

Biodata of Dr. Ankush Gupta

Present Position

Assistant Professor,
Molecular Microbiology Laboratory,
Department of Biochemistry,
Institute of Science,
Banaras Hindu University,
Varanasi-221005, Uttar Pradesh, India.

Contact

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Current Research Interests

- Isolation, molecular characterization and preparation of genetically engineered mycobacteriophages and their gene products (endolysins) as antibacterial agents against *Mycobacterium* sp. for bacteriophage therapy
- Comparative proteomic analysis of drug sensitive and resistant *Mycobacterium tuberculosis* (MDR and XDR-TB) in north Indian subpopulation
- Functional characterization of the Ribonuclease E RNA Degradosome of the *Mycobacterium smegmatis*.
- Role of extra-cytoplasmic function (ECF) sigma factors and anti-sigma factors in the virulence mechanism of *Mycobacterium tuberculosis*.

Educational Qualifications

Degree	Year of passing	University/Institutions	Subjects
Ph.D.	2010	School of Life Sciences, Jawaharlal Nehru University, New Delhi.	Thesis title: “ Functional analysis of the Ribonuclease L (RNase L) ” Electronic copy of the thesis available at UGC website, “ http://shodhganga.inflibnet.ac.in/handle/10603/14172 ”
M.Sc.	2003	Banaras Hindu University, Varanasi, India.	Biochemistry
B.Sc. (Hons.)	2001	Banaras Hindu University, Varanasi, India.	Botany, Zoology, Chemistry (Hons.)

Academic/Research Experience/Employment

From	To	Name of Organization	Position held
2015	cont.	Banaras Hindu University	Assistant Professor
2013	2015	Banaras Hindu University	DST Fast Track Young Scientist
2010	2013	Banaras Hindu University	Dr. D.S. Kothari Postdoctoral Fellow
2003	2010	Jawaharlal Nehru University	Ph.D. Scholar

Distinctions/Recognitions/Scholarships/ Fellowships

- **Ms. Garima Kandwal**, my research scholar has been selected for the prestigious **Prime Minister's Research Fellowship (PMRF) award** in the **Cycle-11, 2023** to conduct her research work on "Engineered bacteriophages" in the Department of Biochemistry, Institute of Science, Banaras Hindu University.
- **Smriti Roy Memorial Gold Medal for the Best teacher** of the Institute of Science, 2017.
- The publication, "Cross-talk between cognate and non-cognate RpoE sigma factors and Zn²⁺-binding anti-sigma factors regulates photooxidative stress response in *Azospirillum brasilense*" in which I am one of the first authors has received the **Vice-Chancellor's Award for Excellence in Research** for the year 2014.
- **DST Fast Track Young Scientist**, 2013 from the Department of Science and Technology, Govt. of India.
- **Dr. D. S. Kothari Postdoctoral Fellowship**, 2010 from University Grants Commission, Govt. of India.
- **National Eligibility Test (NET-Dec. 2002, written test) for Junior Research Fellowship (JRF)** of the Council of Scientific and Industrial Research (CSIR), Govt. of India.
- **All India Graduate Aptitude Test for Engineering (GATE-2002)**, Score 89.81 percentile.

Teaching and Research Experience: Total 14 years 04 months

- As Assistant Professor, Department of Biochemistry, Institute of Science, Banaras Hindu University (Oct. 2015-till date), teaching courses viz; "Molecular Biology", "Clinical Biochemistry", "Outlines of Biotechnology" and "Bioanalytical Techniques" to M.Sc. Biochemistry students.
- As Postdoctoral young scientist, School of Biotechnology, Banaras Hindu University (May 2010-2015), teaching courses viz; "Genetic Engineering" and "Genomics and Proteomics" to M. Sc. Biotechnology students.
- Imparting research training to M. Sc. and Ph. D. students and involved in other departmental duties like, exam invigilation etc.
- Actively participating in important University duties like Observer for the **School Entrance Test (SET-2018)** and **Undergraduate/ Postgraduate Entrance Test (UET/PET-2018)** for Banaras Hindu University entrance examinations.

Sponsored Research Projects/ Grants

- **Council of Science and Technology, UP (CST-UP)** Grant of **Rs. 9 lakhs** on the project entitled, "Isolation and characterization of mycobacteriophages and their novel antibacterial agents against *Mycobacterium* sp." for contingency, consumables etc. from 26th October 2023 till date.
- Equipment grant of **Rs. 6.8 lakhs and Rs.9 lakhs** from the "**Research Promotion Scheme**" of the Banaras Hindu University for minor equipments.
- **Indian Council of Medical Research (ICMR)**, Research Methodology Grant of **Rs. 15 lakhs** on the project entitled, "Comparative transcriptomic and proteomic analysis of drug sensitive and resistant *Mycobacterium tuberculosis* (MDR and XDR-TB) in north Indian subpopulation" for equipments, contingency, consumables etc. from 20th March 2019 to 31st March 2024.
- **Incentive Grant to senior faculty** under the **Institution of Eminence (IoE)** by Banaras Hindu University of **Rs.6 lakhs and Rs.8 lakhs** on the project entitled, "Isolation, identification and molecular characterization of mycobacteriophage and their encoded novel antibacterial agents

(endolysins) against *Mycobacterium* sp.” for consumables, contingency, minor equipments etc. from May 31st 2021 till 31st March 2024.

- Consumable grant of **Rs. 3 lakhs** from the University development fund of the Banaras Hindu University for chemicals, glasswares, kits etc.
- UGC Startup Grant (XII Plan) for the newly appointed faculty members at the Banaras Hindu University, **Rs. 3 lakhs** for minor equipments, consumables, contingency and travel grant from June, 2016 till date.
- **DST Fast Track Young Scientist project** grant from Department of Science and Technology (DST) on the project entitled “Functional and structural characterization of a novel L-asparaginase from *Azospirillum brasilense* Sp7”, ~**Rs. 28 lakhs** for Research fellowship, equipments, contingency, consumables and travel grant from 2nd June 2013 to 16th Dec. 2016.
- **Dr. D.S. Kothari Post Doctoral Research grant** from University Grants Commission (UGC) on the project entitled “Identifying and isolating novel genes from the metagenome of coal beds for producing novel enzymes of industrial importance”, ~**Rs.14 lakhs** for Research fellowship, HRA and Contingency from 4th May, 2010 to 3rd May, 2013.

Publications

Manuscripts:

1. Lav Kumar Jaiswal, Tanmayee Nayak, Anuja Kakkar, Garima Kandwal, Shubham Vashishtha, Kritika Singh, Bishwajit Kundu, **Ankush Gupta** (2025) Comprehensive kinetic characterization and inhibitor study of Ribonuclease E, a key enzyme of RNA metabolism from *Mycobacterium smegmatis*. *International Journal of Biological Macromolecules*, Vol. Volume 322, Part 4, September 2025, 146975 [Accepted 17 August 2025] <https://www.sciencedirect.com/science/article/pii/S0141813025075324?dgcid=author> ISSN/ISBN: 0141-8130, Impact factor (2024): **8.5, Citations: Nil**.
2. Tanmayee Nayak, Anuja Kakkar, Lav Kumar Jaiswal, Garima Kandwal, Anand Kumar Singh, Louise Temple, **Ankush Gupta** (2025) Characterization of a novel virulent mycobacteriophage Kashi-SSH1 (KSSH1) depicting genus-specific broad-spectrum anti-mycobacterial activity. *Life Sciences* Volume 369, 15 May 2025, 123546 [Accepted 6 March 2025] <https://doi.org/10.1016/j.lfs.2025.123546> ISSN (Online): 1879-0631 ISSN (Print): 0024-3205. Impact factor (2024): **5.1, Citations: Nil**
3. Lav Kumar Jaiswal, Rakesh Kumar Singh, Tanmayee Nayak, Anuja Kakkar, Garima Kandwal, Vijay Shankar Singh, **Ankush Gupta** (2024) A Comparative Analysis of Mycobacterial Ribonucleases: Towards a Therapeutic Novel Drug Target. *Infection, Genetics and Evolution*, Volume 123, 2024, 105645 [Accepted 21 July 2024] <https://doi.org/10.1016/j.meegid.2024.105645>. ISSN (Print): 1567-1348, ISSN (Online): 1567-7257. Impact factor (2024): **2.6, Citations: 03**
4. Anuja Kakkar†, Garima Kandwal†, Tanmayee Nayak, Lav Kumar Jaiswal, Amit Srivastava and **Ankush Gupta** (2024) Engineered Bacteriophages: A Panacea against Pathogenic and Drug-Resistant Bacteria. *Heliyon*, Volume 10, Issue 14, 2024, e34333, [Accepted 9 July 2024] <https://doi.org/10.1016/j.heliyon.2024.e34333>. ISSN: 2405-8440. Impact factor (2024): **3.6, Citations: 06 [† : Equal contribution by both the authors]**
5. Tanmayee Nayak, Anuja Kakkar, Rakesh Kumar Singh, Lav Kumar Jaiswal, Anand Kumar Singh, Louise Temple and **Ankush Gupta** (2023) Isolation and characterization of a novel mycobacteriophage Kashi-VT1 infecting *Mycobacterium* species. *Frontiers in Cellular and Infection Microbiology* [Accepted 19 June 2023] Volume 13 (2023), Article ID: 1173894.

<https://www.frontiersin.org/articles/10.3389/fcimb.2023.1173894/full>. ISSN: 2235-2988, Impact factor (2024): **4.8, Citations: 05**

6. Lav Kumar Jaiswal, Rakesh Kumar Singh, Tanmayee Nayak, Vinay Kumar Singh, **Ankush Gupta** (2023) Heterologous Expression, Purification and Structural Characterization of Ribonuclease E from *Mycobacterium smegmatis*. *Iranian Journal of Science* [Accepted 6 April 2023] Volume 47, 683–693, <https://doi.org/10.1007/s40995-023-01467-x> ISSN (Print): 2731-8095 ISSN (Online): 2731-8109. Impact factor (2024): **1.4, Citations: 02**
7. Pallavi Gautam, Anand Kumar Pandey, **Ankush Gupta**, Suresh Kumar Dubey. (2023) Microcosm-omics centric investigation reveals elevated bacterial degradation of imidacloprid. *Environmental Pollution* [Accepted 4 March 2023] Volume 324, 121402. <https://doi.org/10.1016/j.envpol.2023.121402>. ISSN (Print): 0269-7491 ISSN (Online): 1873-6424. Impact factor (2024): **7.3, Citations: 16**.
8. Tanmoy Sarkar, Prashant Ranjan, Smitha Kanathur, **Ankush Gupta** and Parimal Das. (2022) An *in vitro* and computational validation of a novel loss-of-functional mutation in PAX9 associated with non-syndromic tooth agenesis. *Molecular Genetics and Genomics* [Accepted 25 October 2022] Volume 298, 183–199, <https://doi.org/10.1007/s00438-022-01970-7>. ISSN (Print) 1617-4615 ISSN (Online) 1617-4623, Impact factor (2024): **2.1, Citations: 06**.
9. Kamal Singh, Swati Sharma, Tuhina Banerjee, **Ankush Gupta** and Shampa Anupurba (2022) Mutation detection and minimum inhibitory concentration determination against linezolid and clofazimine in confirmed XDR-TB clinical isolates. *BMC Microbiology* [Accepted 16 August 2022] Volume 22, 236 (2022). <https://doi.org/10.1186/s12866-022-02622-x>, ISSN: 1471-2180, Impact Factor (2024): **4.2, Citations: 08**.
10. Rakesh Kumar Singh, Lav Kumar Jaiswal, Tanmayee Nayak, Ravindra Singh Rawat, Sanjit Kumar, Sachchida Nand Rai, and **Ankush Gupta** (2022) Expression, Purification, and In Silico Characterization of *Mycobacterium smegmatis* Alternative Sigma Factor SigB. *Disease Markers* [Accepted June 2022] Volume 2022 |Article ID 7475704 | <https://doi.org/10.1155/2022/7475704> ISSN: 0278-0240 (Print) 1875-8630 (Online), Impact Factor (2023): **3.464, Citations: 07**
11. Kamal Singh, Richa Kumari, Smita Gupta, Rajneesh Tripathi, Anjali Srivastava, Vidisha Shakya, **Ankush Gupta**, Shampa Anupurba (2021) Direct detection of resistance to fluoroquinolones/SLIDs in sputum specimen by GenoType MTBDRsl v. 2.0 assay A study from Eastern Uttar Pradesh, India. *Annals of clinical microbiology and antimicrobials* [Accepted 16 August 2021] Vol. 20 (1), 1-6, Article ID: <https://doi.org/10.1186/s12941-021-00463-6>, ISSN: 1476-0711, Impact Factor (2024): **3.6, Citations: 09**.
12. Kamal Singh, Richa Kumari, Rajneesh Tripathi, **Ankush Gupta** and Shampa Anupurba (2019) Mutation in MPT64 gene influencing diagnostic accuracy of SD Bioline assay (capilia) *BMC Infectious Diseases* [Accepted November 29, 2019] Vol. 19:1048, Article ID: <https://doi.org/10.1186/s12879-019-4671-2>, ISSN/ISBN: 1471-2334, Impact Factor (2024): **3.0, Citations: 20**.
13. Tanmayee Nayak, Rakesh Kumar Singh, Lav Kumar Jaiswal, **Ankush Gupta** (2018) Bacteriophage encoded Endolysins as potential antibacterials *Journal of Scientific Research* Vol. 63, 2018 : 39-48, ISSN/ISBN : 0447-9483, Impact Factor (2024): **None, Citations: 03**.
14. Vijay Shankar Singh, Ashutosh Prakash Dubey, **Ankush Gupta**, Sudhir Singh, Bhupendra Narain Singh, Anil Kumar Tripathi (2017) Regulation of a Glycerol-Induced Quinoprotein Alcohol Dehydrogenase by $\sigma 54$ and a LuxR-Type Regulator in *Azospirillum brasilense* Sp7. [Accepted April 8, 2017] *Journal of Bacteriology* 199:e00035-17. <https://doi.org/10.1128/jb.00035-17>, ISSN/ISBN: 0021-9193 (Print); 1098-5530 (Online), Impact factor (2024): **3.0, Citations: 13**.
15. Durgesh Narain Singh[†], **Ankush Gupta**[†], Vijay Shankar Singh, Rajeev Mishra, Suneel Kateriya and Anil Kumar Tripathi (2015) Identification and characterization of a novel phosphodiesterase from the metagenome of an Indian coalbed. [Accepted Jan. 15, 2015], *PLoS ONE*. Vol. 10(2):e0118075.

<https://doi.org/10.1371/journal.pone.0118075>, ISSN/ISBN: 1932-6203, Impact factor (2024): **2.6, Citations: 12** ([†]: Equal contribution by both the authors).

16. **Ankush Gupta** and Pramod C. Rath (2014) Curcumin, a natural antioxidant, acts as a noncompetitive inhibitor of human RNase L in presence of its cofactor 2-5A *in vitro*. [**Accepted June 10, 2014**], *BioMed Research International*, Vol. 2014, Article ID 817024, 9 pages, 2014. <https://doi.org/10.1155/2014/817024>, ISSN/ISBN: 1110-7243, Impact factor (2024): **2.3, Citations: 18**.
17. **Ankush Gupta** and Pramod C. Rath (2014) Expression of mRNA and protein-protein interaction of the antiviral endoribonuclease RNase L in mouse spleen. [**Published April 26, 2014**], *International Journal of Biological Macromolecules*, Vol. 69: 307-318. pii:S0141-8130(14)00269-4. <https://doi.org/10.1016/j.ijbiomac.2014.04.042>. ISSN/ISBN: 0141-8130, Impact factor (2024): **8.5, Citations: 13**.
18. Namrata Gupta[†], **Ankush Gupta[†]**, Santosh Kumar, Rajeev Mishra, Chhaya Singh, and Anil K. Tripathi (2013) Cross-talk between cognate and non-cognate RpoE sigma factors and Zn²⁺-binding anti-sigma factors regulates photooxidative stress response in *Azospirillum brasilense*. [**Published June 2, 2013**] *Antioxidants & Redox Signaling*. Vol. 20(1) 42-59. <https://doi.org/10.1089/ars.2013.5314>. ISSN: 1523-0864 (Print); 1557-7716 (Online) (Accepted 2 June 2013; Impact Factor (2024): **6.1, Citations: 16** ([†]: Equal contribution by both the authors)).
19. **Ankush Gupta** and Pramod C. Rath (2012) Expression, purification and characterization of the interferon-inducible, antiviral and tumor-suppressor protein, human RNase L. [**Published March, 2012**], *Journal of Biosciences*, Vol. 37(1) 103-113. <https://doi.org/10.1007/s12038-011-9180-4>. ISSNs: 0250-5991 (Print); 0973-7138 (Online), Impact factor (2024): **1.9, Citations: 13**.
20. Mukti Nath Mishra, Santosh Kumar, Namrata Gupta, Simarjot Kaur, **Ankush Gupta** and Anil K. Tripathi (2011) An extra-cytoplasmic function sigma factor cotranscribed with its cognate anti-sigma factor confers tolerance to NaCl, ethanol and methylene blue in *Azospirillum brasilense* Sp7. [**Published January 11, 2011**] *Microbiology*, Vol. 157(4) 988-999. ISSNs: 1350-0872 (Print); 1465-2080 (Online), <https://doi.org/10.1099/mic.0.046672-0>, Impact factor (2024): **2.6, Citations: 34**.

Books/Chapters published:

1. Gupta A. (2019) “**Role of Stress and Hormones of the Hypothalamic-Pituitary-Adrenal (HPA) Axis in Aging**”. pp 241-263, In: Rath P. (eds) Models, Molecules and Mechanisms in Biogerontology. Springer, Singapore; (First Online): 31 July 2019; DOI https://doi.org/10.1007/978-981-13-3585-3_12; ISBN: 978-981-13-3584-6 (Print), 978-981-13-3585-3 (Online).
2. Tripathi Y.N. Divyanshu K, Kumar S, Jaiswal L K, Khan A, Birla H, **Gupta A**, Singh S P, Upadhyay R S. (2019) “**Biopesticides: Current Status and Future Prospects in India**”. pp 79-109, In: Keswani C. (eds) Bioeconomy for Sustainable Development. Springer, Singapore; (First Online) : 15 October 2019; DOI https://doi.org/10.1007/978-981-13-9431-7_6; ISBN: 978-981-13-9430-0 (Print), 978-981-13-9431-7 (Online).
3. Tanmayee Nayak, Rakesh Kumar Singh, Lav Kumar Jaiswal, **Ankush Gupta**, Juhi Singh. (2020) “**A Survey of Recent Nanotechnology-Related Patents for Treatment of Tuberculosis**” Intellectual Property Issues in Nanotechnology. By Taylor and Francis Group DOI <https://doi.org/10.1201/9781003052104>; eBook ISBN: 9781003052104.
4. Jaiswal L.K., Singh P., Singh R.K., Nayak T., Tripathi Y.N., Upadhyay R.S., **Ankush Gupta**. (2021) “**Effects of Salt Stress on Nutrient Cycle and Uptake of Crop Plants**” Chapter 8, In: Pratibha Singh, Madhulika Singh, Rajiv Kumar Singh, Sheo Mohan Prasad (eds) Physiology of Salt Stress in Plants: Perception, Signalling, Omics and Tolerance Mechanism, John Wiley & Sons Ltd., First published: 01 October 2021 DOI <https://doi.org/10.1002/9781119700517.ch8>, Print ISBN:9781119700470, Online ISBN: 9781119700517
5. Robin P. Mathew, Suyash A. Sawale, **Ankush Gupta** and Shashibhal M. Pandey (2025). “**Immunology and pathogenesis of Trichomonas vaginalis and HIV coinfection**” Chapter 10 2025, Pages 155-179,

In: *Trichomonas vaginalis: Pathogenesis, Diagnosis, and Treatment* Edited by Prashant Khare and Ashish Jain. Elsevier (Academic Press). DOI <https://doi.org/10.1016/B978-0-443-22204-7.00010-1>, First published: 31 January 2025 ISBN: 978-0-443-22204-7.

Reviewer

For Frontiers in Cellular and Infection Microbiology, Frontiers in Immunology, Frontiers in Psychology (Publisher: Frontiers Media SA (Switzerland), Molecular Biology Reports (Publisher: Springer Netherlands), Molecular Genetics and Genomics (Springer Nature), ACS Infectious Diseases (ACS Publications).

Editor

For the special issue on **“Emerging Trends in Phage Therapeutics to Overcome Antibiotic Resistance”** in the journal Frontiers in Antibiotics.

Oral Presentation

- **Ankush Gupta**, “Applications of *Bacteriophage Recombineering* with *Electroporated DNA* (BRED) technology in phage therapy”, International Conference on “Emerging Trends on Genome Editing” sponsored by DBT during August 17th-18th, 2022 at the Amity Institute of Microbial Technology, Amity University, Noida, Uttar Pradesh.
- **Ankush Gupta**, “Elucidation of cellular functions by protein-protein interaction and crosstalk studies”, mini symposium on “Interdisciplinary Research in Life Sciences: Current Scenario and Future Directions” at the Interdisciplinary School of Life Sciences, Institute of Science, Banaras Hindu University Varanasi-221005, from November 12th-13th, 2016.
- **Ankush Gupta** and Pramod C. Rath, “Protein-protein interactions and emerging roles of the Interferon-inducible Ribonuclease L (RNase L)”, page 40, National Conference on Medical Biotechnology-Vision 2020, Advanced Centre for Biotechnology, Maharishi Dayanand University, Rohtak, Haryana, India, April 16th-18th, 2010.

Conference Organized

- Organized the **“8th International Translational Cancer Research Conference (TCR-2020)”** on the **“Role of Inflammation and Immune System for Cancer Prevention and Treatment”** from February 13th-16th, 2020 organized by the Department of Biochemistry, Institute of Science, Banaras Hindu University Varanasi-221005, India.
- Organized and worked as Treasurer for the **International Conference on “Trends in Biochemical and Biomedical Research: Advances and Challenges (TBBR-2018)”** from February 13th-15th, 2018 at the Department of Biochemistry, Institute of Science, Banaras Hindu University Varanasi-221005, India.
- Organized the **“26th National Congress of Parasitology: Addressing New Challenges and Emerging Trends in Parasitology and Disease Biology”** from January 21st-23rd, 2016 at the Department of Biochemistry, Institute of Science, Banaras Hindu University, Varanasi-221005, India.

Workshops Organized

- Faculty Resource person for the hands-on training workshop on **“Basics of Bacteriophage Biology and Clinical applications to combat the emerging antimicrobial resistance”**, organized by the

Viral Research & Diagnostic Laboratory, Department of Microbiology, Institute of Medical Science, Banaras Hindu University, Varanasi-221005, India, October 03rd-07th, 2023.

- Resource person for “**IBRO-APRC Neuroscience School on Molecular Basis of Neuroinflammation mediated Neurodegeneration**”, organized by Department of Biochemistry, Institute of Science, Banaras Hindu University, Varanasi-221005, India, September 01st-14th, 2019.
- Resource person for “**Practical training course on Bioinformatics and Proteomics**”, organized by BHU-DBT-Interdisciplinary School of Life Sciences, Banaras Hindu University, Varanasi-221005, India, February 20th- 26th, 2011.

Research

At present, we work on the model organism *Mycobacterium smegmatis*, a non-infectious fast-growing mycobacterium and also perform molecular characterization of *Mycobacterium tuberculosis*, a pathogenic slow-growing mycobacterium, to study the role of important regulatory molecules in the pathogenesis and other cellular processes of this important bacterium. In one of the projects, we are working upon the isolation, molecular characterization and preparation of genetically engineered mycobacteriophages and their gene products like endolysins which are a class of novel antibacterial agents against *Mycobacterium* sp. for bacteriophage therapy. In another project, we are working upon the comparative proteomics from sensitive, MDR and XDR *M. tuberculosis* isolates from patient's sample for elucidation of drug resistance biomarkers and drug targets. In another project we are working on the RNase E RNA-degradosome of *Mycobacterium* sp. to understand the molecular basis of RNA metabolism (processing and degradation) in *M. tuberculosis*. We are also studying the role of Extra-Cytoplasmic Function (ECF) sigma and anti-sigma factors in the virulence mechanism of *Mycobacterium tuberculosis*.

Besides, we are also working on the novel *R.etli* class of L-asparaginases, on the structural as well as functional characterization by preparing several site-directed mutants of this enzyme. Till date, there is no detailed report on molecular, functional/structural characterization of this class of L-asparaginases. It shares no characteristic active-site motifs of bacterial L-asparaginases hence; there is an ample opportunity to investigate the structural aspects to exploit its therapeutic potential.

(Dr. Ankush Gupta)
August 2025, Varanasi, India.