

Assistant Professor
Department of Biochemistry
School of Life Sciences
Central University of Rajasthan
NH-8, Bandar Sindri
Dist-Ajmer-305817, Rajasthan, India
E-mail: naveen.kumar@curaj.ac.in
nav1271@gmail.com
Contact no.: +91 9502186855



Research Publications

1. **Kumar N**, Hazell NC, Bei J, Nguyen T, and Hu H. PCR-generated DNA templates enable efficient, rapid, and cost-effective mRNA synthesis. *Methods*. 2025;243:31-9. (Invited for inclusion in the Editors' Collection, Special Issue: YMETHOD).
2. **Kumar N**, Ma Z, Long F, Bonam SR, Lai H-T, Wu S-Y and Hu H. Mechanistic insights and *in vivo* HIV suppression by the BRD4-targeting small molecule ZL0580. *bioRxiv*. 2025:2025.08.14.670267. doi: <https://doi.org/10.1101/2025.08.14.670267> (Under revision in *Plos Pathogens*).
3. Hazell NC, Reyna RA, Adam A, Bonam SR, Bei J, **Kumar N**, and Hu H. (2025). mRNA-delivered neutralizing antibodies confer protection against SARS-CoV-2 variant in the lower and upper respiratory tract. *bioRxiv*. 2025:2025.04.28.650951. <https://doi.org/10.1101/2025.04.28.650951> (Accepted in *Journal of Virology*).
4. Gjorgjevikj, D., **Kumar, N.**, Wang, B., Hilal, T., Said, N., Loll, B., Artsimovitch, I., Sen, R., and Wahl, M.C. (2025). The Psu protein of phage satellite P4 inhibits transcription termination factor ρ by forced hyper-oligomerization. *Nature Communications*. 16, 550.
5. Ansari MSH, **Kumar N**, Jain S, Balakarthick NY, Sen R (2023). A novel nucleic acid-binding protein, Gp49, from mycobacteriophage with mycobactericidal activity has the potential to be a therapeutic agent. *Int J Biol Macromol* 2023;236:124025.
6. Choudhury M, Koduru TN, **Kumar N**, Salimi S, Desai K, Prabhu NP, Sritharan M (2021). Iron uptake and transport by the carboxymycobactin-mycobactin siderophore machinery of *Mycobacterium tuberculosis* is dependent on the iron-regulated protein HupB. *Biomaterials*. PMID: 33609202.
7. **Kumar, N.** & Sritharan, M. (2020). Role of a 21-kDa iron-regulated protein IrpA in the uptake of ferri-exochelin by *Mycobacterium smegmatis*. *J Appl Microbiol*. PMID: 32472729.
8. Rasheed, M., **Kumar, N.** & Kaur, R. (2020). Global Secretome Characterization of the Pathogenic Yeast *Candida glabrata*. *J Proteome Res* 19, 49–63. PMCID: PMC6947636.
9. Sritharan, N., Choudhury, M., Sivakolundu, S., Chaurasia, R., **Kumar, N.**, Rao, P. P. & Sritharan, M. (2014). Highly immunoreactive antibodies against the rHup-F2 fragment (aa 63-161) of the iron-regulated HupB protein of *Mycobacterium tuberculosis* and its potential for the serodiagnosis of extrapulmonary and recurrent tuberculosis. *Eur J Clin Microbiol Infect Dis* 34, 33–40. PMID: 25037869.

Educational Qualifications and Training

- **Postdoctoral Fellow 2024 to 2025**
Mentor: Dr. Haitao Hu (Associate Professor)
Department of Microbiology and Immunology
UTMB-Health, Galveston, Texas, USA
- **Research Associate I & II. – 2020-2024**
Mentor: Dr. Ranjan Sen (Staff Scientist VII)
Laboratory of Transcription Biology, CDFD,
Hyderabad, India.
- **Research Associate. – 2018-2020**
Mentor: Dr. Rupinder Kaur (Staff Scientist VII)
Laboratory of Fungal Pathogenesis, CDFD,
Hyderabad, India.
- **Ph.D. - 2010-2018**
Animal Sciences
Dept. of Animal Biology, University of Hyderabad, Hyderabad, Telangana
Thesis Title: Identification and characterization of a 21 kDa iron-regulated envelope protein in *Mycobacterium smegmatis*
- **M.Sc. - 2007-2009**
Biochemistry
Dept. of Biochemistry, Osmania University, Hyderabad, Telangana
- **B.Sc. - 2004-2007**
Microbiology, Botany, Chemistry
National Degree College, Kakatiya University, Warangal, Telangana

Technical skills

- Expertise in **mRNA vaccine technology**, including design, preparation, and characterization of mRNA-LNP formulations.
- Skilled in conducting **animal studies (mice and hamsters)** for vaccine immunization and immune response evaluation.
- Proficient in developing and applying **antibody-encoded mRNA vaccines** for therapeutic and prophylactic purposes.
- Experienced in **mRNA-LNP targeted delivery systems**, optimizing formulations for efficient in vivo delivery.
- I am well-trained in a BSL III facility to handle pathogenic strains of *Mycobacteria*.
- Efficient in handling BALB/C and C57BL/6 mice for Systemic, gastrointestinal, and vaginal candidiasis models.

- Expert in animal handling and immunization (polyclonal antibodies generation) procedures in Rabbit.
- **Molecular biology:** Gene cloning, protein expression, purification, preparation of proteins from bacteria and yeast for SDS-PAGE, Native PAGE, Western Blotting. Nucleic acid (DNA/RNA) isolation and purification, cDNA synthesis by reverse transcription, PCR and qRT-PCR, DNA gel analysis/extraction/quantification. Transformation and transduction in bacteria.
Yeast genetics: Yeast transformation, Generation of knockout in yeast.
- **Radiolabelled isotopes:** Uptake assays with ^{55}Fe in *Mycobacterium smegmatis* cells. Competitive EMSA with P^{32} labeled radioisotope.
- **Cell culture** expertise with human THP-1 monocytic cells, murine primary macrophages, and 293T and CHO cells for mRNA and mRNA-LNP transfection and expression analysis.
- **Analytical methods: Microscopy:** Confocal and Superresolution microscopy for GFP fluorescence and DAPI staining. Immunofluorescence in superresolution microscopy.
- **FACS** for expression of cell surface proteins.
- **Reporter assays, pull-down assays, and protein immunoprecipitation**
- **Bioinformatics:** Online database mining, Sequence alignment and manipulation, and sequencing result analysis for generating new bacterial constructs and clones.
- **Computational and Digital Skills:** Handling various basic and analytical tools including Microsoft Word, Microsoft Excel, Microsoft PowerPoint, GraphPad Prism, Image J, Adobe Photoshop, etc.
- **Documentation:** Proficient in writing scientific reports, manuscripts, and poster presentations.

Achievements

- Received the **Best Poster Award** at the 2025 GSBS Research Expo, UTMB.
- Served as a poster judge in the 2025 GSBS Research Expo, organized by GSBS, UTMB.
- Served as a judge for the Summer Research Program (Academic Year 2024–2025), organized by the Graduate School of Biomedical Sciences (GSBS), UTMB.
- Received Senior Research Fellowship from the University of Grant Commission (UGC), Government of India, 2012-2015
- Availed Junior Research Fellowship from UGC, Govt. of India, 2010-2012
- Qualified for **CSIR-UGC/JRF exam**.
- Secured **20th rank** in Post Graduate entrance exam conducted by Kakatiya University, India
- Secured **80th rank** Post Graduate entrance exam conducted by Osmania University, India
- University rank holder during Bachelor studies