor’s Highlights, Manuscript on antiphage defense systems

2021 Teachers ranked as excellent Department of Biochemistry, University of Illinois, Urbana-Champaign

2013 All India Rank of 36, National Entrance Test (Junior Research Fellowship)), India, 2013

2012 DBT Builder Scholarship, Department of Life Sciences, Jawaharlal Nehru University

2012 Delhi State rank of 6, Delhi University, Genetics Examination.

**C. Contributions to Science**

Throughout my career, I have worked with proteins and reaction mechanisms of a variety of antiphage defense systems including viperin, CdnG, Cap5 and others and contributed to the discovery of novel small molecule termed AIPP, the generation of which is predicted to be the mechanism through which viperin executes its antiviral functions. Viperin is known to be induced in a variety of viral infections including Dengue, HIV and Influenza and the discovery of AIPP by fungal, archaeal and human viperin potentially added to the list of ways in which viperin inhibits viruses. Additionally, my work on the CdnG-Cap5 cyclic-oligonucleotide driven CBASS system led to the discovery of a novel small molecule with a unique linkage specificity termed as 3’,2’-cGAMP which was 10,000-fold more potent in activating the operonically linked Cap5 nuclease effector as compared to other similarly reported cyclic-dinucleotide ligands. This led us to publish our manuscript in a top journal where it was selected as a featured article. Furthermore, I have also worked on cyclic mononucleotide based antiphage systems which are different from CBASS.

1. Fatma, S\*., Chakravarti, A\*, Zeng, X. et al. (2021). Molecular mechanisms of the CdnG-Cap5 antiphage defense system employing 3′,2′-cGAMP as the second messenger. ***Nat Commun*** 12, 6381.
2. Chakravarti, A., Selvadurai, K., Shahoei, R., Lee, H., Fatma, S., Tajkhorshid, E., & Huang, R. H. (2018). Reconstitution and substrate specificity for isopentenyl pyrophosphate of the antiviral radical SAM enzyme viperin. ***The Journal of biological chemistry***, *293*(36), 14122–14133.
3. Chakravarti, A., & Patel, D. J. (2023). Atypical bacterial Argonautes regulate antiphage defense. *Cell research*, *33*(9), 655–656.
4. Chakravarti, A., & Patel, D. J. (2025). Structure-guided insights into TIR-mediated bacterial and eukaryotic immunity. *Structure (London, England : 1993)*, S0969-2126(24)00553-7.

* These authors contributed equally.