

Biochemical Engineering and Biotechnology

IIT Delhi

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Year End Review **2020** - Highlights



Compiled by D. Sundar (Dec 31, 2020)

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Scientific Articles

1.1. Published peer-reviewed scientific articles in CY 2020 (from PubMed/Scopus)

1. Abd Hamid S, Shahadat M, Ballinger B, Farhan Azha S, Ismail S, Wazed Ali S, Ziauddin Ahammad S: Role of clay-based membrane for removal of copper from aqueous solution. **Journal of Saudi Chemical Society** 2020, **24**(10):785-798.
2. Aggarwal S, Mishra S: Differential role of segments of α -mating factor secretion signal in *Pichia pastoris* towards granulocyte colony-stimulating factor emerging from a wild type or codon optimized copy of the gene. **Microbial cell factories** 2020, **19**(1):199.
3. Anand G, Bisaria VS, Sharma S: Impact of abiotic stressors on native rhizospheric bacterial community of *Cajanus cajan*. **Journal of basic microbiology** 2020, **60**(1):4-13.
4. Anand G, Goel V, Dubey S, Sharma S: Tailoring the rhizospheric microbiome of *Vigna radiata* by adaptation to salt stress. **Plant Growth Regulation** 2020.
5. Bisht G, Srivastava S, Kulshreshtha R, Sourirajan A, Baumler DJ, Dev K: Applications of red pigments from psychrophilic *Rhodospirillum rubrum* in health, food and antimicrobial finishes on textiles. **Process Biochemistry** 2020, **94**:15-29.
6. Blundell TL, Gupta MN, Hasnain SE: Intrinsic disorder in proteins: Relevance to protein assemblies, drug design and host-pathogen interactions. **Progress in biophysics and molecular biology** 2020, **156**:34-42.
7. Charbe NB, Amnerkar ND, Ramesh B, Tambuwala MM, Bakshi HA, Shrivastava G, Aljabali AAA, Khadse SC, Satheeshkumar R, Satija S *et al*: Small interfering RNA for cancer treatment: overcoming hurdles in delivery. **Acta pharmaceutica Sinica B** 2020, **10**(11):2075-2109.
8. Chawla P, Malik A, Sreekrishnan TR, Dalvi V, Gola D: Selection of optimum combination via comprehensive comparison of multiple algal cultures for treatment of diverse wastewaters. **Environmental Technology and Innovation** 2020, **18**.
9. Choudhary K, Narang A: Urn models for stochastic gene expression yield intuitive insights into the probability distributions of single-cell mRNA and protein counts. **Physical Biology** 2020, **17**(6).
10. Dhanjal JK, Dammalapati S, Pal S, Sundar D: Evaluation of off-targets predicted by sgRNA design tools. **Genomics** 2020, **112**(5):3609-3614.
11. Gahlaut SK, Savargaonkar D, Sharan C, Yadav S, Mishra P, Singh JP: SERS Platform for Dengue Diagnosis from Clinical Samples Employing a Hand Held Raman Spectrometer. **Analytical chemistry** 2020, **92**(3):2527-2534.
12. Gangwar R, Rasool S, Mishra S: Purified cellobiose dehydrogenase of *Termitomyces* sp. OE147 fuels cellulose degradation resulting in the release of reducing sugars. **Preparative biochemistry & biotechnology** 2020:1-9.
13. Garg S, Huifu H, Kumari A, Sundar D, Kaul SC, Wadhwa R: Induction of Senescence in Cancer Cells by a Novel Combination of Cucurbitacin B and Withanone: Molecular Mechanism and Therapeutic Potential. **The journals**

- of gerontology Series A, Biological sciences and medical sciences* 2020, **75**(6):1031-1041.
14. Gautam A, Sahai V, Mishra S: Development of a dual specific growth rate-based fed-batch process for production of recombinant human granulocyte colony-stimulating factor in *Pichia pastoris*. *Bioprocess and biosystems engineering* 2020.
 15. Ghosh D, Veeraraghavan B, Elangovan R, Vivekanandan P: Antibiotic Resistance and Epigenetics: More to It than Meets the Eye. *Antimicrobial agents and chemotherapy* 2020, **64**(2).
 16. Gola D, Bhattacharya A, Dey P, Malik A, Ahammad SZ: Assessment of Drain Water Used for Irrigation in the Delhi Region. *Journal of health & pollution* 2020, **10**(26):200610.
 17. Gola D, Chawla P, Malik A, Ahammad SZ: Development and performance evaluation of native microbial consortium for multi metal removal in lab scale aerobic and anaerobic bioreactor. *Environmental Technology and Innovation* 2020, **18**.
 18. Guleria R, Jain P, Verma M, Mukherjee KJ: Designing next generation recombinant protein expression platforms by modulating the cellular stress response in *Escherichia coli*. *Microbial cell factories* 2020, **19**(1):227.
 19. Gupta MN, Alam A, Hasnain SE: Protein promiscuity in drug discovery, drug-repurposing and antibiotic resistance. *Biochimie* 2020, **175**:50-57.
 20. Gupta MN, Roy I: Drugs, host proteins and viral proteins: how their promiscuities shape antiviral design. *Biological reviews of the Cambridge Philosophical Society* 2020.
 21. Gupta V, Gupta I, Park J, Bram Y, Schwartz RE: Hedgehog Signaling Demarcates a Niche of Fibrogenic Peribiliary Mesenchymal Cells. *Gastroenterology* 2020, **159**(2):624-638.e629.
 22. Hafeez S, Jaishankar J, Srivastava P, Nebhani L: Bactericidal materials prepared via conjugation of responsive polymers to cysteine. *Materials Today Communications* 2020:101813.
 23. Jaishankar J, Srivastava P: Strong synthetic stationary phase promoter-based gene expression system for *Escherichia coli*. *Plasmid* 2020, **109**:102491.
 24. Jangir M, Sharma S, Sharma S: Synergistic effect of oilseed cake and biocontrol agent in the suppression of *Fusarium* wilt in *Solanum lycopersicum*. *Brazilian journal of microbiology : [publication of the Brazilian Society for Microbiology]* 2020, **51**(4):1929-1939.
 25. Kalyani N, Goel S, Jaiswal S: On-site sensing of pesticides using point-of-care biosensors: a review. *Environmental Chemistry Letters* 2020.
 26. Kannan K, Mukherjee J, Mishra P, Gupta MN: Nickel Ferrite Nanoparticles as an Adsorbent for Immobilized Metal Affinity Chromatography of Proteins. *Journal of chromatographic science* 2020.
 27. Khatri S, Sazinas P, Shivay YS, Sharma S, Jelsbak L: Complete Genome Sequence of *Pseudomonas* sp. Strain SK, Isolated from Organic Wheat Rhizosphere. *Microbiology resource announcements* 2020, **9**(26).
 28. Kumar P, Mondal I, Kulshreshtha R, Patra AK: Development of novel ruthenium(ii)-arene complexes displaying potent anticancer effects in glioblastoma cells. *Dalton Transactions* 2020, **49**(38):13294-13310.
 29. Kumar V, Dhanjal JK, Bhargava P, Kaul A, Wang J, Zhang H, Kaul SC, Wadhwa R, Sundar D: Withanone and Withaferin-A are predicted to interact with transmembrane protease serine 2 (TMPRSS2) and block entry of SARS-CoV-2 into cells. *Journal of biomolecular structure & dynamics* 2020:1-13.
 30. Kumar V, Dhanjal JK, Kaul SC, Wadhwa R, Sundar D: Withanone and caffeic acid phenethyl ester are predicted to interact with main protease (M(pro)) of

- SARS-CoV-2 and inhibit its activity. **Journal of biomolecular structure & dynamics** 2020:1-13.
31. Lamba M, Sreekrishnan TR, Ahammad SZ: Sewage mediated transfer of antibiotic resistance to River Yamuna in Delhi, India. **Journal of Environmental Chemical Engineering** 2020, **8**(1).
 32. Malik V, Garg S, Afzal S, Dhanjal JK, Yun CO, Kaul SC, Sundar D, Wadhwa R: Bioinformatics and molecular insights to anti-metastasis activity of triethylene glycol derivatives. **International journal of molecular sciences** 2020, **21**(15):1-23.
 33. Manoj KM, Ramasamy S, Parashar A, Gideon DA, Soman V, Jacob VD, Pakshirajan K: Acute toxicity of cyanide in aerobic respiration: Theoretical and experimental support for murburn explanation. **Biomolecular concepts** 2020, **11**(1):32-56.
 34. Mateen QS, Khan SU, Islam DT, Khan NA, Farooqi IH: Copper (II) removal in a column reactor using electrocoagulation: Parametric optimization by response surface methodology using central composite design. **Water environment research : a research publication of the Water Environment Federation** 2020, **92**(9):1350-1362.
 35. Mehta R, Singh J, Nath S: Time-Resolved Oxygen Exchange Measurements Offer Novel Mechanistic Insights into Enzyme-Catalyzed ATP Synthesis during Photophosphorylation. **The journal of physical chemistry B** 2020, **124**(25):5139-5148.
 36. Mittal A, Changani AM, Taparia S, Goel D, Parihar A, Singh I: Structural disorder originates beyond narrow stoichiometric margins of amino acids in naturally occurring folded proteins. **Journal of biomolecular structure & dynamics** 2020:1-12.
 37. Momina, Mohammad S, Suzylawati I: Study of the adsorption/desorption of MB dye solution using bentonite adsorbent coating. **Journal of Water Process Engineering** 2020, **34**.
 38. Mondal I, Kulshreshtha R: Potential of microRNA based diagnostics and therapeutics in glioma: a patent review. **Expert opinion on therapeutic patents** 2020:1-16.
 39. Motiwale M, Yadav NS, Kumar S, Kushwaha T, Choudhir G, Sharma S, Singour PK: Finding potent inhibitors for COVID-19 main protease (M(pro)): an in silico approach using SARS-CoV-3CL protease inhibitors for combating CORONA. **Journal of biomolecular structure & dynamics** 2020:1-12.
 40. Moudgil A, Singh S, Mishra N, Mishra P, Das S: MoS₂/TiO₂ Hybrid Nanostructure-Based Field-Effect Transistor for Highly Sensitive, Selective, and Rapid Detection of Gram-Positive Bacteria. **Advanced Materials Technologies** 2020, **5**(1).
 41. Murarka P, Keshav A, Meena BK, Srivastava P: Functional characterization of the transcription regulator WhiB1 from *Gordonia* sp. IITR100. **Microbiology (Reading, England)** 2020.
 42. Murarka P, Keshav A, Meena BK, Srivastava P: Functional characterization of the transcription regulator WhiB1 from *Gordonia* sp. IITR100. 2020, **166**(12):1181-1190.
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45. Nath S: Consolidation of Nath's torsional mechanism of ATP synthesis and two-ion theory of energy coupling in oxidative phosphorylation and photophosphorylation. ***Biophysical chemistry*** 2020, **257**:106279.
46. Nath S: A Novel Conceptual Model for the Dual Role of FOF1-ATP Synthase in Cell Life and Cell Death. ***Biomolecular concepts*** 2020, **11**(1):143-152.
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48. Pimenova AA, Herbinet M, Gupta I, Machlovi SI, Bowles KR, Marcora E, Goate AM: Alzheimer's-associated PU.1 expression levels regulate microglial inflammatory response. ***Neurobiology of disease*** 2020:105217.
49. Rodríguez DC, Ahammad ZS, Peñuela GA, Graham DW: Effect of β -lactamases associated to the resistance of β -lactam antibiotics on the treatment of wastewater. ***Journal of Environmental Chemical Engineering*** 2020, **8**(1).
50. Sari AN, Bhargava P, Dhanjal JK, Putri JF, Radhakrishnan N, Shefrin S, Ishida Y, Terao K, Sundar D, Kaul SC *et al*: Combination of Withaferin-A and CAPE Provides Superior Anticancer Potency: Bioinformatics and Experimental Evidence to Their Molecular Targets and Mechanism of Action. ***Cancers*** 2020, **12**(5).
51. Sevda S, Garlapati VK, Naha S, Sharma M, Ray SG, Sreekrishnan TR, Goswami P: Biosensing capabilities of bioelectrochemical systems towards sustainable water streams: Technological implications and future prospects. ***Journal of bioscience and bioengineering*** 2020, **129**(6):647-656.
52. Shariq M, Quadir N, Sheikh JA, Singh AK, Bishai WR, Ehtesham NZ, Hasnain SE: Post translational modifications in Tuberculosis: Ubiquitination Paradox. ***Autophagy*** 2020.
53. Sharma R, Gal L, Garmyn D, Bisaria VS, Sharma S, Piveteau P: Evidence of Biocontrol Activity of Bioinoculants Against a Human Pathogen, *Listeria monocytogenes*. ***Frontiers in microbiology*** 2020, **11**:350.
54. Sharma R, Pooniya V, Bisaria VS, Swarnalakshmi K, Sharma S: Bioinoculants play a significant role in shaping the rhizospheric microbial community: a field study with *Cajanus cajan*. ***World journal of microbiology & biotechnology*** 2020, **36**(3):44.
55. Shrivastava G, Bakshi HA, Aljabali AA, Mishra V, Hakkim FL, Charbe NB, Kesharwani P, Chellappan DK, Dua K, Tambuwala MM: Nucleic Acid Aptamers as a Potential Nucleus Targeted Drug Delivery System. ***Current drug delivery*** 2020, **17**(2):101-111.
56. Shukla A, Srivastava S, Darokar J, Kulshreshtha R: HIF1 α and p53 Regulated MED30, a Mediator Complex Subunit, is Involved in Regulation of Glioblastoma Pathogenesis and Temozolomide Resistance. ***Cellular and molecular neurobiology*** 2020.
57. Singh A, Narang A: The Mut⁺ strain of *Komagataella phaffii* (*Pichia pastoris*) expresses PAOX1 5 and 10 times faster than Mut^s and Mut⁻ strains: evidence that formaldehyde or/and formate are true inducers of PAOX1. ***Applied microbiology and biotechnology*** 2020, **104**(18):7801-7814.
58. Singh S, Kumar V, Kumar N, Sharma P, Waheed SM: Protective and Modulatory Effects of *Trapa bispinosa* and *Trigonella foenum-graecum* on Neuroblastoma Cells Through Neuronal Nitric Oxide Synthase. ***Assay and drug development technologies*** 2020, **18**(1):64-74.
59. Singh TB, Sahai V, Ali A, Prasad M, Yadav A, Shrivastav P, Goyal D, Dantu PK: Screening and evaluation of PGPR strains having multiple PGP traits from hilly terrain. ***Journal of Applied Biology and Biotechnology*** 2020, **8**(4):38-44.

60. Singh TB, Sahai V, Goyal D, Prasad M, Yadav A, Shrivastav P, Ali A, Dantu PK: Identification, Characterization and Evaluation of Multifaceted Traits of Plant Growth Promoting Rhizobacteria from Soil for Sustainable Approach to Agriculture. **Current microbiology** 2020, **77**(11):3633-3642.
61. Singh U, Choudhary AK, Sharma S: Agricultural practices modulate the bacterial communities, and nitrogen cycling bacterial guild in rhizosphere: field experiment with soybean. **Journal of the science of food and agriculture** 2020.
62. Singh U, Choudhary AK, Sharma S: Comparative performance of conservation agriculture vis-a-vis organic and conventional farming, in enhancing plant attributes and rhizospheric bacterial diversity in *Cajanus cajan*: A field study. **European Journal of Soil Biology** 2020, **99**.
63. Singhi D, Srivastava P: Role of Bacterial Cytoskeleton and Other Apparatuses in Cell Communication. **Frontiers in molecular biosciences** 2020, **7**:158.
64. Singhi D, Srivastava P: How similar or dissimilar cells are produced by bacterial cell division?, **Biochimie** 2020, **176**:71-84.
65. Singhi D, Srivastava P: Role of Bacterial Cytoskeleton and Other Apparatuses in Cell Communication. **Frontiers in molecular biosciences** 2020, **7**:158.
66. Somani M, Datta M, Ramana GV, Sreekrishnan TR: Contaminants in soil-like material recovered by landfill mining from five old dumps in India. **Process Safety and Environmental Protection** 2020, **137**:82-92.
67. Srivastava S, Kulshreshtha R: Insights into the regulatory role and clinical relevance of mediator subunit, MED12, in human diseases. **Journal of cellular physiology** 2020.
68. Tewari S, Pooniya V, Sharma S: Next generation bioformulation prepared by amalgamating Bradyrhizobium, cell free culture supernatant, and exopolysaccharides enhances the indigenous rhizospheric rhizobial population, nodulation, and productivity of pigeon pea. **Applied Soil Ecology** 2020, **147**.
69. Tewari S, Sharma S: Rhizobial-metabolite based biocontrol of fusarium wilt in pigeon pea. **Microbial pathogenesis** 2020, **147**:104278.
70. Tewari S, Sharma S: Rhizobial exopolysaccharides as supplement for enhancing nodulation and growth attributes of *Cajanus cajan* under multi-stress conditions: A study from lab to field. **Soil and Tillage Research** 2020, **198**.
71. Tyagi A, Kamal MA, Poddar NK: Integrated Pathways of COX-2 and mTOR: Roles in Cell Sensing and Alzheimer's Disease. **Frontiers in neuroscience** 2020, **14**:693.
72. Varshney S, Pandey P, Gupta D, Sharma S: Role of fabric properties, moisture and friction in transfer of bacteria from fabric to fabric. **Textile Research Journal** 2020, **90**(3-4):478-485.
73. Varshney S, Sain A, Gupta D, Sharma S: Factors Affecting Bacterial Adhesion on Selected Textile Fibres. **Indian Journal of Microbiology** 2020.
74. Vats A, Mishra S: Laccase isoform diversity on basal medium in *Cyathus bulleri* and role in decolorization/detoxification of textile dyes and effluent. **World journal of microbiology & biotechnology** 2020, **36**(11):164.
75. Vinchure OS, Kulshreshtha R: miR-490: A potential biomarker and therapeutic target in cancer and other diseases. **Journal of cellular physiology** 2020.
76. Vinchure OS, Whittemore K, Kushwah D, Blasco MA, Kulshreshtha R: miR-490 suppresses telomere maintenance program and associated hallmarks in glioblastoma. **Cellular and molecular life sciences : CMLS** 2020.

77. Wani AA, Khan AM, Manea YK, Shahadat M, Ahammad SZ, Ali SW: Graphene-supported organic-inorganic layered double hydroxides and their environmental applications: A review. ***Journal of Cleaner Production*** 2020, **273**.
78. Yadav N, Sharma S: Pollution shapes the bacterial community of a river: a case study. ***International Journal of Environmental Science and Technology*** 2020, **17(4):2003-2016**.

1.2. Book chapters

1. Ahammad SZ, Ahmad A, Ahmad IZ, Alagirusamy R, Ali SW, Argañaraz MPQ, Azam A, Babiarczuk B, Basak S, Benítez G *et al*: List of contributors. In: *Handbook of Nanomaterials for Manufacturing Applications*. edn. Edited by Hussain CM: **Elsevier**; 2020: xv-xviii.
2. Goel S, Parihar PS, Meshram V: Plant-derived quinones as a source of antibacterial and anticancer agents. In: *Bioactive Natural Products in Drug Discovery*. edn.: **Springer Singapore**; 2020: 245-279.
3. Murarka P, Srivastava P: Chapter 9 - Biodesulfurization of petroleum wastes. In: *Biovalorisation of Wastes to Renewable Chemicals and Biofuels*. edn. Edited by Krishnaraj Rathinam N, Sani RK: **Elsevier**; 2020: 165-187.
4. Shahadat M, Ahmad A, Bushra R, Ismail S, Ahammad SZ, Wazed Ali S, Rafatullah M: Recent Advancement in Wastewater Decontamination Technology. In: *Modern Age Waste Water Problems : Solutions Using Applied Nanotechnology*. edn. Edited by Oves M, Ansari MO, Zain Khan M, Shahadat M, M.I. Ismail I. Cham: **Springer International Publishing**; 2020: 1-22.
5. Shahadat M, Ali SW, Ahammad SZ, Azam A: Chapter 12 - Polyaniline/carbon nanotube-supported nanocomposite electrode for detection of organic pollutants. In: *Handbook of Nanomaterials for Manufacturing Applications*. edn. Edited by Hussain CM: **Elsevier**; 2020: 279-296.
6. Shahadat M, Momina, Yasmin, Ismail S, Ali SW, Ahammad SZ: Environmental Toxicity of Nanoparticles. ***Environmental Nanotechnology for Water Purification*** 2020:1-32.
7. Shahadat M, Oves M, Shalla AH, Ahammad SZ, Wazed Ali S, Sreekrishnan TR: Fabrication of Polyaniline Supported Nanocomposites and Their Sensing Application for Detection of Environmental Pollutants. In: *Modern Age Waste Water Problems : Solutions Using Applied Nanotechnology*. edn. Edited by Oves M, Ansari MO, Zain Khan M, Shahadat M, M.I. Ismail I. Cham: **Springer International Publishing**; 2020: 93-147.
8. Singh U, Walvekar VA, Sharma S: Microbiome as Sensitive Markers for Risk Assessment of Pesticides. ***Pesticides in Crop Production*** 2020:89-108.
9. Somani M, Datta M, Ramana GV, Sreekrishnan TR: Release of Dark-Colored Leachate from Mined Aged Municipal Solid Waste from Landfills. In., *Geotechnical Characterization and Modelling*. Edited by Gali, M.L. and Rao, P.R.: **Springer Science and Business Media Deutschland GmbH** 2020, vol. 85: 379-386.
10. Vora DS, Dhanjal JK, Sundar D: Engineering of Cas9 for improved functionality. In: *Genome Engineering via CRISPR-Cas9 System*. edn. Edited by Singh V, Dhar PK: **Academic Press**; 2020: 111-122.

1.3. News coverage of our research

1. *Ashwagandha emerges as Mother Nature's COVID-Warrior*

[Vigyan Prasar \(COVID-19 S&T Efforts in India\)](#) (Weekly newsletter May 21, 2020)

IITD News (May 18, 2020)

<https://vigyanprasar.gov.in/wp-content/uploads/vp-Covid-Newsletter-21may2020.pdf>

<https://youtu.be/d9udJXTvUi0>

<https://www.youtube.com/watch?v=euogV0TDGt8>

<https://home.iitd.ac.in/news-covidashwagandha.php>

2. *Pathogens listed as critical by WHO found in river Yamuna*

THE HINDU (August 10, 2020)

<https://www.thehindu.com/sci-tech/energy-and-environment/pathogens-listed-as-critical-by-who-found-in-river-yamuna/article32315382.ece/amp/>

2

IPR applications filed and Technology Licenses executed

2.1. List of IPR applications filed during 2019-2020

Sl.	Names	PI
1	A system for maintenance of root culture for improved viability and propagation	Prof. AK. Srivastava
2	A novel process of arsenic bioremediation for potable water	Prof. GP. Agarwal
3	A recombinant stationary phase auto-inducible promoter and implementations, thereof	Prof. Preeti Srivastava
4	Biological pre-treatment process of lignocellulosic residues	Prof. Ziauddin Shaikh Ahammad
5	Method providing biotransformation of asphaltene through microbial consortium	Prof. Preeti Srivastava
6	A composition of essential oil of <i>Pleurospermum brunonis</i> as effective cell cycle inhibitor and anti-cancer agent against cancer cells and method of use thereof	Prof. Ritu Kulshreshtha
7	A method of isolation of red pigments from psychrophilic bacterium <i>Rhodonellum psychrophilium</i> GL8 and uses thereof	Prof. Ritu Kulshreshtha

2.2. List of Patents awarded during FY 2019-2020

Sl.	Names	PI
1	Magnetic capturing of rare cells (US Patent No. 10,690,662 dated June 23, 2020)	Prof. Ravikrishnan Elangovan

3

Research Grants and Support

(with DBEB faculty as main PI)

3.1. Extramural Projects awarded in the CY 2020

SI	Project Title	Sponsoring Agency	Amount of Support (in INR lacs)	Period	PI
1	Surveillance and mitigation to combat AMR related to discharges from antimicrobial manufacture	The Royal Embassy of Denmark, New Delhi	48.00	15-12-2020 14-06-2021	Shaikh Ziauddin Ahammad
2	Evaluation of potential diagnostic value of circRNA in meningiomas for risk stratification and its role in therapeutic intervention	ICMR, Gol	7.30	01-12-2020 30-11-2023	Ritu Kulshreshtha
3	An investigation of life history, breeding ecology and genomic consequences of adaptation to chronic protein deficiency using experimental evolution for live-yeast deprivation on <i>Drosophila melanogaster</i> populations (RP03951G)	SERB, Gol	14.19	19-06-2020 18-06-2023	Ishaan Gupta
4	Development of rapid, deployable diagnostics platform for COVID-19 virus	M/s. Reliance Industries, Mumbai	361.08	18-06-2020 17-12-2020	Ravikrishnan Elangovan
5	Dissecting the role of somatic polyploidy in the regulation of gene expression associated with liver disease (RP03920G)	SERB, Gol	28.71	12-03-2020 11-03-2022	Ishaan Gupta
6	Dissecting the mechanism and role of polyploidy associated	DBT, Gol	42.50	16-02-2020 15-02-2025	Ishaan Gupta

	alternative splicing in liver aging and disease (RP03918G)				
7	GenomeIndia: Cataloguing the Genetic Variation in Indians (RP03879G)	DBT, Gol	140.00	16-01-2020 15-01-2023	D. Sundar

3.2. Other Extramural Projects currently under progress

SI	Project Title	Sponsoring Agency	Amount of Support (in INR lacs)	Period	PI
1	Molecular basis of asphaltene biotransformation by a microbial consortium (RP03846G)	DBT, Gol	55.88	14-10-2019 13-10-2022	Preeti Srivastava
2	Engineered Bioremediation Approaches for Onsite treatment of soil contaminated with crude oil (RP03692G)	DBT, Gol	29.55	19-03-2019 18-03-2022	Preeti Srivastava
3	Catalyzing diagnostic technology innovation from bench to bedside (Under SPARC scheme of MHRD) (RP03745G)	MHRD, Gol	47.43	30-04-2019 29-04-2021	Ravi Krishnan Elangovan
4	p53 in regulation of Epithelial-Mesenchymal Transition in breast cancer: role of micro-RNA (RP03790G)	DST, Gol	96.30	21-08-2019 20-08-2022	Ritu Kulshrestha
5	Novel laccases for degradation of complex dyes for textile waste water treatment (RP03814G)	DBT, Gol	68.86	01-10-2019 30-09-2022	Saroj Mishra
6	Development of metagenomics assisted surveillance tools for tracking antibiotic resistance in river bodies (Nanolog) (RP03711G)	DBT, Gol	79.30	16-03-2019 15-03-2022	Shaikh Ziauddin Ahammad
7	M. Tech Biochemical Engineering and Biotechnology Teaching programme at DBEB of the I.I.T. Delhi (Phase - 2 of MI00647) (MI02019G)	DBT, Gol	29.56	01-01-2019 31-03-2021	Shilpi Sharma

8	PAVITRA GANGA - Unlocking wastewater treatment, water re-use and resource recovery opportunities for urban and peri-urban areas in India (RP03828G)	DBT, Gol	217.72	21-10-2019 20-10-2022	T R Sreekrishnan
9	Metabolic engineering of <i>Bacillus subtilis</i> for the production of biorenewable isoprene (RP03507G)	SERB, Gol	31.19	03-08-2017 02-03-2021	Ashish Misra
10	Development of an Integrated Process for Conversion of Biomass to Affordable Liquid Biofuel (RP03509G)	DST, Gol	90.09	08-03-2018 07-03-2021	Atul Narang
11	Unit of Excellence in Cancer Research (RP03206G)	DBT, Gol	314.00	16-05-2016 15-05-2021	D. Sundar
12	DBT-AIST International Laboratory for Advanced Biomedicine (DAILAB) - expansion to DBT-AIST International Center for Translational and Environmental Research (DAICENTER)	DBT, Gol	1997.00	12-07-2018 11-07-2021	D. Sundar
13	Finding of a New RNA Aptamer and Mediated Drug Delivery Method Specific to Prostate Cancer a Pioneer Cancer Research Approach in India (RP03398G)	DST, Gol	31.55	02-08-2017 01-02-2021	Prashant Mishra
14	Molecular events responsible for the switching of cell shape with respect to cell cycle in <i>Rhodococcus</i> <i>erythropolis</i> PR4 (RP03642G)	DST, Gol	19.20	05-12-2018 04-12-2021	Preeti Srivastava
15	Development of Stationary Phase Prompter - Based Gene Expression System for Actinomycetes (RP03388G)	DBT, Gol	59.17	15-06-2017 31-03-2021	Preeti Srivastava
16	DOSA - Diagnostics for One Health and User Driven Solutions for AMR (RP03600G)	DBT, Gol	232.54	04-09-2018 03-09-2021	Ravi Krishnan Elangovan

17	Does AMR in livestock contribute to AMR in people in NE India? An interdisciplinary study (RP03651G)	DBT, Gol	62.42	20-11-2018 19-11-2021	Shaikh Ziauddin Ahammad
18	Biotechnology for the recovery of germanium, indium and copper from industrial copper dust waste (Bio-CuInGe) (RP03532N)	Indo German Science and Technology Germany	161.00	18-04-2018 17-04-2021	Shaikh Ziauddin Ahammad
19	Study on the changes in microbial community structure and function in organic farming vs. conventional farming (RP03578G)	DBT, Gol	49.66	30-07-2018 29-07-2021	Shilpi Sharma
20	Local Treatment of Urban Sewage Streams for Healthy Reuse (LOTUS)(INDO-DUTCH Joint project) (RP03349G)	DBT, Gol	1648.67	01-04-2017 30-08-2021	T.R. Sreekrishnan

3.3. Intramural Projects awarded in the CY 2020

SI	Project Title	Sponsoring Agency	Amount of Support (in INR lacs)	Period	PI
1	Repair of Equipment under RP02521 under Prof. Ritu Kulshrestha, DBEB (MI02251G)	IRD, IIT Delhi	1.9	29-10-2020 28-04-2021	Ritu Kulshrestha
2	Development of digital ELISA diagnostics to monitor therapeutic efficacy of pharmacological interventions in dopamine dictated states of Parkinson;s disease and schizophrenia (Under MFIRP Scheme of IRD with AIIMS) (MI02223G)	IRD, IIT Delhi	5.0	10-01-2020 09-07-2021	Ravi Krishnan Elangovan

3.4. Other Intramural Projects currently under progress

SI	Project Title	Sponsoring Agency	Amount of Support (in INR lacs)	Period	Faculty
1	Investigation of the interface between electrochemically-active microorganisms and self- assembled graphene/carbon nanotubes over polymeric surfaces (Under FIRP Scheme of IRD Call 2019) (MI02085G)	IRD, IIT Delhi	5.0	16-12-2019 15-06-2021	Lucinda Elizabeth Doyle
2	Point-of-Care Devices for Detection of Oral Cancer (under MFIRP Scheme of IRD 2019 with Clemson University, USA) (MI02022G)	IRD, IIT Delhi	5.0	24-09-2019 23-03-2021	Prashant Mishra
3	Gut microbiome sequencing and molecular tracking of AMR genes in Shrimp Aquaculture (Under MFIRP Scheme of IRD 2019 CALL) (MI02087G)	IRD, IIT Delhi	5.0	24-09-2019 23-03-2021	Ravi Krishnan Elangovan
4	Liquid Biopsy: An exploratory study on exosome based diagnostics for lung cancer (Under MFIRP Scheme of IRD) (MI01962G)	IRD, IIT Delhi	10.0	01-03-2019 31-08-2021	Ravi Krishnan Elangovan
5	microRNA therapeutics for glioblastoma (under MFIRP Scheme of IRD 2019 collaboration with NII) (MI02033G)	IRD, IIT Delhi	5.0	24-09-2019 23-03-2021	Ritu Kulshrestha
6	Identification of non-coding RNA panel as novel biomarker for stratification of meningiomas and evaluation of its prognostic and	IRD, IIT Delhi	10.0	01-03-2019 31-08-2021	Ritu Kulshrestha

	therapeutic significance (MFIRP Project No. 02 for the year 2019) (MI01903G)				
7	Clean Drain-IITD (MI01915G)	IRD, IIT Delhi	27.40	14-03-2019 31-10-2021	Shaikh Ziauddin Ahammad
8	Biological markers for soil suppressiveness (Under IRD MFIRP Scheme 2019 with ICAR Collaboration) (MI02024G)	IRD, IIT Delhi	5.0	24-09-2019 23-03-2021	Shilpi Sharma
9	Design and construction of miRNA-based hybrid sponge as a potential novel agent for glioblastoma treatment (under 1-2-3-4 discover & Learn scheme of IRD for the year 2018) (MI01704G)	IRD, IIT Delhi	12.00	11-01-2018 31-06-2021	Ritu Kulshrestha
10	MI for the operation of DDF at DBEB (MI00677)	IIT Delhi	20.07	15-06-2009 31-09-2021	D Sundar (HoD)

3.5. Extramural support to Postdocs/scientists

SI	Project Title	Sponsoring Agency	Amount of Support (in INR lacs)	Period	Mentor
1	Preparation of feather keratin Zinc sulphide (ZnS) nanocomposites material for water purification application. (Under women scientist scheme of DST awarded to Dr. Aditi Banerjee under the mentorship of Prof. Shaikh Ziauddin Ahammad- Project transfered from IIT Guwahati) (RP03922G)	DST, Gol	19.85	06-03-2020 05-10-2021	Shaikh Ziauddin Ahammad
2	Effect of heavy metal pollution on antibiotic resistance (MBLs/ESBL) proliferation (SERB NPDFship of Dr.	SERB, Gol	19.20	04-12-2019 03-12-2021	TR Sreekrishnan

	Parveen Sultana under supervision of Prof. T.R. Sreekrishnan, DBEB) (MI02082G)				
3	Using Bioimprinted Lipase in Low water Media for design and Synthesis of Healthier edible Oils (Under DBT Bio-Care 2016 women scientist Scheme) (RP03500G)	DBT, Gol	33.36	20-02-2018 19-02-2021	Prashant Mishra
4	Upgradation of heavy crude oil and diesel by bio desulfurization using a microorganism with improved activity (Under Young Scientist Scheme) (RP03510G)	DST, Gol	28.13	06-03-2018 05-03-2021	Preeti Srivastava
5	Identification and functional characterization of hypoxia regulated long non-coding RNAs (lncRNAs) in glioblastoma (CSIR DIRECT RAship to Dr. Shivani Sharma) (MI01942G)	CSIR, Gol	10.36	01-04-2019 31-03-2021	Ritu Kulshrestha
6	Deciphering the role of ACC deaminase producing bacteria in mediating stress tolerance in <i>Cajanus cajan</i> against Fusarium wilt (SERB NPDFship of Dr. Annapurna Bhattacharjee) (MI01920G)	SERB, Gol	22.36	01-05-2019 30-04-2021	Shilpi Sharma
7	Synthetic microbial community as a novel approach to combat biotic stress in pigeon pea (under DST SYST Scheme for Young Scientist) (RP03679G)	DST, Gol	32.82	26-03-2019 25-03-2022	Shilpi Sharma
8	Effect of heavy metal pollution on antibiotic resistance (MBLs/ESBL) proliferation (SERB NPDFship of Dr. Parveen Sultana) (MI02082G)	SERB, Gol	19.20	04-12-2019 03-12-2021	T R Sreekrishnan

4

Students who graduated in the CY 2020

4.1. Doctor of Philosophy (Ph.D.)

(a) PhD thesis details

Sl.	Name of the Student	PhD thesis title	Supervisor(s)
1	Divya Singhi	Chromosome segregation in <i>Rhodococcus rrythropolis</i> PR4	Prof. Preeti Srivastava
2	Sonam Takkar	Unravelling the role of miR-196A in Glioblastoma	Prof. Ritu Kulshreshtha
3	Sanjay Singh	Antibiotic functionalized metallic nanoparticles for bacterial detection and antimicrobial activity	Prof. Prashant Mishra
4	Omkar Suhas Vinchure	Regulatory and functional characterization of miR-490 in Glioblastoma	Prof. Ritu Kulshreshtha
5	Vidhi Malik	Molecular targets for cancer therapeutics: Insights from genomic aberrations and protein interactions	Prof. D. Sundar
6	Sakshi Aggarwal	To enhance the secretory efficiency of Granulocyte Colony Stimulating Factor in <i>Pichia pastoris</i> via manipulation of secretory signal sequences	Prof. Saroj Mishra
7	Sonia Gupta	Finding the link between metal pollution and antibiotic resistance	Prof. Ziauddin S Ahammed Prof. T.R. Sreekrishnan
8	Moolchand Sagar	Enhancing secretory expression of Granulocyte colony stimulating factor in <i>Pichia pastoris</i> using genetic approaches	Prof. Saroj Mishra Prof. D. Sundar

(b) Current position of graduated PhD students

Sl.	Name of the Student	Current Position	Current Affiliation
1	Divya Singhi		
2	Sonam Takkar	Research Associate (ICMR)	DBEB, IIT Delhi
3	Sanjay Singh	Research Associate	Nano Research Facility, IIT Delhi
4	Omkar Suhas Vinchure	Postdoctoral Fellow	Hannover Medical School, Germany
5	Vidhi Malik	Postdoctoral Fellow	Harvard Medical School, Boston, USA
6	Sakshi Aggarwal		
7	Sonia Gupta		
8	Moolchand Sigar	Faculty Member	Sankalp Career Institute, Hisar

4.2. Five-year dual degree program

**Master of Technology in Biochemical Engineering and Biotechnology and
Bachelor of Technology in Biochemical Engineering and Biotechnology**

Sl.	Name of the Student	Current Position	Current Affiliation
1	AR Shubham	Business Analyst	i3 consulting
2	Akhil Kumar		
3	Bharti Meena	Preparing for UPSC	
4	Dhaval Rakesh Narwani	Associate Product Manager	MakeMyTrip
5	Divya Garg	Strats Analyst	Goldman Sachs
6	Ekatmika		
7	Indhana Divya Jayasree		
8	Jashan Singh Suri	Associate Consultant	Bain & Company
9	Kancharana Preeti Raj		
10	Malla Paramesh		
11	Nitesh Chaudhary	Associate Consultant	Finmechanics
12	Prarthana Jain	Management Trainee	American Express
13	Sashi Kalan	Manager: Business Intelligence Unit	Axis Bank
14	Yugesh Verma	Software Engineer	HCL Technologies

4.3. Bachelor of Technology in Biochemical Engineering and Biotechnology

Sl.	Name of the Student	Current Position	Current Affiliation
1	Bharti Nakwal		
2	Eeshwar Dutt Nirmal		
3	Ghanshyam Meena		
4	Ishank Pahwa	DevOps Engineer	AB InBev
5	Jivesh Madan	Associate Consultant	MasterCard Advisors
6	Karan Birpali	Project Associate	OYO
7	Kumar Shubham	Software Engineer	Jio Saavn
8	Madhur Virli	Business Analyst	Shadowfax Technologies
9	Muskan Choudhary	Profit Enhancement Resident	Essex Lake Group
10	Nadiyadra Hemal Nileshbhai	Associate	HDFC Bank
11	Navdeep		
12	Nikhil Shenoy	Machine Learning Associate	BioMind
13	Nipun Gupta	Software Engineer	Societe Generale
14	Pragya Mehra		
15	Prateek Kumar Agnihotri	Business Analyst	Swiggy
16	Puneet Lagoo		
17	Raghav Mishra	Associate	Indus Insights
18	Rishi Dayanand		
19	Rohan Sanghi	Analyst	Alvarez & Marsal
20	Sannat Mengi	Associate Product Manager	Flipkart
21	Sanyam Modi	Consultant I	EXL Analytics
22	Saransh Kumar		
23	Satygeet	MBA student	IIM Calcutta
24	SatyaJeet Kumar		
25	Shreya Johri	Computational Biologist	Dana-Farber Cancer Institute, Boston, USA
26	Sonal Arora	Product Manager	Hicare Services Pvt. Ltd.
27	Suyash Kumar Tak		
28	Ralabathula Ravali Kanaka Saran		
29	Tanya Chaudhary	Consultant I	EXL Analytics
30	Uddeshya Jaiswal	Software Engineer	Magicbricks
31	Udiyaman Shukla	PhD student	University College London
32	Varuni Sarwal	PhD student	UCLA, USA
33	Vikas Kumar		
34	Vivek		



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