BIOGRAPHICAL SKETCH

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NAME: ARPITA CHAKRAVARTI

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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
Bhaskaracharya College of Applied Sciences, New Delhi	B.Sc (HON)	06/2009	06/2012	Biomedical Sciences
Jawaharlal Nehru University, New Delhi	M.Sc	07/2012	07/2014	Life Sciences
University of Illinois at Urbana-Champaign	Ph.D	05/2015	05/2022	Biochemistry
Memorial Sloan Kettering Cancer Center		08/2022	-	Structural Biology

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.

- These authors contributed equally.