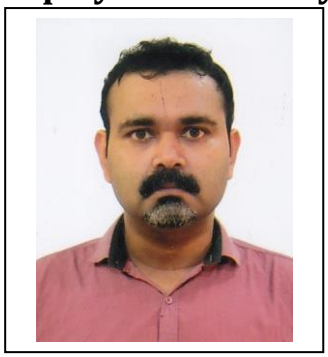
Dr. D.Y. Patil Vidyapeeth's
Dr. D. Y. Patil Biotechnology & Bioinformatics Institute
Mumbai-Bangalore Express High way, Tathawade, Pune 411033
Mail: info.biotech@dpu.edu.in, **Website:** http://biotech.dpu.edu.in

Dr. Supriyo chowdhury



Designation: Assistant Professor

Email ID: supriyo.chowdhury@dpu.edu.in(office), rohansupriyo@gmail.com

Qualification: MSc. PhD (Botany)

Area of Specialization: Molecular plant-microbe interaction, Plant transgenics, DNA-protein interaction

Projects:

- Investigating the role of a tomato membrane bound NAC transcription factor (SlNACMTF3) in shaping antiviral immune response against Tomato Leaf curl virus.(File Number: SRG/2022/000070, Total Funding: Rs.32,83,000): Funded by **DST-SERB. (Start-up Grant)(ongoing)**
- Application of STTM (short tandem target mimic) in tomato to silence miR319 for developing antiviral resilience against Tomato Leaf curl Virus. **DPU Internal funded project (**Ref No: DPU/906-3/2022, Total funding: Rs.500000)(ongoing)

Research Interest:

Small RNA (sRNA) mediated immune response against plant viruses:

Plant sRNAs (siRNA /miRNA) deploy major antiviral defense by either post-transcriptional gene silencing (PTGS) of viral mRNA transcripts or by translational repression. Simultaneously miRNA mediated transcription factors (TFs) regulation and R gene turnover are found to be both cost effective for strategizing metabolism as well as protective mechanism to restrict autoimmunity in absence of a pathogen. However, intracellular release of viral silencing suppressors (VSRs) effectors to counterfeit PTGS, leads to independent reprogramming of R-genes and TFs to evoke effector triggered immunity (ETI). ETI is correlated with complex network of defense signalling pathways, leading to both diverse cellular responses like ROS generation, hypersensitive response, salicylic acid accumulation and large-scale transcriptional reprogramming of plant immune genes whereby R-genes interact directly with TF. Research in my lab is focused on the interplay between PTGS-VSR interaction and how it shapes antiviral immune response. We use tomato, *Nicotiana benthamiana* and begomoviruses to analyze plant-virus interaction.

Organellar plant proteomics to characterize antiviral resilience

Tomato leaf curl disease (TLCD), prevalent in different tomato growing regions of world, including India, poses one of the greatest threats to tomato cultivation. The disease is characterized by distinct symptoms like severe leaf curling, shrinking leaves, and stunted plant growth. TLCD is caused by Geminiviruses (genus Begomovirus, family Geminiviridae) and is transmitted by whitefly (*Bemisia*

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tabaci). Effective TolCV pathogenesis in tomato involves high jacking of host cellular machinery for viral replication along with suppression of plant immune response and manipulation of host developmental pathway for generation of leaf curling phenotype. Plant response to viral infection involves a precise reprogramming of host transcriptional activity, which is largely orchestrated by different groups of transcription factors (TF) and other nuclear localized proteins. In recent years, several different quantitative proteomics studies characterizing plant-virus interaction, role of differentially expressed organellar proteins viz. chloroplast, nuclear, mitochondrial proteins partaking in viral pathogenesis as well as antiviral immunity have been identified. Organelle proteomics appears to be a promising alternative that reduces the complexity of the total cellular proteome, concentrating on a specific group of proteins that are central to the biological process under study. In recent years, high-throughput nuclear proteome analysis has been performed in various plants against viral infection, including *Potato*, *Pepper*, *Nicotiana benthamiana* which characterizes function of specific nuclear proteins partaking plant immunity during viral infection. In our lab, we analyze the organellar proteome of tomato, *Nicotiana benthamiana* post infection with different begomoviruses to characterize antiviral immune response of host plants

EDUCATIONAL QUALIFICATIONS:

- PhD in Botany(2016)-University of Calcutta(Area of work: Molecular plant pathology, development of transgenic crop lines resilient against biotic, abiotic stresses)
- MSc in Botany(2008)-University of Calcutta, **First class**
- BSc in Botany (2006)-University of Calcutta, **First class**

ACADEMIC AND RESEARCH EXPERIENCE:

Postdoctoral Research

- **UGC-Dr. D. S. Kothari fellow** **November 2019- January 2022**

(Molecular Virology Lab, School of Life Sciences, **Jawaharlal Nehru University**)

Purification and characterization of RPA70 paralogs of tomato to understand their role in Tomato leaf curl virus infection. Intracellular localization of RPA70 paralogs and analyzing its interaction with AC1 by BIFC, Y2H. Checked expression RPA paralogs post viral inoculation of tomato by q-PCR. Checked the effect of RPA70 paralogs in viral replication by both transient overexpression and silencing studies.

- **Research Associate-I (DST project)** **January 2019- October 2019**

(Molecular Virology Lab, School of Life Sciences, **Jawaharlal Nehru University**)

Purification and characterization of RPA32 paralogs of tomato to understand their role in Tomato leaf curl virus infection

- (**Severo Ochoa International postdoctoral fellow**) **2018**

(Molecular reprogramming and evolution group, **Centre for research in Agricultural genomics, Barcelona, Spain**)

miRNA-Transcription Factor mediated host cell reprogramming in *Arabidopsis* upon *Pseudomonas syringae* infection due to intracellularly secreted HopT1 effector.

- **DBT-Research Associate** **2016- 2018**

(Division of Plant Biology**, Bose Institute**)

Purification, biochemical characterization of membrane bound NAC Transcription Factors of tomato and their regulation of defense genes during *Alternaria solani* infection.

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PhD Research
UGC-NET JRF/SRF **2009-2015**
(Department of Botany, **University of Calcutta**)
Pioneering work in sesame-*Macrophomina phaseolina* pathosystem showing how transition in fungal lifestyle reprogramme host defense via transcriptional modulation. Cloned, purified and characterized osmotin-like protein, showing *in-vitro* antifungal activity Developed high frequency transformation protocol for recalcitrant sesame leading to development of world's first transgenic sesame lines showing tolerance against both biotic and abiotic stresses.

Along with my PhD research, I have also completed a short project on synthesis and characterization of silver nanoparticles (synthesized from cell extracts of *M.phaseolina*) showing antimicrobial properties

Teaching experience:
Served as guest lecturer in Botany in an undergraduate college (Netajinagar Day College) under University of Calcutta (August 2008-August 2009).

AWARDS AND ACHIEVEMENTS:

- **UGC- Dr. D. S. Kothari postdoctoral fellowship** to work in Molecular Virology lab, School of Life Sciences, Jawaharlal Nehru University (October 2019)
- **DST Research Associate-1**, Molecular Virology lab, School of Life Sciences, Jawaharlal Nehru University (January-October 2019)
- **"Severo Ochoa" international postdoctoral fellowship** to work as scientist in Center for research in Agrigenomics (CRAG), Barcelona, Spain 2018.
- **DBT-RA, Postdoctoral research Associateship from DBT** (Department of Biotechnology, Government of India, 2016)
- **JRF and SRF from University Grants Commission, Govt.of INDIA by qualifying CSIR-UGC National Eligibility Test (NET**), 2009 for PhD research.

- **PATENT:**

- Surekha Kundu, **Supriyo Chowdhury** (2013): **Silver nanoparticles synthesized with cell free extract of fungus *Macrophomina phaseolina* (Tassi) Goid and its use as antibacterial, antifungal and apoptogenic agent (Application number: 1444/KOL/2012 A).**

- **GENBANK ACCESSION:**

- Osmotin like protein (SindOLP) from *Solanum nigrum* var.indica (KC292261.1).
- Tomato leaf curl Karnataka Virus genome, DNA-A(Accession No: OR509787)
- Pepper leaf curl virus, DNA-A(Accession number: OR360532), β-satellite(Accession number: PP092204.1)

REVIEWER:

- Served as reviewer of manuscripts for BMC Plant Biology, Scientific reports, Journal of Experimental Botany, Plant cell, Plant Journal, PloS Pathogen

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INTERNATIONAL ADVISORY COMMITTEE MEMBER: NA
SCIENTIFIC COMMITTEE MEMBER: NA

PUBLICATIONS:

Publications from current research group (As corresponding author)

- Chetia R, Aggarwal N, Divgi A, **Chowdhury S** (2024) First report of pepper leaf curl virus causing leaf curl of castor bean (*Ricinus communis*) in India. ***New Disease Reports***. https://doi.org/10.1002/ndr2.12290.

- Chetia R, Aggarwal N, **Chowdhury S** (2023) First report of Tomato leaf curl Karnataka virus causing papaya leaf curl disease in India. ***New Disease Reports***. https://doi.org/10.1002/ndr2.12236

First author publications:

- **Chowdhury S,** Basu Chowdhury A, Chakraborty S (2021) Revisiting regulatory roles of Replication protein A (RPA) in plant DNA metabolism. ***Planta*** 253:130 (IF=4.1)

- **Chowdhury S**, Basu A, Kundu S (2017) Biotrophy- necrotrophy switch in pathogen evoke differential response in resistant and susceptible sesame involving multiple signaling pathways at different phases. ***Scientific Reports*** DOI: 10.1038/s41598-017-17248-7(IF=4.3)

- **Chowdhury S**, Basu A, Kundu S (2017) Overexpression of a new osmotin-like protein gene (SindOLP) confers tolerance against biotic and abiotic stresses in sesame. ***Frontiers in Plant Sciences*** 8:410 doi:10.3389/fpls.2017.00410 (IF=5.7)

- **Chowdhury S**, Basu A, Kundu S (2015) Cloning, characterization, and bacterial over-expression of an osmotin-like protein gene from *Solanum nigrum* L. with antifungal activity against three necrotrophic fungi. ***Molecular Biotechnology*** 57(4):371-381. (IF=2.69)

- **Chowdhury S**, Basu A, Kundu S (2014) A new high-frequency Agrobacterium-mediated transformation technique for *Sesamum indicum* L. using de-embryonated cotyledon as explant. ***Protoplasma*** 251(5):1175-1190.(IF=3.3)

- **Chowdhury S**, Basu A, Raychaudhuri T, Kundu S (2014) In-vitro characterization of the behaviour of *Macrophomina phaseolina* (Tassi) Goid at the rhizosphere and during early infection of roots of resistant and susceptible varieties of sesame. ***European Journal of Plant Pathology*** 138(2): 361-375. (IF=1.9)

- **Chowdhury S**, Basu A, Kundu S (2014) Green synthesis of protein capped silver nanoparticles from phytopathogenic fungus Macrophomina phaseolina (Tassi) Goid with antimicrobial properties against multidrug-resistant bacteria. ***Nanoscale Research Letters*** 9(1):365. (IF=3.5)

Co-authored publications

- Basu A, Ray S, **Chowdhury S,** Sarkar A, Mandal DP, Bhattacharjee S, Kundu S (2018) Evaluating the antimicrobial, apoptotic, and cancer cell gene delivery properties of protein-capped gold nanoparticles synthesized from the edible mycorrhizal fungus *Tricholoma crassum*. ***Nanoscale Research Letters*** 13:154(IF=3.5)

- Basu A, **Chowdhury S**, Ray Chaudhuri T, Kundu S (2016) Differential behavior of sheath blight pathogen Rhizoctonia solani in tolerant and susceptible and tolerant rice varieties before and during infection. ***Plant Pathology*** 65, 1333-1346. (IF=2.5)

- Ray S, Mondal S, **Chowdhury S**, Kundu S (2015) Differential responses of resistant and susceptible tomato varieties to inoculation with *Alternaria solani*. ***Physiological and Molecular Plant Pathology*** 90:78-88. (IF=1.6)

- Chowdhury B, **Chowdhury S**, Biswas AK (2011) Regulation of growth and metabolism in rice (Oryza sativa L.) by arsenic and its possible reversal by phosphate***. Journal of Plant Interactions*** 6,115-24. (IF=2.9)
- Sarkar S, **Chowdhury S**, Basu A, Ray S, Raychaudhuri T, Samajpati N, Kundu S (2010) Effect of culture condition on the sporulation and virulence of Magnaporthe oryzae isolated from rice field of Hoogly, West Bengal. ***Journal of Mycopathological Research*** 48, 349-355.

Review:

- **Chowdhury S**, Raychaudhuri T, Kundu S (2009) Tomato R-genes against Fusarium wilt: Present status and future prospect. ***Journal of Mycopathological Research*** 47, 175-180.

BOOK CHAPTERS:

Chowdhury S, Bhattacharjee P, Basak S, Chowdhury S, Kundu P.(2019) "Method to study dynamics of membrane bound plant transcription factors during biotic stress in tomato" in **Methods in Molecular Biology: Plant innate immunity: Methods and protocol**. Ed: Walter Gassmann. Springer Science LLC New York. DOI: 10.1007/978-1-4939-9458-8_7

CERTIFICATIONS: NA
EPIGEUM (Research Skill Courses): NA
CONFERENCES (Abstracts/Oral/Poster):

- **Presented poster**: "*Cloning, characterization and overexpression of a new Osmotin like protein gene functioning in multi-stress resistance in plants*" at International symposium "**Insight to plant biology in the modern era**" (2017) at Bose Institute, Kolkata.

- Participated in national symposium-"**Insight to Plant Biology through Systems Approach**" organized by Division of Plant Biology, Bose Institute, 17th December 2015.

- **Best Poster Award**: "*Host pathogen interaction in necrotrophic diseases of dicot crop plants: development of necrotroph resistant transgenic crops*" at National Symposium on- "**Evolving Plant Biology from Chromosomes to Genomics**", Kolkata, 27th-29th November 2014 organized by West Bengal Academy of Sciences (WAST).

- Participated in national symposium-"**Genomics research and Impact in Plant System**" organized by Center of Advanced Study in Botany, University of Calcutta Biology, Bose Institute, 21th March 2011.

- Participated in national symposium-"**Microorganisms and their role in plant and human affairs**" organized by Indian Mycological Society, Department of Botany, University of Calcutta, 3rd-5th December 2009.

WORKSHOPS:

Participated in online workshop-cum webinar on: ***Genome Editing: Basic to Advanced Applications in Agriculture, Pharma & Health Sectors*** organized by Glostem in association with Indian National Young Academy of Sciences. June 27-July 23, 2022

Participated in workshop on **Fundamentals of Health Professions Education** organized by University Centre for Professional Education and Faculty Development, Dr. D.Y. Patil Vidyapeeth, Pune (21-25th November 2022)

Participated in one day workshop on **Scientific Grant Writing** organized by DYPBBI and DBT/Welcome Trust India Alliance at Dr. D.Y. Patil Biotechnology and Bioinformatics Institute on 3. 3. 2023

Participated in one day Workshop on **Financial Literacy Awareness** organized by Dr. D.Y. Patil Biotechnology and Bioinformatics Institute on 11.8.2023

Worked as demonstrator and resource person

- Workshop on basic techniques in Molecular Biology (14th-21st May 2014), arranged in Department of Botany, University of Calcutta.
- Workshop on Crop Biotechnology (2010) arranged in Department of Botany, University of Calcutta.

BIOINFORMATICS AND BIOTECHNOLOGY SKILLS:

TECHNICAL SKILLS:

Molecular Biology	Isolation of genomic DNA, RNA and analysis by agarose gel electrophoresis. PCR from genomic DNA, colony PCR. Southern and Northern blot Plasmid isolation, bacterial transformation (*E.coli* (different strains) and

	A.tumefaciens), *Agrobacterium* mediated fungal transformation with *gfp*-carrying vector. Conventional cloning and sub cloning in different kinds of vectors (cloning, expression and binary vector) TA cloning, blue white screening to search desired cloned gene as well as cloning using green gate vector. Development of random oligo library and screening of suitable NAC binding site by DNA protein interaction using SELEX; EMSA, Co- immunoprecipitation (Co-IP) using Myc-tagged protein, PCR based site directed mutagenesis. Gene expression analysis using Real-time PCR (Sybr Green), semi-quantitative RT-PCR.
Protein Biochemistry	Isolation of plant proteins, Induction and purification of heterologous protein in bacterial system (His6-tagged protein) by Ni-NTA affinity chromatography. Protein-protein interaction by Yeast-2 hybrid assay, BIFC In-gel enzyme assay of purified protein. Spectrophotometric protein quantitation, protein profiling using SDS-PAGE. Plant Isozyme analysis using native PAGE; Polyclonal antibody development against recombinant protein in rabbit, Western blot.
Plant Biotechnology	Plant tissue culture, callus culture, somatic embryogenesis, *Agrobacterium* mediated genetic transformation of sesame (*Sesamum indicum*), tobacco (*Nicotiana tabacum*), Tomato Experience with protoplast transformation, *Agrobacterium* mediated transient transformation and VIGS mediated gene silencing using tobacco, tomato plants.
Microscopy	Expertise using different kinds of electron microscopy (SEM, TEM), AFM (Atomic force microscope), brightfield and stereo microscopy. Cellular fungal infection study in plant roots using *gfp*-tagged fungal hyphae by confocal microscopy, cellular localization of fluorescent tagged protein. Cellular callose, phenolics, H_2O_2 deposition in plant roots by

	fluorescence as well as brightfield microscopy
Plant Physiological skills	Technical expertise in recording and analyzing plant physiological data viz. relative water content, electrolyte leakage of cell membrane study using conductivity meter, stomatal aperture measurement, anatomical study in root, stem as well as estimation of biochemical parameters(proline, lipid peroxidation, ROS accumulation, flavonoids, phenolics, nitrogen estimation, enzyme assay).Estimation of phytohormone by HPLC-MS/MS.
Bioinformatics and Biostatistics	Working experience in bioinformatics tools like BLAST, GPMAW, PSORT, PROSITE, Protscale (ExPASy)-Kyte-Doolittle algorithm, multiple alignment using ClustalW. Worked with Biostatistics tools like GraphPad Prism, SPSS.