

Lalit Kumar Gautam

Ph.D. Biotechnology (Thesis Submitted)

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Research experience

Department of CSIC, PGIMER, Chandigarh, India – 160012. 2021 – Present

Designation: Junior Demonstrator

Responsibilities:

- Aquisition and analysis of biological samples using Confocal Laser Scan Microscope.
- HPLC for protein analysis.
- Realtime PCR: Standarization, data optimization and analysis.
- Management of lab activities and maintenance of advanced analytical instruments in the department.

Dr. Capalash's Lab, Dept of Biotechnology & Dr. Sharma's Lab,

Dept of Microbiology, Panjab University, India 160014.

2013- 2021

Designation: Ph.D Student

Research Highlights:

- Cloning, purification and characterization of *Acinetobacter baumannii* ATCC 17978 polyphosphate kinase 1 (AbPPK1).
- Compound library was virtually screened for identification of inhibitors against AbPPK1 and their effectiveness was checked through *in vitro* inhibition assay.
- Effects of PPK1 inhibition on expression of polyP homeostasis and stress response regulator.
- Inhibitors were validated for their efficacy to reduce the virulence traits (*viz.* motility, biofilm formation, quorum sensing and desiccation) of *A. baumannii* (Published).
- Additionally, AbPPX (exopolyphosphatase) and AbPPK2 (polyphosphate kinase 2) of *A. baumannii* were cloned and purified for their characterization.
- Attempted to generate the *ppk1* gene knockout of *A. baumannii* ATCC 17978.
- Screened potential inhibitors against LuxS (Quorum Sensing protein) from *Meiothermus ruber*.

Dr. Rathore's Lab, Gautam Buddha University, Greater Noida, India. 2012-2013

Designation: Research Fellow

Highlights:

- Identified, cloned and overexpressed RelBE toxin-antitoxin (TA) homologs and MazEF of *Xenorhabdus nematophila* for insight into their role in survival and program cell death.
- Using bioinformatics approach function of these toxin-antitoxin modules were explored for insight into their role in survival and program cell death.
- Further validation for the role of TA modules were done by performing *in vitro* exogenous killing assay after co-expression of toxin antitoxin using arabinose inducible promoter.

Dr. Gourinath's Lab, SLS, Jawaharlal Nehru University, India

2010-2011

Designation: Research intern

Highlights:

- Cloning, over-expression, purification of Serine Acetyltransferase 3 from *Entamoeba histolytica*
- Crystallization trials of Serine Acetyltransferase 3 (SAT3) from *E. histolytica* by vapour diffusion (hanging drop) method.

Skills

Molecular Biology: Real-time PCR, Conventional PCR, Plasmid Isolation, DNA isolation, Gene cloning, Restriction Digestion and ligation, Recombinant protein expression, purification, Enzyme Kinetics, RNA isolation, EMSA,

Bio Techniques: UV/Visible-spectroscopy, CLSM Microscopy, CD spectroscopy, Thermal Shift Assay, Affinity chromatography, Gel permeation chromatography (GPC), Protein dialysis, Native and SDS-PAGE, Agarose gel electrophoresis.

Microbiological Skill and Techniques: Experience to work in BSL-1 and BSL-2 facilities. Lyophilization. Electroporation, Gram staining, Culture maintenance, Toxicity assays, Competent Cell Preparation, Plasmid curing, Biofilm formation, Quorum sensing, Desiccation survival assay.

Docking and Visualisation: AutoDock Tools, Chimera, Discovery Studio (Biovia, Accelrys), PyMOL and Maestro (Schrodinger).

Molecular modeling and Dynamics: Gromacs 4.5 and later.

Online tools: Clustal Omega, BLAST, ORF finder, NEB cutter, SWISS-Model, Phyre², CASTp, EBI-SAS, MEGA6.

Operating Systems: Windows Vista, XP, 7, 8 and 10; Linux/Ubuntu.

Document: MS office Suite, Libre office (Windows /Linux).

Education

Panjab University, Chandigarh, India

Ph.D. Biotechnology (Thesis submitted)

2013-2021

Supervisor: Dr. Neena Capalash and Dr. Prince Sharma

Thesis title: “Role of polyphosphate kinase in virulence and stress responses of *Acinetobacter baumannii*”

Tilka Manjhi Bhagalpur University, Bhagalpur, India

M.Sc. Biotechnology (68.97 %)

2008-2010

Supervisor: Dr. Samudrala Gourinath (SLS, JNU)

Thesis: “Cloning, over-expression, purification and crystallization trials of Serine Acetyltransferase 3 from *E. histolytica*”

Tilka Manjhi Bhagalpur University, Bhagalpur, India

B. Sc. Zoology (55.63 %)

2004-2007

Graduated with major in Zoology and a minor in Botany and Chemistry

Publications

1. **Gautam LK**, Sharma P and Capalash N, “Attenuation of *Acinetobacter baumannii* virulence by inhibition of polyphosphate kinase 1 with repurposed drugs” *Microbiological Research*, 2021, 242, 126627. doi: [10.1016/j.micres.2020.126627](https://doi.org/10.1016/j.micres.2020.126627).
2. Nim JS, Mohit Yadav **Gautam LK**, Ghosh C, Sahi S and Rathore JS, “Novel Toxin-antitoxin System Xn-mazEF from *Xenorhabdus nematophila*: Identification, Characterization and Functional Exploration”, *Current Computer-Aided Drug Design* (2021) 17 (3): 402-411. doi:[10.2174/1573409916666200625135850](https://doi.org/10.2174/1573409916666200625135850).
3. **Gautam LK**, Sharma P and Capalash N, “Bacterial Polyphosphate kinases Revisited: Role in Pathogenesis and Therapeutic Potential” *Current Drug Targets*, 2019;20(3):292-301. doi: [10.2174/1389450119666180801120231](https://doi.org/10.2174/1389450119666180801120231).
4. **Gautam LK**, Yadav M and Rathore JS, "Functional annotation of novel toxin-antitoxin system Xn-RelT of *Xenorhabdus nematophila*; a combined *in silico* and *in vitro* approach," *Journal of Molecular Modeling*, 2017, 23: 189. doi:[10.1007/s00894-017-3361-5](https://doi.org/10.1007/s00894-017-3361-5).
5. **Gautam LK**, Yennamalli RM and Rathore JS, “Implication on the function of novel Xn-relE toxin structure of *Xenorhabdus nematophila* using homology modeling,” *Current Bioinformatics*, Vol. 12 (6), 535 – 542, 2017, doi:[10.2174/1574893611666160620093520](https://doi.org/10.2174/1574893611666160620093520).
6. Rathore JS and **Gautam LK**, “Expression, Purification, and Functional Analysis of Novel RelE Operon from *X. nematophila*,” *The Scientific World Journal*, vol. 2014, Article ID 428159, 2014. doi:[10.1155/2014/428159](https://doi.org/10.1155/2014/428159).
7. Kaur A, **Gautam LK**, Balda S, Capalash N and Sharma P, “Quenching bacterial Quorum Sensing with Triclosan Controls Slime Formation in Paper Mill,” (*Under communication*)

Work presented at conferences and proceedings:

- **Gautam LK**, Sharma P and Capalash N, “Pharmacophore based screening and identification of natural compounds for inhibition of *Acinetobacter baumannii* polyphosphate kinase (AbPPK) and *in vitro* validation” at 6th Biennial international

conference on “New developments in drug discovery from natural products and traditional medicine (DDNPTM - 2018)” at NIPER, Mohali, Panjab, 15-17 Nov 2018.

- **Gautam LK**, Sharma P and Capalash N, “Identification of high affinity inhibitors of *Acinetobacter baumannii* polyphosphate kinase (AbPPK) through virtual screening” at 11th Chandigarh Science Congress (CHASCON 2017) at Panjab University, Chandigarh, 9-11 Mar 2017.
- **Gautam LK**, Sharma P and Capalash N, “An insight into *Acinetobacter baumannii* polyphosphate kinase (AbPPK) structure and its protein ligand complex: an *in silico* approach for inhibitor screening” at 10th Chandigarh Science Congress (CHASCON 2016) at Panjab University, Chandigarh, 29 Feb- 2 Mar 2016.

Awards and Achievements

- Selected for Research Fellowship in Sciences for Meritorious Students (RFSMS) scheme 2013 by UGC, Govt. of India for pursuing Ph.D. in Dept. of Biotechnology, PU, Chandigarh.
- "Haryana Science and Technology Awards of Fellowship" in Life Science 2012.
- Qualified "CSIR - National Eligibility Test (NET)" June 2011: Rank-031
- GATE Life Science: 2011; All India Rank-503, Percentile - 96.2.

Conference and Seminar attended

- International Webinar on “Update on Covid 19 Vaccine Trials” organized by the Department of Zoology, CRAC, Sonipat on June 6, 2020.
- International Webinar-‘Health Perspectives in 2020’ organised by Dept. of Zoology GCW Lakhan Majra, Rohtak, Haryana on 7th June, 2020.
- International Webinar on ‘Bio Risk Management of SARS-CoV-2 (Covid-19) Operations in Clinical, Diagnostic and Research Laboratories’ Friday, May 29, 2020.
- International webinar on “Frontiers in Biotechnology” Department of Biotechnology, Panjab University, Chandigarh, India. 27 Apr 2020.
- Seminar on “Communicable and Non-communicable Disease: Latest Therapeutics Interventions” and student talent hunt at Department of Biotechnology, Panjab University, Educational Institution, Chandigarh, India. 12-13 Feb 2019.
- “Industry-Academia Meet” Department of Microbiology, Panjab University, Chandigarh, India. 22 June 2018.
- International Seminar on “Biosafety Risk and Management” Department of Biochemistry, Panjab University, Chandigarh, India. 19 March 2018.
- National Symposium on “Frontiers in Biotechnology” Department of Biotechnology, Panjab University, Chandigarh, India. 6 March 2018.
- National Symposium on “Frontiers in Biotechnology” Department of Biotechnology, Panjab University, Chandigarh, India. 21 March 2017.

- Seminar on “Intellectual Property Rights (IPRs) and Regulatory Perspective for Pharma and Biotech Sectors” held at Panjab University, Chandigarh, 22-23 Feb 2017.
- Seminar on “Communicable and Non-communicable Disease: Latest Therapeutics Interventions” at Department of Biotechnology, Panjab University, Educational Institution, Chandigarh, India. 21 Feb 2017.
- Webinar - "The OPLS3 force field: A new force field for accurate modeling of proteins and ligands" by Schrödinger LLC; November 2015
- MICROCON 2015 "Microbes for the Mankind: Vision India 2020" Department of Microbial Biotechnology, Panjab University, Chandigarh, India. January 2015.
- 1st Lecture Series of Bio-Club (CRIKC)' at Panjab University, Chandigarh, India. 8 Nov 2014.
- 'Stimulating Bio-Entrepreneurs Talk' Association of Biotechnology Led Enterprises (ABLE) and BIRAC; at Panjab University, Chandigarh, India. July 2014.
- Virtual Workshop on "Art of Science Communication” at Department of Microbiology, Panjab university; 4th Dec 2013.
- “VIIth Annual research festival (BIOSPARKS 2010)” at School of Life Sciences, JNU, 11th -12th march 2010.

Workshop

1. "International Workshop on BioRisk Management" organised by International Biological Threat Reduction (IBTR), Sandia National Laboratories USA and Panjab University, Chandigarh; 3-9 April 2014.
2. “Transportation Workshop *including: The Class 6.2 Dangerous Goods Shipping General awareness and function specific training*” organised by International Biological Threat Reduction (IBTR), Sandia National Laboratories USA and Panjab University, Chandigarh; 4-5 April 2014.
3. ‘Biorisk Management Trainer Development Program Curriculum Development Track’ organized by International Biological Threat Reduction (IBTR), Sandia National Laboratories, USA and Panjab University, Chandigarh; 14- 18 December 2015.
4. “Advanced Techniques in Protein Design and Engineering” at IISER Mohali, 14-18 March 2016.
5. “Small Angle X-ray Scattering (NSAXS – 2017)” at Department of SAIF, Panjab University, Chandigarh, 6 - 8 November 2017.
6. “Filmmaking as a tool for Science Communication” at The Science Media Centre, IISER Pune, 14 - 18 September 2020.
7. “Writing about Science for Non-Scientific Audiences” at The Science Media Centre, IISER Pune, 07- 11 December 2020.

Memberships

Life member (L31963) - Indian Science Congress Association, India
 Life member (4749-2018) - Association of Microbiologist of India (AMI)
 Session member - American Society of Microbiology (ASM), USA

Reviewer

Journal of Molecular Modeling (Springer Nature)
Current Bioinformatics (Bentham Science Publisher)
Computational Biology and Bioinformatics (Science Publishing Group)
SVOA Microbiology (Science Volks Publications)
The Applied Biology & Chemistry Journal

Reference

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