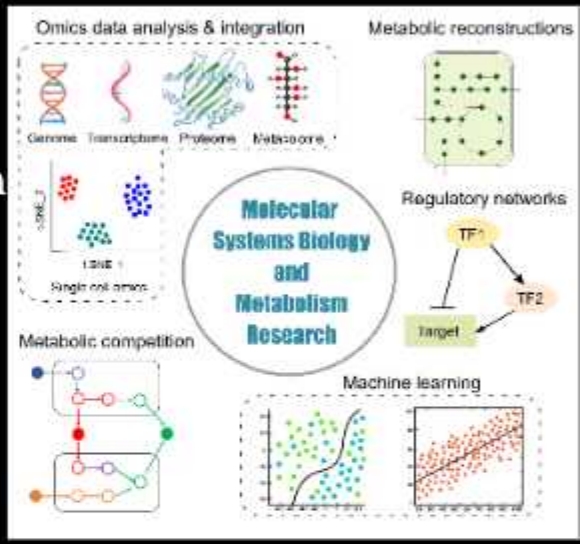
Abhishek Subramanian

Assistant Professor, Computational Biology Lab, Department of Biotechnology

BT404; Office Phone No.; Mobile (optional); abhisheks@bt.iith.ac.in; Webpage Link

Major Areas of Research/Up to 3 major sponsored projects

1. Computational models of condition-specific biological networks –metabolism and transcriptional regulation
2. Integrative biology – mathematical / statistical models, omics data integration
3. DBT-Ramalingaswami Re-entry Fellowship sponsored project for discovering host-microeukaryotic parasite (metabolic) interactions in human infections of the gut and lung



Major Research Facilities in the Group

1. MATLAB, R programming, pipeline development, parallel computing
2. Workstations, network-attached storage devices, HPC clusters

Technology/Product Developed/Up to 3 most significant Publications

1. K. Rohlenova#, J. Goveia#, M. García-Caballero#, Abhishek Subramanian#, et al., "Single-Cell RNA Sequencing Maps Endothelial Metabolic Plasticity in Pathological Angiogenesis", *Cell Metabolism*, 31(4), 862-877 e14
2. Abhishek Subramanian, R. R. Sarkar (2017), "Revealing the mystery of metabolic adaptations using a genome scale model of *Leishmania infantum*", *Scientific Reports*, 7(1):10262
3. S. Nandi, Abhishek Subramanian, R. R. Sarkar (2017), "An integrative machine learning strategy for improved prediction of essential genes in Escherichia coli metabolism using flux- coupled features", *Molecular BioSystems*, 13, 1584 – 1596

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Althuri Avanthi

Assistant Professor, Integrated Bioprocess Technology Research Lab,
Department of Biotechnology

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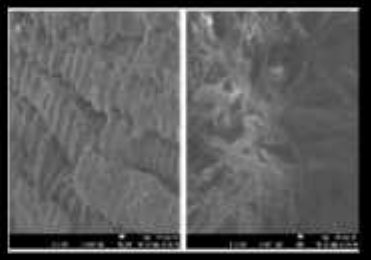
Major Areas of Research/Up to 3 major sponsored projects

- Biofuels, Biomaterial and Biochemicals
- Bioprocess technology and Downstream processing
- Waste valorization and Circular economy

Major Research Facilities in the Group

- In-house industrial enzymes production facility
- Microwave synthesizer with condenser for biomaterial synthesis
- UV-Visible spectrophotometer



Technology/Product Developed/Up to 3 most significant Publications

- Emerging innovations for sustainable production of bioethanol and other mercantile products from circular economy perspective. Bioresource Technology, 2022, 363, 128013
- Sequential and consolidated bioprocessing of biogenic municipal solid waste: a strategic pairing of thermophilic anaerobe and mesophilic microaerobe for ethanol production. Bioresource Technology, 2020, 308, 123260
- A strategic laccase mediated lignin degradation of lignocellulosic feedstocks for ethanol production. Industrial Crops and Products, 2016, 92,

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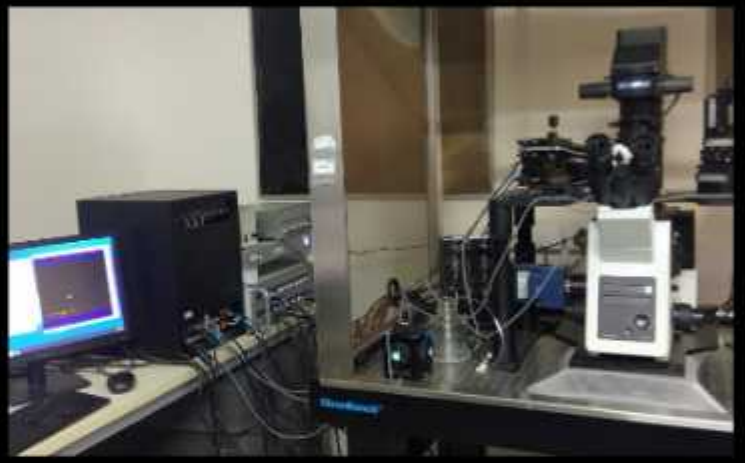
Anamika Bhargava

Associate Professor, Cell Signalling and Ion Channel Biology Lab, Department of Biotechnology

BT-216; 2301-6156; 8331008833; abhargava@bt.iith.ac.in; csl.biotech.iith.ac.in

Major Areas of Research/Up to 3 major sponsored projects

- Voltage-gated calcium channel dysfunction in breast cancer
- Investigation of induced toxicity using Zebrafish animal model
- Development of xenograft models of breast cancer for personalized therapeutics



Major Research Facilities in the Group

- Mammalian cell culture lab
- Zebrafish lab
- Patch-clamp electrophysiology rig
- Real-time PCR

Technology/Product Developed/Up to 3 most significant Publications

- Sekar S, Subbamanda Y, Pullaguri N, Sharma A, Sahu C, Kumar R, Bhargava A. Isoform-specific expression of T-type voltage-gated calcium channels and estrogen receptors in breast cancer reveals specific isoforms that may be potential targets. Current Research in Biotechnology, Volume 4, 2022, Pages 459-467.
- Pullaguri N, Kagoo AR, Bhargava A. New insights into inhibitory nature of triclosan on acetylcholinesterase activity. Toxicology Volume 466, 30 January 2022, 153080.

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Anindya Roy

Professor, DNA Repair Research lab, Department of Biotechnology

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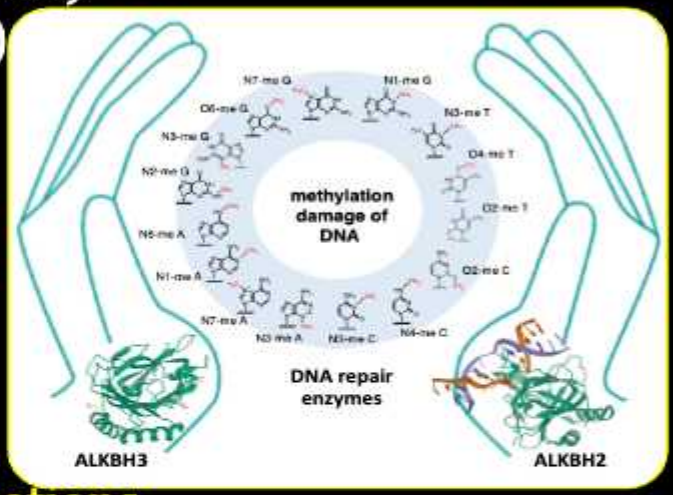
Major Areas of Research/Up to 3 major sponsored projects

1) Molecular characterization of DNA alkylation repair (DST)
2) Repurposing of drugs as inhibitor of DNA repair (DBT)
3) Assay development for disease diagnosis



Major Research Facilities in the Group

1) Flow cytometer
2) HPLC
3) Fluorescence microscope
4) Multimode reader

Technology/Product Developed/Up to 3 most significant Publications

1) G. Shivange, N. Kodipelli, M. Monisha, R. Anindya*, A role for Saccharomyces cerevisiae Tpa1 protein in direct alkylation repair, Journal of Biological Chemistry 289(52) (2014) 35939-35952.

2) G. Shivange, M. Monisha, R. Nigam, N. Kodipelli, R. Anindya, RecA stimulates AlkB-mediated direct repair of DNA adducts, Nucleic Acids Research 44(18) (2016) 8754-8763.

3) M Mohan, D Akula, A Dhillon, A Goyal, A Anindya. Human RAD51 paralogue RAD51C fosters repair of alkylated DNA by interacting with the ALKBH3 demethylase (2019) Nucleic Acids Research. 47(22):11729-11745.

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Ashish Misra

Assistant Professor, Cancer Genomics and RNA Biology, Department of Biotechnology

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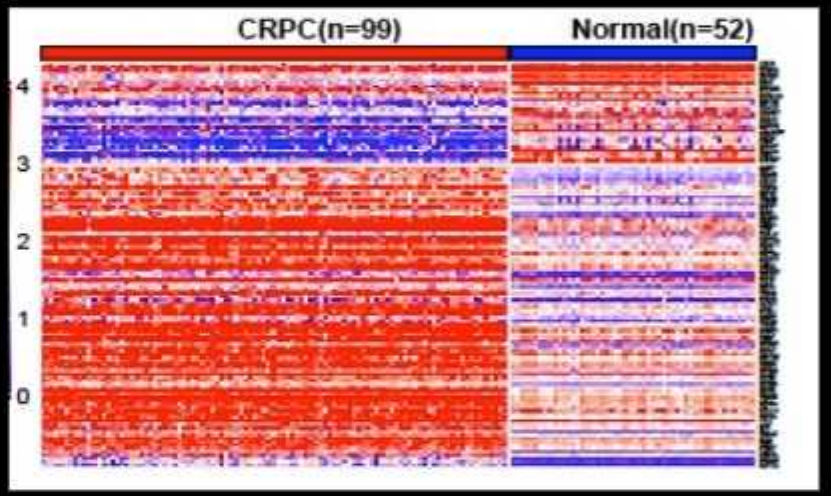
Major Areas of Research/Up to 3 major sponsored projects

Cancer Genomics and Transcriptomics
Pediatric B-cell acute lymphoblastic leukemia and
Prostate Cancer Therapeutics
In vitro 3D tumor model development



Major Research Facilities in the Group

Real-time PCR machine
Automated High-content Imaging Microscope
Mammalian Cell culture facility
ChemiDoc XRS+ Imaging System

Technology/Product Developed/Up to 3 most significant Publications

Raut R, Gupta P, Saini T, Mishra P, Misra A. Protein kinase Inhibitors, Elsevier, 2022, 479-503

Misra A, Jianhong O, Zhu J, Green MR. Molecular Cell. 2015 Jun 4;58(5):819-31

Misra A*, Green MR*. RNA Biology 2016, 13(3):259-64

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Basant Kumar Patel

Associate Professor, PMRL, Department of Biotechnology

Office Room No. BT-214; Office Phone No. 23016151; Institute Email: basantkpatel@bt.iith.ac.in.

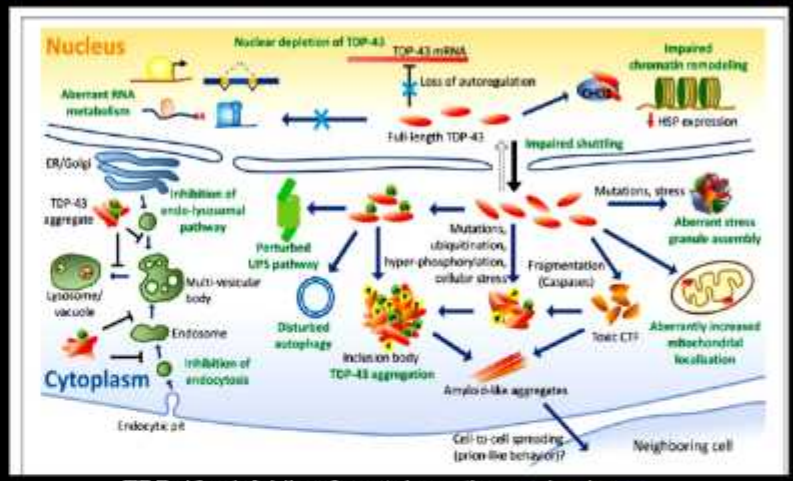
Webpage Link: https://pmrl.biotech.iith.ac.in/

Major Areas of Research/Up to 3 major sponsored projects

- Biochemistry of protein misfolding mechanisms
- Yeast cell model of protein misfolding
- Anti-protein aggregation small molecules

Major Research Facilities in the Group

- Incubators & shakers
- Ultra freezer
- Laminar flow
- Fluorescence microscope
- Microcentrifuge



TDP-43 misfolding & proteinopathy mechanisms.
(*Front. Mol. Neurosci.* https://doi.org/10.3389/f

Technology/Product Developed/Up to 3 most significant Publications

- Role of *CNC1* gene in TDP-43 aggregation-induced oxidative stress-mediated cell death in *S. cerevisiae* model of ALS. Bharathi, V., Girdhar, A., and Patel, B.K. ***BBA-Molecular Cell Research,*** 1868, 118993 (2021).
- Zn^{2+} modulates *in vitro* phase separation of TDP-43^{2C} and mutant TDP-43^{2C}-A315T C-terminal fragments of TDP-43 protein implicated in ALS and FTLD-TDP diseases. Preethi S., Vidhya Bharathi, Basant K Patel. ***Int. J. Biol. Macromol.,*** 176, 186–200 (2021).
- Molecular Mechanisms of TDP-43 Misfolding and Pathology in Amyotrophic Lateral Sclerosis. Prasad, A., Bharathi, V., Sivalingam, V., Girdhar, A., and Patel, B.K. ***Front Mol Neurosci.*** Feb 14; 12:25. doi: 10.3389/fnmol.2019.00025 (2019).

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Dr. Indranil Malik

Assistant Professor, Department of Biotechnology

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Major Areas of Research/Up to 3 major sponsored projects

- Molecular Mechanisms Underlying Repeat
- Expansion Disorders
- Regulation of Non-canonical Translations

Major Research Facilities in the Group

- Molecular biology
- In vitro transcription/translation
- *Drosophila* disease models

Technology/Product Developed/Up to 3 most significant Publications

- Malik I, et al., ***Neurobiology of Disease***. 2023 Jun 22;184:106212.
- Malik I, et al., ***EMBO Mol Med***. 2021 Nov 8;13(11):e14163. doi:10.15252/emmm.202114163.
- Malik I, et al., ***Nucleic Acids Res***. 2017 May 5;45(8):4431-4451. doi: 10.1093/nar/gkx037.

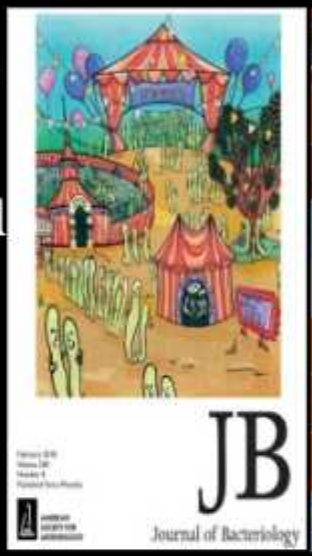
Gaurav Sharma

Assistant Professor, Microbial Genomics & Evolution Lab, Department of Biotechnology

BT-401; Office Phone No.; +917668700190; sharmag@bt.iith.ac.in; Gaurav Sharma| IIT Hyderabad

Major Areas of Research/Up to 3 major sponsored projects

1) Microbial (Bacteria, Virus, any Pathogen, etc.) genomics and evolution studies to understand their physiological function and mechanisms
2) Medicinal Plant genomics and metagenomics to understand how microbes might be assisting the plant in secreting medicinal compounds
3) Building bioinformatic software to reveal biological properties using a genome



Major Research Facilities in the Group

1) Potential to analyse high-throughput sequencing data (such as SARS-CoV-2 genome sequencing, pathogen surveillance, etc.)

Technology/Product Developed/Up to 3 most significant Publications

1) Kalia K, Saberwal G, Sharma G*. The lag in SARS-CoV-2 genome submissions to GISAID. **Nature Biotechnology**. 2021 Sep;39(9):1058-1060.
2) Sharma G*, Burrows LL, Singer M. Diversity and Evolution of Myxobacterial Type IV Pilus Systems.
Frontiers in Microbiology. 2018;9:1630.
3) Saïdi F, Mahanta U, Panda A, et al, Sharma G*, Islam ST*. Bacterial Outer Membrane Polysaccharide Export (OPX)
Proteins Occupy Three Structural Classes with Selective β-Barrel Porin Requirements for Polymer Secretion
Microbiology Spectrum. 2022 Oct 26;10(5):e0129022.

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Gunjan Mehta

Assistant Professor, Department of Biotechnology

BT314; Mobile: +91 7016896886; Email: gunjanmehta@bt.iith.ac.in; Webpage: www.mehtalab-iith.com

Major Areas of Research/Up to 3 major sponsored projects

- Single-Molecule Tracking of mitotic kinases and phosphatases to understand their dynamic interplay during cell division.
- Understanding the Chromatin Remodelers based regulation of meiotic recombination, chromosome segregation, and meiotic transcription program. (Innovative Young Biotechnologist Award, DBT, and JICA FRIENDSHIP2 Research Grant)
- Exploring the cohesin-ring independent functions of Rec8 during yeast meiosis. (Ramalingaswami Fellowship, DBT)
- Developing LAMP-based diagnostic kits for detecting viral and bacterial diseases.

Major Research Facilities in the Group

- Single-Molecule Imaging Microscope (TIRF/HILO illumination) with Prime 95B sCMOS camera, 488 nm and 640 nm lasers
- Yeast Tetrad Dissection Microscope
- Diagenode Bioruptor Waterbath Sonication Device
- Real-Time PCR Machine

Most Significant Publications

- Podh NK, Das A, Dey P, Paliwal S, Mehta G*. Single-Molecule Tracking for studying protein dynamics and target-search mechanism in live cells of S. cerevisiae. STAR Protocols (Cell Press) 2022,3(4):101900
- Podh NK, Paliwal S, Dey P, Das A, Morjaria S, Mehta GD*. In-vivo Single-Molecule Imaging in Yeast: Applications and Challenges. *Journal of Molecular Biology 2021*; 433(22):167250.
- Mehta G*, Sanyal K, Suman A, Eerappa R, Ghosh SK*. Minichromosome Maintenance Proteins in Eukaryotic Chromosome Segregation. *BioEssays 2022;*44(1):e2100218.

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Prof. G. Narahari Sastry

Professor, 5thParadigm Lab, Department of Biotechn

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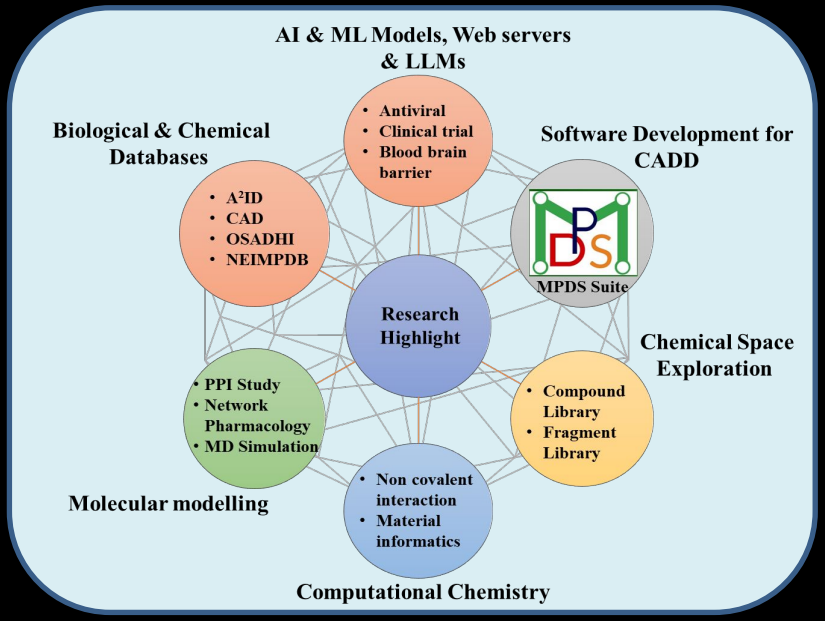
Webpage Link- https://gnsastry.com/

Major Areas of Research/Up to 3 major sponsored projects

- Artificial Intelligence and Machine Learning applications in the field of drug discovery, health care sectors .
- Software development for CADD, Database-development and webserver development.
- Bioinformatics and Cheminformatics
- Theoretical/Computational Chemistry



Major Research Facilities in the Group

The Fifth Paradigm Lab in the Biotechnology Department have been recently established to address the utilization of data driven applications in pharma and health care science.

Technology/Product Developed/Up to 3 most significant Publications

1. Priyadarsinee, L., Jamir, E., Nagamani, S., Mahanta, H. J., Kumar, N., John, L., Sarma, H., Kumar, A., Gaur, A. S., Sahoo, R., Vaikundamani, S., Murugan, N. A., Priyakumar, U. D., Raghava, G. P. S., Bharatam, P. V., Parthasarathi, R., Subramanian, V., Sastry, G. M., & Sastry, G. N. (2024). Molecular Property Diagnostic Suite for COVID-19 (MPDSCOVID-19): an open-source disease-specific drug discovery portal. *GigaByte*, 2024, gigabyte114.

Himanshu Joshi

Assistant Professor, Computational Nanobiotech lab, Department of Biotechnolog

Office: BT403, Email: hjoshi@bt.iith.ac.in, Webpage: sites.google.com/view/molecular-simulation-lab

Major Areas of Research

DNA Nanotechnology

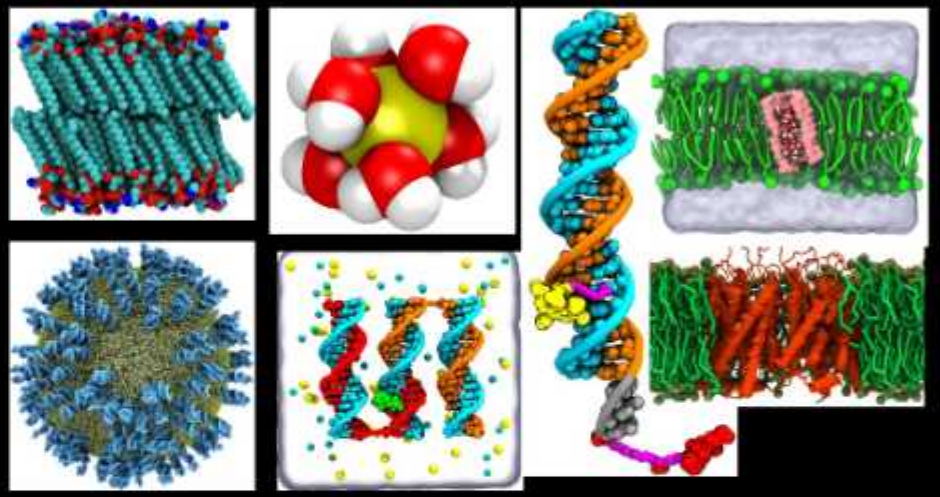
Biological and artificial water channels

Lipid-DNA interactions

Research Methodology

All-atom and coarse-grain MD Simulations

LAMMPS, GROMACS, NAMD, AMBER



Technology/Product Developed/Up to 3 most significant Publications

Fluorofoldamer-Based Salt- and Proton-Rejecting Artificial Water Channels for Ultrafast Water Transport. Nano Letters , 22 (12), 4831-4838 2022.

Leakless end-to-end transport of small molecules through micron-length DNA nanochannels Science Advances 8 (36), 1-9, 2022

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N K Raghavendra

Associate professor, PIAL, Department of Biotechnology

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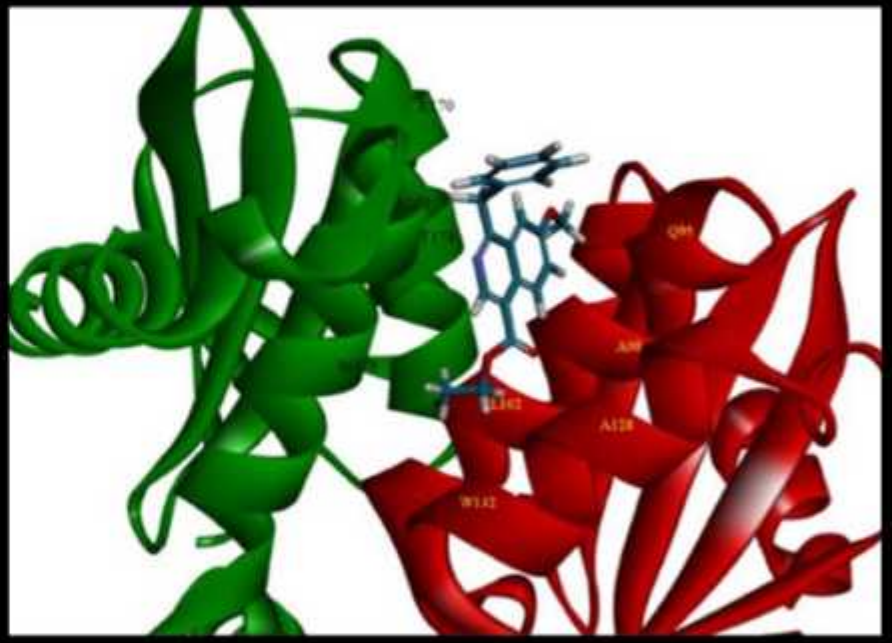
Webpage Link: https://sites.google.com/iith.ac.in/pial/home

Major Areas of Research

> HIV-1 protein interaction in human cells

> SARS-CoV-2 entry into human cells



Major Research Facilities in the Group

> Molecular Biology

> Cell culture

> BSL-2^{+}

Technology/Product Developed

> Isoquinoline inhibitors of HIV-1 integrase

> REMP software for site-directed mutagenesis

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Rahul Kumar

Assistant Professor, Computational Genomics and Transcriptomics Laboratory

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Webpage Link: https://sites.google.com/view/rahulklab

Major Areas of Research/Up to 3 major sponsored projects

Investigating non-coding genome for therapeutics vulnerabilities in cancer.

Developing AI/ML based algorithms to classify clinical subtypes of different cancer types.

Developing biological databases and prediction servers.

Major Research Facilities in the Group

Desktops and workstations

Technology/Product Developed/Up to 3 most significant Publications

Viswanathan A, Kundal K, Sengupta A, **Kumar A**, Kumar K V, Holmes A B, **Kumar R#** (2022) Deep learning-based classifier of diffuse large B-cell lymphoma cell-of-origin with clinical outcome, **Briefings in Functional Genomics.**

Bal E., **Kumar R.**, et. al. (2022) Super-Enhancer Hypermutation Alters Oncogene Expression in B-cell Lymphoma. **Nature 607, 808–815**

Vigneshwaran G, Hasan Q A, **Kumar R**, Eranki A (2022) Analysis of single-nucleotide polymorphisms in genes associated with triple-negative breast cancer, **Frontiers in Genetics.**

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Associate professor, Structural Biology Lab, Department of Biotechnology

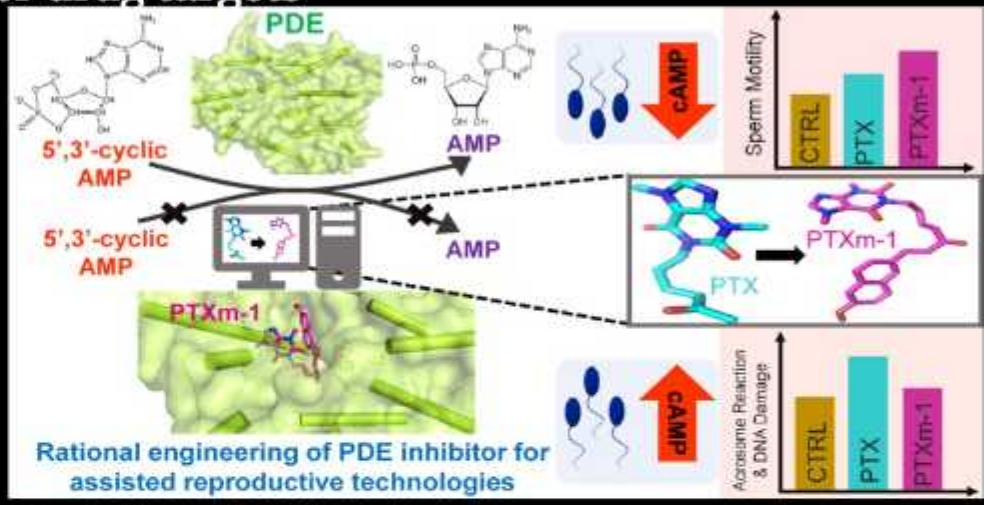
BT-213; Office Phone No.; +91-40-23017002; eraj@bt.iith.ac.in;
https://sites.google.com/iith.ac.in/rajakumaraeerappa

Major Areas of Research

1) Epigenetics, DNA repair, Characterization of cancer drug targets
2) Enzyme engineering for organic synthesis
3) Vaccine and drug design

Major Research Facilities in the Group

1) FPLC for protein purification
2) Robot for crystallization
3) Bio-Layer interferometry and Isothermal Titration Calorimetry



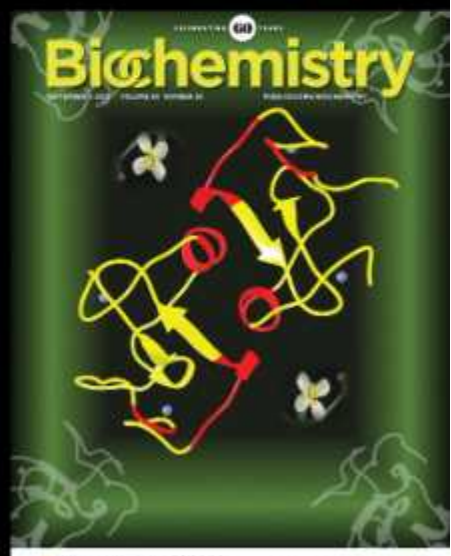
Rational engineering of PDE inhibitor for assisted reproductive technologies

Significant Publications

1) Satish M, Kumari S, Deeksha W, Abhishek S, Nitin K, Adiga SK, Hegde P, Dasappa JP, Kalthur G, **Rajakumara E#.** Structure-based redesigning of pentoxifylline analogs against selective phosphodiesterases to modulate sperm functional competence for assisted reproductive technologies, **Nature Scientific Reports** 11(1):12293 (2021).

2) Abhishek S, Deeksha W, **Rajakumara E#**· Mechanistic insights into allosteric regulation of methylated DNA and histone H3 recognition by SRA and SET domains of SUVH5 and the basis for di-methylation of lysine residue **FEBS J**. 2022 Sep 21.

3) Pratibha M, Abhishek S, **Rajakumara, E.#** Designing ferritin nanocage based vaccine candidates for SARS-CoV-2 by *in silico* engineering of its MHC I and MHC II epitope peptides. **J Biomol Struct Dyn**. Jul 27:1-13 (2022).



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Sandipan Ray

Assistant Professor, Circadian Rhythms and Disease Biology Laboratory

Department of Biotechnology

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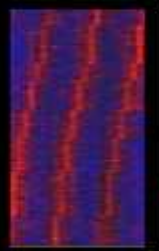
Major Areas of Research/Up to 3 major sponsored projects

1. Circadian Regulations of Kinases and Signaling Pathways (SERB DST)
2. Circadian Aberrations, Sleep Deficiency and Aging (ICMR)
3. Host and Parasite Circadian Rhythms in Malaria

Major Research Facilities in the Group

1. Drosophila Activity Monitor (DAM) system
2. Cell culture facility (BSL1/2)
3. Quantitative proteomics – HRMS (under installation)



Technology/Product Developed/Up to 3 most significant Publications

1. Banerjee S, **Ray S***. Circadian medicine for aging attenuation and sleep disorders: Prospects and challenges. ***Progress in Neurobiology*** 2023, 220:102387.
2. **Ray S**, Valekunja UK, Stangherlin A, Howell SA, et al., Circadian rhythms in the absence of the clock gene Bmal1. ***Science***. 2020, 367(6479), 800-806.
3. Ch R, Rey G, **Ray S**, Jha P, et al., Rhythmic glucose metabolism regulates the redox circadian clockwork in human red blood cells. ***Nature Communications***. 2021, 12, 377.

భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
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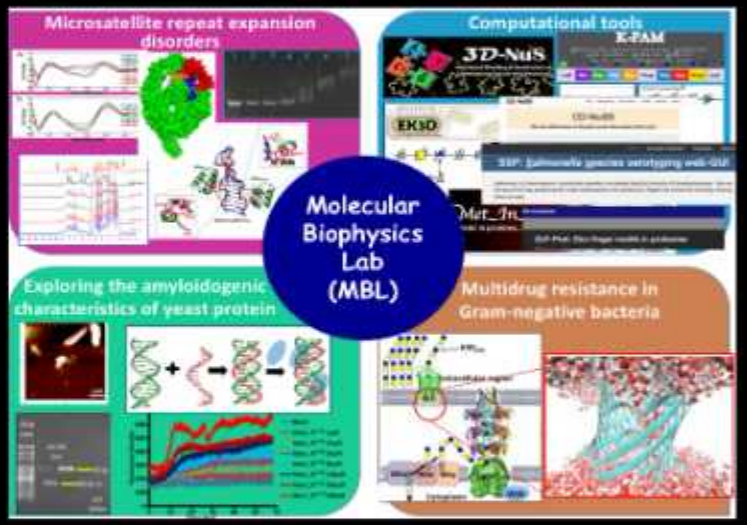
Major Areas of Research/Up to 3 major sponsored projects

In silico and *in vitro* characterizations of biomacromolecules and their interactions to address antimicrobial resistance in Gram-negative bacteria, SARS-CoV-2 evolutionary dynamics and microsatellite repeat expansion disorders;

Algorithms and application tools development for biomolecular modeling and interaction prediction.



Major Research Facilities in the Group

Computational facilities to carry out molecular dynamics simulations; Servers to host web application tools and databases; Experimental facilities for molecular cloning, protein expression and purification and biophysical characterization of biomacromolecules and their complexes and, biomacromolecules-ligand interaction.

Technology/Product Developed/Up to 3 most significant Publications

* Sequence patterns and HMM profiles to predict proteome wide zinc finger motifs, ***Pattern Recognition*** (2023) * SARS-CoV-2 whole-proteome sequences from environment as an indicator of community viral distribution, evolution and epidemiological dynamics: A cohort analysis of Austria, ***Environmental microbiology reports*** (2022) * Secondary structural choice of DNA and RNA associated with CGG/CCG trinucleotide repeat expansion rationalizes the RNA misprocessing in FXTAS, ***Scientific Reports*** *(2021)*

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