

Center of Excellence In Molecular Biology and Regenerative Medicine (CEMR)

Recognized by Vision Group on Science and Technology (VGST),
Government of Karnataka

Funded in Part by

Department of Science and Technology – Fund for Improvement of
Science and Technology Infrastructure in Universities and Higher
Education Institutions (DST-FIST)

Report (August 2019)



Department of Biochemistry
(A DST-FIST Sponsored Department), JSS Medical College,
JSS Academy of Higher Education & Research
(Accredited “A+” grade by NAAC),
Mysuru – 570105, Karnataka, India



**JSS ACADEMY OF HIGHER EDUCATION
& RESEARCH**

A REPORT ON THE PROGRESS

IN

**CENTER OF EXCELLENCE IN
MOLECULAR BIOLOGY AND
REGENERATIVE MEDICINE (CEMR)**

August 2019

ABOUT THE CENTER

Since its inauguration by Sri. Sudip Bandyopadhyay, former Union Minister of State for Health and Family Welfare, Government of India, on 6th July 2012, the Centre of Excellence in Molecular Biology and Regenerative Medicine (CEMR) located in the Department of Biochemistry, JSS Medical College, has made significant contributions in the field of biomedical research, promoted student and teacher training, and produced high-quality researchers and published research and review articles. Currently, the CEMR is supported by JSS Academy of Higher Education & Research and the funds received in part by Vision Group on Science and Technology (VGST), Government of Karnataka and Department of Science and Technology - Fund for Improvement of Science and Technology Infrastructure (DST-FIST) program.

The CEMR is established by JSS AHER with the following objectives

- Develop biomarkers for early diagnosis and detection of various diseases
- Identify therapeutic and drug resistance markers in various communicable and non-communicable diseases
- To identify key factors regulating cellular transformation and differentiation in health and disease.
- To promote “stem cell based research” for developing diagnostic techniques and novel therapies for various otherwise difficult to treat diseases
- To assist drug discovery using molecular biology
- To conduct training and academic programs

VISION

To have a cross-disciplinary, multipronged approach to diagnose and treat various diseases and bridge the distance between clinical and laboratory research using molecular biology and stem cells research

MISSION

The mission of the “Center of Excellence in Molecular Biology and Regenerative Medicine” (CEMR) is

- To help develop diagnostic techniques and novel therapies using molecular biology and stem cell technology
- To pursue understanding the mechanisms for various diseases and therapies through molecular biology
- To offer academic programs and training in the area of molecular biology and biomedical research to help develop skilled manpower
- To establish a human bio-repository for archiving clinically annotated specimens

THE TEAM

The center is headed by Dr. H. Basavanagowdappa, the Principal, JSS Medical College, and the Vice-Chancellor, JSS Academy of Higher Education & Research.

Staff of the center includes:

Dr. M.N. Suma

Dr. Prashant Vishwanath

Dr. Akila Prashant

Dr. M.V.S.S.T.SubbaRao

Dr. T. Rajesh Kumar - DBT-Ramalingaswamy Fellow

Dr. S. Prasannakumar - DBT-Ramalingaswamy Fellow

Dr. D. Devanand

Dr. N.K. Swetha – DBT-BioCARE Fellow

Dr. Parveen Doddamani

Dr. B.S. Anjali Devi

Dr. P. Sujatha

Dr. Divya P. Kumar - DBT-Ramalingaswamy Fellow

Dr. J.R. Kumar

Dr. Asha Srinivasan

Dr. Raghuram Achar

Activities of the CEMR Laboratory

Training

The center is actively involved in training postgraduate and doctoral degree students for their academic programs. Currently 23 Full Time and 5 Part Time research scholars are pursuing their research leading to Ph.D.

SI.No	Name of the candidate	Name of the guide	Name of the co-guide
1	Shashanka K. Prasad Part-Time	Dr. D. Devanand	Dr. M.N. Suma
2	B. Venugopal Reddy Full-Time; ICMR-SRF	Dr. M.V.S.S.T.SubbaRao	Dr. G.V. Manjunatha
3	M.V. Prashant Kumar Full-Time; ICMR-SRF	Dr. M.N. Suma	Dr. M.V.S.S.T.SubbaRao
4	Jhansi Lakshmi Full-Time	Dr. M.V.S.S.T.SubbaRao	Dr. L.V. Mohan Rao
5	Dr. H.M. Thippeswamy Part-Time	Dr. D. Devanand	None
6	Sumit Kumar Dey Full-Time; ICMR-SRF	Dr. T. Rajeshkumar	Dr. M.V.S.S.T.SubbaRao
7	H. Souparnika Full-Time; DST-JRF	Dr. T. Rajeshkumar	Dr. M.V.S.S.T.SubbaRao
8	Anshukumar Yadav Full-Time; ICMR-SRF	Dr. M.N. Suma	Dr. Narayanappa
9	S.R. Pushkal Full-Time; CSIR-JRF	Dr. D. Devanand	None
10	R. Veena Full-Time; ICMR-SRF	Dr. T. Rajeshkumar	Dr. M.V.S.S.T.SubbaRao
11	S. Kavya Full-Time; ICMR-SRF	Dr. T. Rajeshkumar	Dr. M.V.S.S.T.SubbaRao
12	Dr. N.K.Swetha Part-Time; DBT- BioCARE Fellow	Dr. T. Rajeshkumar	Dr. Sunil Kumar
13	A.U. Chinnappa Full-Time; DST-SRF	Dr. M.V.S.S.T.SubbaRao	Dr. R. Rajalakshmi
14	K.G. Mahadevaswamy Full-Time; ICMR-SRF	Dr. M.V.S.S.T.SubbaRao	Dr. T. Rajeshkumar
15	B.G. Vidya Full-Time; SERB-PA	Dr. M.V.S.S.T.SubbaRao	Dr. B. Madhu
16	L.H. Zonunsiami Full-Time; NFST-Fellow	Dr. M.V.S.S.T.SubbaRao	Dr. M.K. Jayanthi
17	Dr. C.R. Shobha Part-Time	Dr. Prashanth Vishwanath	None
18	B.R. Lavanya Full-Time; SERB-PA	Dr. Akila Prashanth	Dr. Manjunath Shetty
19	A. Brunda	Dr. D. Devanand	None

	Part-Time		
20	Adel Mohammed Saleh Ahmed Full-Time	Dr. Akila Prashanth	Dr. S. Suchitha
21	Mohammad Kaleemullah Full-Time	Dr. Prashanth Vishwanath	Dr. P.A. Mahesh
22	Rimsha Naaz Full-Time; DST-PA	Dr. R. Rajalakshmi	Dr. P.V. Salimath
23	Nishitha R. Kumar Full-Time	Dr. Akila Prashanth	Dr. Thejashree
24	D. Shiva Full-Time; DBT-SRF	Dr. M.V.S.S.T.SubbaRao	Dr. T. Rajeshkumar
25	G.B. Chaithanya Full-Time; DBT-PA	Dr. M.V.S.S.T.SubbaRao	Dr. M.N. Suma
26	G. R. Ramya Full-Time; DBT-PA	Dr. S. Prasanna Kumar	Dr. Divya P. Kumar
27	M. Gayathri Full-Time: DBT-PA	Dr. Divya P. Kumar	Dr. S. Prasanna Kumar
28	V. M. Mandara Full-Time: DBT-PA	Dr. S. Prasanna Kumar	Dr. Divya P. Kumar

Ph.D.s Awarded

Sl. No.	Name of the candidate	Guide	Co-Guide	Year Degree Awarded
1	Dr. M.K. Jayanthi	Dr. M.V.S.S.T.SubbaRao	Dr. P.A. Mahesh	2017
2	Dr. Akila Prashanth	Dr. M.N. Suma		2018
3	Dr. Manish Kumar Yadav	Dr. Nandini Manoli	Dr. M.V.S.S.T.SubbaRao	2017
4	Dr. Preethi G. Anantharaju	Dr. G.V. Manjunath	Dr. M.V.S.S.T.SubbaRao	2017
5	Dr. B. S. Anjali Devi	Dr. M.V.S.S.T.SubbaRao	Dr. Nandish Manoli	2018
6	Dr. P. Sujatha	Dr. M.V.S.S.T.SubbaRao	Dr. K. Gowthamarajan	2018
7	Dr. R. Rashmi	Dr. M.V.S.S.T.SubbaRao		2018
8	Dr. S. B. Magesh	Dr. M.V.S.S.T.SubbaRao		2018
9	Dr. C. Prathima	Dr. M.V.S.S.T.SubbaRao	Dr. H. Basavanagowdappa	2019
10	Dr. Prashanth Vishwanath	Dr. H. Basavanagowdappa		2019

National Hands on Workshop (From July 2014 onwards)

CEMR laboratory, every year, conducts National Hands-on Workshop on “Molecular Medicine” in the period of September- October along with a CME. To date, 3 National workshops have been conducted by CEMR laboratory. The workshops were well-received and appreciated by the participants.

Details of Workshop/Seminar/conference conducted by the CEMR Lab

Sl. No	Date & Place	Scientific Program	Topic	Name of the speaker with details	# of Participants
1.	28 th to 30 th September 2014 at JSS Medical College	National Hands on Workshop on Molecular Medicine	Molecular Medicine	1.Dr. Akila Prashant, Associate Professor of Biochemistry 2.Dr. Devananda D, Lecturer of Biochemistry 3.Dr. M.V.S.S.T. SubbaRao, Associate Professor of Biochemistry 4.Dr. N.B. Ramachandra, Professor of Zoology (Genetics), University of Mysore 5.Sajith Das, Product manager, Eppendorf Pvt Ltd	12
2.	1 st October 2014 at JSS Hospital	CME on stem cells and regenerative medicine	Stem Cells	1.Dr. Polani B Sheshagiri, In-charge of stem cell and transgenic laboratory, Indian Institute of Science 2.Dr. Akila Prashant, Associate Professor of Biochemistry 3.Dr. Ramesh Jayaraman, Chief Scientific officer, TheraIndex life science Pvt Ltd, Bangalore 4.Dr. M.V.S.S.T. Subbarao Associate Professor of Biochemistry 5.Dr. V.V. Suryanarayana, Scientist at Dr. Surapaneni's Genomic Solutions Pvt Ltd, Hyderabad 6.Dr. Shailaja Dharmesh, Principal Scientist, Department of Biochemistry, CFTRI Mysore 7.Dr. M.S. Vishveshwara, Chief Radiation Oncologist and Medical Superintendent,	175

				Bharat Hospital and Institute of Oncology, Mysore	
3.	16 th to 20 th August 2016 at JSS Medical College	National Hands on Workshop on Molecular Medicine	Molecular Medicine	<p>1. Dr. Akila Prashant, Professor of Biochemistry, JSS Medical College, Mysore</p> <p>2. Dr. Devananda D, Assistant Professor of Biochemistry, JSS Medical College, Mysore</p> <p>3. Dr. MVSST SubbaRao, Associate Professor of Biochemistry, JSS Medical College, Mysore</p> <p>4. Dr. Rajesh, Associate Professor, Department of Biochemistry, JSS Medical College, Mysore</p> <p>5. Mr. Satish, Application Specialist – Molecular biology, Qiagen</p> <p>6. Dr. Kshitish Acharya, Core faculty Institute of Bioinformatics and Applied Biotechnology Bangalore</p> <p>7. Dr. G.V. Manjunath, Professor & head, Department of Pathology, JSS Medical College, Mysore</p> <p>8. Dr. N.B. Ramachandra, Professor in zoology (Genetics), University of Mysore</p>	20
4.	23 rd to 24 th February 2018 at JSS Medical College	Indo-South Africa Conference	Integrative Medicine For Healthcare: Emerging Scientific Knowledge	<p>1. Dr. Anil Chuturgoon, MD, Ph.D. Prof, Department of Medical Science, University of KwaZulu-Natal, Durban, South Africa</p> <p>2. Dr. Raghuvendraswamy</p>	100

			and New Therapies	<p>BNYS Assistant Prof., Division of Life Sciences, S-VYASA University, Bangalore</p> <p>3. Dr. Rajesh Sreenivasan Ph.D Director Production, R&D, The Sadvaidyasala Pvt Ltd Nanjangud, Karnataka</p> <p>4. Dr. M.S. Vishveshwara MBBS, M.D Chief Radiation Oncologist, Bharath Hospital & Institute of Oncology, Mysuru</p> <p>5. Dr. Prabhanshu Tripathi Ph.D. Scientist, Ramalingaswami Fellow, Translational Health Science and Technology Institute, New Delhi</p> <p>6. Dr. Savania Nagaih Ph.D Post-Doctoral Fellow, Department of Medical Science, University of KwaZulu-Natal, Durban, South Africa</p> <p>7. Miss Taskeen Docrat Research Scholar, Department of Medical Science, University of KwaZulu-Natal, Durban, South Africa</p> <p>8. Dr. Anand Krishnan Ph.D Post-Doctoral Fellow, Department of Medical Science, University of KwaZulu-Natal, Durban, South Africa</p> <p>9. Dr. Venkatesh Hegde Ph.D Research Assistant Professor, Department of Pathology, Microbiology & Immunology, School of Medicine, University of South Carolina, USA</p> <p>10. Dr. Murali Krishna MBBS</p>	
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				<p>Psychiatrist, Welcome Trust-DBT Alliance Fellow, CSI Holdsworth Memorial Hospital, Mysore</p> <p>11. Dr. M.A. Shekar M.D Director of Karnataka Institute of Endocrinology and Research, Bengaluru</p> <p>12. Dr. K.M. Ramkumar Ph.D Associate Prof. of Biotechnology, SRM Institute of Science and Technology, Chennai, Tamil Nadu</p> <p>13. Dr. P.V. Ravindra Ph.D Scientist and Ramalingaswami Fellow, CFTRI, Mysore</p> <p>14. Mr. Naeem Sheik Research Scholar Department of Medical Science, University of KwaZulu-Natal, Durban, South Africa</p> <p>15. Miss. Terisha Ghazi Research Scholar Department of Medical Science, University of KwaZulu-Natal, Durban, South Africa</p> <p>16. Miss. Shanel Dhani Research Scholar Department of Medical Science, University of KwaZulu-Natal, Durban, South Africa</p>	
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Recently Completed / Ongoing / Sanctioned Projects (>15.0 Lakhs)

Sl. No.	Title	Principal Investigator	Duration of the project (Years) Sanctioned Year	Funding Agency	Grant received (in Lakhs)
1.	Isolation of colorectal cancer stem cells based on biomarker expression and test the efficacy of <i>Piper nigrum</i> as an anticancer agent for further use in translational studies	Dr. Akila Prashanth	3.0 2012	Vision Groups on Science and Technology, Department of Science and Technology, Govt. of Karnataka	60.0
2.	Novel in-house multiplex PCR guided management of neonatal sepsis in a tertiary care hospital in South India	Dr. Akila Prashanth	2.0 2015	ICMR	19.81
3.	Impact of ambient air pollution on lung growth immunity and macrophage plasticity	Dr. T. Rajeshkumar	5.0 2015	DBT-Ramalingaswamy Fellowship	88.00
4.	Development of Moringa enriched isothiocyanate as nutraceutical activator of NRF2 signaling for mitigation of dyslipidemia	Dr. T. Rajeshkumar	3.0 2016	DST-NRF Indo-South Africa	33.00
5.	Dysfunctional HDL: A diagnostic target for atherosclerosis risk in Type 2 diabetes Mellitus	Dr. N.K. Swetha	3.0 2016	DBT-BioCARE	36.52
6.	Fund for Improvement of Science and Technology Infrastructure	Dr. M.V.S.S.T.SubbaRao	5.0 2018	DST	58.00
7.	Targeting Key Signaling Cascades Using D-Formin (A Combination Of Vitamin-D And Metformin) For Inhibiting Carcinomas Of Breast In Vitro And In Vivo	Dr. M.V.S.S.T.SubbaRao	3.0 2019	DBT	49.67
8.	The role of RNA-induced silencing complex in the	Dr. S. Prasannakuma	5.0 2019	DBT-Ramalingaswamy	113.60

	development and progression of Nonalcoholic Steatohepatitis (NASH) and Hepatocellular Carcinoma (HCC): The molecular intervention using natural compounds	r		Fellowship	
9.	Molecular Mechanisms Underlying High Fat Diet (HFD)-induced Hepatocellular Carcinoma: Specific Role of TNF α Converting Enzyme (TACE) and Apoptosis Antagonizing Transcription Factor (AATF)	Dr. Divya P. Kumar	5.0 2019	DBT-Ramalingaswamy Fellowship	113.60
10.	Upregulation Of Hydroxy Prostaglandin Dehydrogenase (HPGD) Expression Using Hydroxy Chloroquine As A Novel Therapeutic Strategy In Carcinoma Cervix	Dr. M.N. Suma	3.0 2019	ICMR	49.57

CONSULTANCY ACTIVITIES - ACADEMIC

CEMR laboratory is one of the well-known laboratories for cancer research. Post graduate students and research scholars from national institutes and state and central universities in India are selecting CEMR laboratory as their choice for carrying out research. To date many students and research scholars from national institutes have conducted their dissertation work in CEMR laboratory.

Projects completed by students of other Universities / Research Institutes

	Student Name, and University / Institution	Name of the guide from CEMR lab	Study Period	Laboratory Fee (Rs.)
1	Mr. Arjun Venkatesh Thilagaraj, M.Sc. Student Manipal Institute of Technology, Manipal, Karnataka	Dr. M.V.S.S.T.SubbaRao	25 th June to 25 th July	10,000/-
2	Mr. Md. Sharif Lecturer, and Part-Time Ph.D. Scholar V. S. Lakshmi Women's College, Kakinada, East Godavari District, Andhra Pradesh	Dr. M.V.S.S.T.SubbaRao	1 st Jan 2015 to 31 st March 2015	10,000/- (Paid online)
3	Ms. Juveriah Kausar, M.Sc. Biotechnology Student, Bharathiar University, Coimbatore, Tamil Nadu	Dr. M.V.S.S.T.SubbaRao	11 th May 2015 to 13 th June 2015	No fee collected as we have a MoU signed with BU
4	Ms. Annie Yau, Graduate Student, University of California, Berkeley, USA	Dr. M.V.S.S.T.SubbaRao And Dr. Parveen Doddamani	24 th June 2015 to 17 th August 2015	No fee collected towards laboratory charges as we have collaborative on going study
7.	Dr. M.N. Nagendra Prasad Associate Professor Department of Biotechnology, SJCE Mysore	Dr. M.V.S.S.T.SubbaRao	24 th and 25 th June 2015	2,000/-
8.	B. Deepa Reddy Research Scholar Department of Applied Microbiology, Sri	Dr. M.V.S.S.T.SubbaRao	April 2017 to Sep 2018	30,000

	Padmavati Mahila Viswavidyalayam, Tirupati, Andhra Pradesh			
9	Divya Yadav Research Scholar Department of Life Sciences, Bangalore University, Bangalore, Karnataka	Dr. M.V.S.S.T.SubbaRao	Nov 2017 to date	30,000
10	Praveen Kumar Research Scholar Department of Biochemistry Kuvempu University Shivamogga, Karnataka	Dr. M.V.S.S.T.SubbaRao	June 2018 to date	30,000
11	Sharoon Veronika Kommalapati Yogi Vemana University Cuddapah, Andhra Pradesh	Dr. T. Rajeshkumar	May to June 2019	Joint Science Academies' Summer Research Fellowship Programme Indian Academy of Science
12	Sourabh Tyagi M.Sc. Biotechnology Deenbandhu Chhotu Ram University of Science and Technology, Sonipat, Haryana	Dr. T. Rajeshkumar	June to August 2019	Joint Science Academies' Summer Research Fellowship Programme Indian Academy of Science

CONSULTANCY ACTIVITIES - INDUSTRY

SI.No.	Name and Address of the Industry	CEMR Member Involved	Activity
1	Sadvaidyashala, Nanjangud, Karnataka	Dr. M.V.S.S.T.SubbaRao	Tested the anti- cancer potential of Shivagutika
2	Oxyease Health Care Pvt Ltd, Bengaluru, Karnataka	Dr. M.V.S.S.T.SubbaRao	Yet to initiate
3			

Academic Achievements of Students-UG, PG degree/diploma, Ph.D, etc.

Sl. No.	Name of the students	Achievement
1.	Dr. Parveen D Lecturer Dept of Biochemistry	Best oral presentation at the 22 nd National conference of Association of Medical Biochemists of India held from 14-16 th Nov 2014, Tirupathi
2.	Preethi GA Research scholar Dept of Biochemistry	Best oral presentation at the 2 nd National Conference on Recent trends in Bioorganic Chemistry, held at Sharada Vilas College, Mysore
1.	Dr. Sahana KR Post Graduate Dept of Biochemistry	Best oral presentation at the 2 nd State level Conference of Association of Medical Biochemists, Karnataka Chapter held on 11 th and 12 th of September 2014 at Sri Devaraj Urs Medical College, Tamaka, Kolar
2.	Dr. Sahana KR Post Graduate, Dept of Biochemistry & Dr. Naga Mrudula M Post Graduate, Dept of Biochemistry	First prize in the Post Graduate Quiz Competition at the 2 nd State level Conference of Association of Medical Biochemists, Karnataka Chapter held on 11 th and 12 th of September 2014 at Sri Devaraj Urs Medical College, Tamaka, Kolar
3.	Dr. Akila Prashant, Associate Professor in the Dept of Biochemistry	Prof. Y.T.Thathachari Endowment Prize for the best Research Scholar at the Graduates Ceremony 2015 at JSS Medical College, Mysore
4.	Dr. M.V.S.S.T.SubbaRao, Associate Professor, Department of Biochemistry, JSS Medical College.	Molecular Bio-systems Best Poster Award by the Royal Society of Chemistry in the Chemical Biology Society of India Annual Meeting, February 2015. Briefly about Royal Society of Chemistry: A prestigious not-for-profit organization with over 51,000 members and a knowledge business that spans the globe, RSC is the UK's professional body for chemical scientists, supporting and representing the members and bringing together chemical scientists from all over the world. Web link: www.rsc.org
5.	Preethi GA Research scholar Dept of Biochemistry	Maulana Azad National Fellowship for Minority Students for the year 2014-2015, sponsored by the University Grants Commission (UGC) of India, for her research project leading to Ph.D (MANF-2014-2015-JAI-KAR-34099).
6.	Dr. C.R. Shobha Post graduate in the Dept of Biochemistry	Best oral presentation at the "Samagama- converging paths" National Conference held on 12 th & 13 th December 2014 at University of Mysore.
7.	Ritu Sharma, MBBS Student conducted ICMR-STC project in the Department of Biochemistry	Best poster presentation at Elixir 2015 Organized by K.S. Hegde Medical Academy from 6 th -7 th March 2015

8.	Asha Jose, DST-INSPIRE Fellow, JSS College of Pharmacy, Ooty	Awarded consolation best poster award at National Conference on “Drug Discovery from Bio-organic Chemicals and Indigenous Systems of Medicines for the Betterment of Public Health”, 31 st July 2015 and 1 st Aug 2015
9.	Dr. M.V.S.S.T.SubbaRao	Prof. Y.T.Thathachari Endowment Prize for the best Research Paper at the Graduates Ceremony 2017 at JSS Medical College, Mysore
10.	Dr. M.V.S.S.T.SubbaRao	Best Guide Award for the poster Presented in Make-in-India poster competition, organized by Project Council of India (An ECI initiative) in association with Satyabhama University, Chennai, Tamil Nadu, held on 19 th November 2016
11.	Venugopal Reddy Bovilla	Won Second Prize and Selected for National Level Competition in Student Research Convention “ANVESHAN” – South Zone Competition organized by Tumkur University, Tumkur, Karnataka, held on 14 ^h and 15 th February 2017
12.	R. Rashmi	Won Best Oral Presentation Award in National Conference on “Challenges and opportunities for researchers and health care professional in the management of metabolic disorders”. Organized by Sarada Vilas College of Pharmacy, Mysuru, Karnataka on 7 th and 8 th April 2017
13.	Asha Jose	Won Best Poster Award for e-poster presented at “International seminar and exhibition on phytopharmaceuticals: Emerging challenges and opportunities”. Held at JSS College of Pharmacy, Ooty, Tamil Nadu by TIFAC Core in Herbal Drugs and AICTE, Government of India, on 11 th and 12 th December 2017
14.	Venugopal Reddy Bovilla	Won Best Poster Award - Second Place for Poster presented in National Conference on Integrative medicine for health care: Emerging scientific knowledge and new therapies. Organized by Department of Biochemistry, JSS Medical College, JSS Academy of Higher Education & Research, Mysuru, Karnataka. Held on 23 rd and 24 th February 2018
15.	R. Divya Yadav	Won Best Poster Award - Third Place for Poster presented in National Conference on Integrative medicine for health care: Emerging scientific knowledge and new therapies. Organized by Department of Biochemistry, JSS Medical College, JSS Academy of Higher Education & Research, Mysuru, Karnataka. Held on 23 rd and 24 th February 2018
16.	Preethi G. Anantharaju	Won Best Poster Award - Third Place for Poster presented in National Conference on Integrative medicine for health care: Emerging scientific knowledge and new therapies. Organized by Department of Biochemistry, JSS Medical College, JSS Academy of Higher Education & Research, Mysuru, Karnataka. Held on 23 rd and 24 th February 2018
17.	Asha Jose	Won Best e-Poster Presentation Award for an e-poster presented in National symposium on “Exploring the advances and challenges in green and protein chemistry: Industry and Academia perspective” on 9 th and 10 th March 2018

18.	R. Divya	Won Best Poster Award – In Biotechnology of Medicinal and Aromatic Plants Category. For poster presented in National Conference on Innovations and future challenges in biotechnology (NCIFCB-2018). Organized by the Department of Biotechnology, Sri Venkateswara University, Tirupati, Andhra Pradesh, India. Held on 26 th to 28 th March 2018
19.	B. Deepa Reddy	Won Best Poster Award – in Medical Biotechnology Category. For poster presented in National Conference on Innovations and future challenges in biotechnology (NCIFCB-2018). Organized by the Department of Biotechnology, Sri Venkateswara University, Tirupati, Andhra Pradesh, India. Held on 26 th to 28 th March 2018
20.	M.V. Prashanth Kumar	Won Best Poster Award – In Animal Biotechnology Category. For poster presented in National Conference on Innovations and future challenges in biotechnology (NCIFCB-2018). Organized by the Department of Biotechnology, Sri Venkateswara University, Tirupati, Andhra Pradesh, India. Held on 26 th to 28 th March 2018
21.	P. Sujatha	Won Best Poster Award. For poster presented at International Symposium on “Nutri-concept – Innovative Food Concepts and Technologies for Global Nutrition and Business, held at CSIR-CFTRI, Mysore, Karnataka, between 15 th to 16 th May 2018
22.	Asha Jose	Won Best e-Poster Presentation Award. For an e-poster presented in National Conference on “Sustainable development with pharmacological research and innovations” held on 28 th and 29 th September 2018
23.	Venugopal Reddy Bovilla	Won Best Poster Award for a poster presented a poster in the Second International NIN Centenary Conference ‘Aligning food systems for healthy diet and improved nutrition’ at National Institute of Nutrition, Hyderabad, India from 11 th to 13 th November, 2018.
24.	K.G. Mahadevaswamy	Best Oral Presentation – Second Prize. For the oral presentation delivered in “Innovative Approaches in Biological Science Research (IABSR-2019)” organized by the Department of P.G. Studies and Research in Biochemistry, Kuvempu University, between March 22 and 23 rd , 2019.
25.	Dr. Vivek Anand Ojha	Runner-Up in quiz, held during 4 th International Conference on Birth Defects, (ICBD-2018), Jointly held from 13 th to 14 th December 2018 with the 5 th Annual Conference of the Society offor Indian Academy of Medical Genetics (SIAMG), Vellore, Tamil Nadu.
26.	Dr. Vivek Anand Ojha	First Prize in quiz, held in International Hands-on Workshop on “Essential Zebrafish Techniques-Development and Genetics” organized by NITTE University Center for Science Education & Research, on 29 th and 30 th November 2018
27.	Sinduvadi R. Pushkal	Received Travel Grant of Rs. 1,06,103 from Science and Engineering Research Board, Govt of India to participate in 32 nd International Papilloma Virus Conference, Sydney, Australia between 2 nd to 6 th October 2018

28.	Venugopal Reddy Bovilla	Received Travel Grant of Rs.60,000 From Council of Scientific and Industrial Research (CSIR), Govt of India to participate in 21 st International Conference on Oxidative Stress Reduction, Redox Homeostasis and Antioxidants, Paris, France, between 20 th and 21 st June 2019
29.	Dr. Vivek Anand Ojha	Received The Asia-Pacific Federation For Clinical Biochemistry And Laboratory Medicine Young Scientists' Travel Grant Award of SGD 1500 to participate in 15 th APFCB conference to be held at Jaipur, India, between 17 th to 19 th November 2019

Details of Guest Lectures/Academic/Industrial Experts visited the CEMR

Sl. No.	Details of the Expert	Date	Title of the topic	No. of participants
1.	Dr. Harishkumar Madhyastha, Associate Professor in Physiology, Faculty of Medicine, University of Miyazaki, Miyazaki, Japan,	1 st December 2014	The Micro-RNA and its role in Patho-physiological events'	75
2.	Qiagen company on Rotogene Q	18 th September 2014	Presentation on Real time PCR	25
3.	Dr. Jessy Abraham, Assistant Professor of Biochemistry, All India Institute of Medical Sciences (AIIMS), Raipur.	31 st December 2014	A FANCastic tale of BRCA	50
4.	Perkin Elmer Company	5 th March 2015,	The usage of multimode plate reader	50
5.	Olympus company	26 th Feb 2015	The usage of fluorescent microscope	50
6.	Qiagen company	23 rd March 2015	The usage of RT PCR	50
7.	Shimadzu company	17 th March 2015	The usage of HPLC	50
8.	Dr. M. Vijay Kumar Assistant Professor, Department of Nutritional Sciences Pennsylvania State University, University Park, Pennsylvania, USA	9 th July 2015	Interplay between Gut Microbiota, Chronic Inflammation and Metabolic Syndrome	70
9.	Dr. Arivalagan Muthusamy Research Investigator, Department of Ophthalmology and Visual Sciences, University of Michigan Kellogg Eye Center,	20 th July 2015	Molecular Mechanism of Ischemic-reperfusion Injury Induced Blood Retinal Barrier Breakdown and Vascular Repair	40

	Ann Arbor, Michigan, USA			
10	Dr. Siddarama Gowda Associate in Virology University of Florida, IAFS – Citrus Research and Education Center, Florida, USA	7 th Feb 2018	Use of RNAi and CRISPR tool to manage citrus greening disease of citrus in florida	80

	Speaker Details	Organized on	Title of the topic	# of Participants
11	Mr. Anand Vishwanath Sales and Application Specialist, MetaSystems India (Bengaluru) Pvt. Ltd ,Karnataka, India	24 th June 2016	An introduction to Karyotyping and FISH techniques and the instrumentation for analysis.	38
12	Dr. M. Vishveshwara Chief Radiation Oncologist and Medical Superintendent, Bharath Hospital and Institute of Oncology, Mysuru, Karnataka, India	24 th June 2016	Personalized Medicines in Oncology	48
13	Dr. B.T. Prabhakar Assistant Professor, Molecular Biomedicine Laboratory, Postgraduate Department of Studies and Research in Biotechnology, Sahyadri Science College (Autonomous), Kuvempu University, Shivamogga-577203, Karnataka, India	30 th August 2016	Slacking the Neovascular Sprout – In a Way to Palliate the Malignant Progression.	35
14	Dr. Shylaja M. Dharmesh Senior Principal	28 th October 2016	Immuno-Nutrition: A Strategy To Fight Against Cancer	41

	Scientist, Department of Biochemistry and Nutrition, CSIR-CFTRI, Mysuru, Karnataka, India			
15	Dr. Vinay Vyas Biopharmaceutical Development Program, Leidos Biomedical Research Inc, Advanced Technology Research Facility, Frederick National Laboratory for Cancer Research, Frederick, Maryland, USA	7 th November 2016	Transitioning Products from Bench to Bedside	40
16	Dr. Praveenkumar Shetty Research Coordinator and Professor, Central Research Laboratory, Department of Biochemistry, SDM College of Medical Sciences and Hospital, Sattur, Dharwad, Karnataka	29 th December 2016	Characterization of Biomarker and Therapeutic Target for Triple Negative Breast Cancer	20
17	Dr. Ravi Kasiappan DBT-Ramalingaswamy Fellow, Department of Biochemistry and Nutrition, CSIR-CFTRI, Mysuru, Karnataka	23 rd February 2017	Vitamin D and Cancer: Macro Role of MicroRNA	24
18	Dr. Raghavendra Gowda Assistant Professor, Department of Pharmacology, Penn State Hershey Cancer Institute, Hershey, Pennsylvania, USA	3 rd March 2017	Identification of WEE1 as a Target to Make Akt3 Inhibition more Effective in Melanoma	41

19	Dr. Kishor Associate Professor, Department of Psychiatry, JSS Medical College, Jagadguru Sri Shivarathreeshwara University, Mysuru, Karnataka	11 th May 2017	Cognition and Cancer	25
20	Dr. Syed Musthapa Meeran Senior Scientist, Department of Biochemistry and Nutrition, CSIR-CFTRI, Mysuru, Karnataka	12 th October 2017	“ABOVE” the genome: Bioactive Diets Against Hormonal Refractory Breast Cancers	43
21	Dr. Saravanan Karumbaya Adjunct Professor, Department of Microbiology, Immunology and Molecular Genetics Eli and Edythe Broad Center of Regenerative Medicine and Stem Cell Research, University of California at Los Angeles (UCLA), USA	9 th November 2017	Generation and Clinical Applications of Human Induced Pluripotent Stem Cells	32
22	Dr. Murali Hegde Associate Professor, Department of Radiation Oncology and Neurosciences, Houston Methodist Research Institute, Houston, Texas USA	7 th December 2017	Exploring Motor Neuron Disease associated Protein TDP-43 as a Novel Adjuvant Target for Enhancing Radio- immunotherapy Efficacy in Cancer using an siRNA- Liposome Nano-Cocktail	37
23	Mr. Abhishek Singh Field Application Scientist, Premas Life	23 rd March 2018	Next Generation Sequencing: Unveiling The Clinical Envelope	25

	Sciences Pvt Ltd, South Delhi, Delhi			
24	Mr. Iman Bhattacharya Product Manager - Oncology, Premas Life Sciences Pvt Ltd, South Delhi, Delhi	23 rd March 2018	NGS in Oncology - Current trends and the future vision from Illumina	19
25	Dr. Indranil Chattopadhyay Assistant Professor, Department of Life Sciences, School of Basic and Applied Sciences, Central University of Tamil Nadu, Thiruvarur , Tamil Nadu	9 th April 2018	Role of Src-Regulated AR Transcriptome and Cistrome in Castration Recurrent Prostate Cancer	30
26	Dr. Purnima Madhivanan Associate Professor, Robert Stempel College of Public Health, Florida International University, Miami, Florida USA	14 th May 2018	PHRII: The David and Goliath in Public Health Research	29
27	Dr. Ramesh Aiyagari Professor, Department of Biosciences and Bioengineering, IIT Guwahati, Guwahati, India	12 th July 2018	Exploring the Chemistry-Biology Interface for the Generation of Antibacterials	50
28	Dr. Sridhar Deshmukh Visiting Faculty, IIM Bangalore Consultant, Preventive Health Care and Therapeutic Yoga, Bangalore Consultant, Synergy Specialty Clinic and Diagnostic Center, Bangalore	30 th August 2018	Emerging Paradigm in Wellbeing – A Synthesis	55

	Faculty, Par Excellence Leadership Solutions, Mumbai Bangalore, Karnataka, India			
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Details of Collaboration with other Universities/Industries/Organizations – National and International

Sl. No	Name of the University/Industry/ Organization	Nature of collaboration	Coordinating person	Present status / outcome of collaboration
1	CSIR-CFTRI, Karnataka And School of Life Sciences, Manipal University, Manipal, Karnataka	Academic program to run integrated M.Sc.-Ph.D. in Nutrition Biology MoU Signed	Dr. Basavanagowdappa Coordinator Participating Faculty from Department of Biochemistry, Dr. M.N. Suma Dr. M.V.S.S.T.SubbaRao	Ongoing Integrated Masters and Ph.D. program in Nutrition Biology
2	CSIR-IICB, Kolkata	Research, MoU Signed	Dr. P.A. Mahesh Dr. B.S. Jayaraj Dr. M.V.S.S.T.SubbaRao	Ongoing Joint publications in high impact journals
3	PHRII, Mysore, Karnataka	Research, MoU under preparation	Dr. P.A. Mahesh Dr. D. Devanand Dr. M.V.S.S.T.SubbaRao	Ongoing Joint publications and research grants
4	University of Kwazalu-Natal, Durban, South Africa	Research	Dr. T. Rajeshkumar Dr. M.V.S.S.T.SubbaRao	Ongoing Indo-South Africa joint project
5	University of Texas Health Center, Houston, Texas, USA	Research	Dr. M.V.S.S.T.SubbaRao	Ongoing A collaborative research leading to Ph.D.

Details of Research Publications With Impact Factor 1.0 and Above

SI No	Title	Authors	Name of the Journal with Volume Year & Issue	National / International	Indexed / non indexed	Impact factor
1.	Evaluation of serum uric acid and serum gamma glutamyl transferase in patients with metabolic syndrome	Suma M. N., Reshma D.	Journal of Dental and Medical Sciences 2014; 13(7): 98-103.	International	Indexed	1.576
2.	Dipeptidyl peptidase-4 inhibition by <i>Pterocarpus marsupium</i> and <i>Eugenia jambolana</i> ameliorates streptozotocin induced Alzheimer's disease	Jayasankar Kosaraju, SubbaRao V. Madhunapantula , Santhivardhan Chinni, Rizwan Basha Khatwal, Anil Dubala, Satish Kumar Muthureddy Nataraj, Duraiswamy Basavan.	Behavioral Brain Research , 267, 55-65, July 2014	International	Indexed	3.391
3.	Targeting multiple key signaling pathways in melanoma using leelamine.	Raghavendra Gowda, SubbaRao V. Madhunapantula , Kuzu, O.F., Sharma A, and Gavin P. Robertson.	Molecular Cancer Therapeutic , 13, 1679-1689, July 2014	International	Indexed	6.107
4.	Serum Levels of IL-10, IL-17F and IL-33 in Patients with Asthma: A Case-Control Study	Raeiszadeh JS, Mahesh PA, Jayaraj BS, SubbaRao V. Madhunapantula , Holla AD, Vishweswaraiah S, Ramachandra NB	Journal of Asthma, 51, 1004-1013, December 2014	International	Indexed	1.828
5.	5-Aminosalicylic acid attenuates allergen-induced airway inflammation and oxidative stress in asthma	Raju KRS, Sathishkumar, MN, Gupta S, Srinivas TN, Jayashankar K, Murthy V, SubbaRao V. Madhunapantula , Shashank M, Nilesh SA, Shashank T,	Pulmonary Pharmacology and Therapeutics, 29, 209-216, December 2014	International	Indexed	2.570

		Vishnuvarthan VJ, Azam A, Elango K.				
6.	Mucosal Vaccines: A paradigm shift in the development of mucosal adjuvants and delivery vehicles	Atul Srivastava ¹ , D.V.Gowda* ¹ , SubbaRao V. Madhunapantula , Chetan G Shinde, Meenakshi Iyer.	<i>Acta Pathologica Microbiologica Et Immunologica Scandinavica (APMIS)</i> , 123 (4), 275-288, April 2015	International	Indexed	1.922
7.	A novel mutation in SLURP1 in patients with mal de Meleda from the Indian subcontinent	Nellen RG, Claessens T, Subramaniam R, Betkerur J, Prashanth A , Steijlen PM, van Geel M.	J Dermatol Sci. 2015 Oct;80(1):76-8.	International	Indexed	3.67
8.	Development And Efficacy Assessment Of An Enteric Coated Porous Tablet Loaded With F4 Fimbriae For Oral Vaccination of Piglets Against F4+ Enterotoxigenic <i>Escherichia coli</i> Infections.	Srivastava, A., Gowda, D.V., SubbaRao V Madhunapantula , Siddaramaiah	Current Drug Delivery 13 (1), 121-130, 2016	International	Indexed	1.645
9.	Salicylic acid derivatives as potential anti-asthmatic agents using disease responsive drug delivery system for prophylactic therapy of allergic asthma.	Rama Satyanarayana Raju K, Ambhore, N.S., Mulukutla, S., Gupta, S., Murthy, V., Kiran Kumar, M.N., Madhunapantula, S.V. , Kuppuswamy, G., Elango, K.	Medical Hypothesis. 87, 75-79, Feb 2016	International	Indexed	1.322
10	Application of Quality-by-Design approach to optimize diallyl disulfide loaded solid lipid nanoparticles	Siddhartha V. Talluri, Gowthamarajan K., Satyanarayana Reddy V.V. K., Karthik Y., Wadhvani A. SubbaRao V. Madhunapantula ,	Artif. Cells Nanomed. Biotechnol. 45(3): 474-488, 2017	International	Indexed	4.462

		Saikiran S. S. Pindiprolu.				
11	Exploring the anti-breast cancer potential of flavonoid analogs.	Vanrajsinh T., Mayur P., Sumit D., Manjula S.N. SubbaRao V. Madhunapantula. , Rahul, P, Harun M.Patel., Malleshappa N. Noolvi.	RSC Advances. 6, 79166-79179, 2016	International	Indexed	3.049
12	Evaluation of inflammatory markers interleukin-6 (IL-6) and matrix metalloproteinase-9 (MMP-9) in Asthma	Srilata P. Naik., Mahesh A. Padukudri, Jayaraj, B.S., SubbaRao V. Madhunapantula. , Sare R. Jahromi and Manish K. Yadav.	Journal of Asthma, 54(6), 584- 593, 2017	International	Indexed	2.081
13	Comparative assessment of vitamin-B12, Folic acid and homocysteine levels in relation to p53 expression in megaloblastic anemia	Yadav, M.K. Nandini, N.M. and SubbaRao V. Madhunapantula.	PLoS ONE. October 2016	International	Indexed	2.776
14	MicroRNA Regulation of Acute Lung Injury and Acute Respiratory Distress Syndrome.	Rajasekaran S, Pattarayan D, Rajaguru P, Sudhakar Gandhi PS, Thimmulappa RK	J Cell Physiol. 2016 Oct;231(10):20 97-106	International	Indexed	4.522
15	Naturally occurring benzoic acid derivatives retard cancer cell growth by inhibiting histone deacetylases (HDACs)	Preethi G. Anantharaju., Deepa R. Bandi., Mahesh A. Padukdru., Chandikumar M. Chitturi., Manjunath G. Vimalambike., and SubbaRao V. Madhunapantula.	Cancer Biology and Therapy, 18(7), 492- 504, 2017	International	Indexed	2.879
16	Induction of colon and cervical cancer cells death by cinnamic acid derivatives is mediated through the inhibition of histone deacetylase	Preethi G. Anantharaju., Deepa R. Bandi., Mahesh A. Padukdru., Chandikumar M.	PLoS ONE – 12(11), 2017	International	Indexed	2.776

	(HDAC) activity.	Chitturi., Manjunath G. Vimalambike., and SubbaRao V. Madhunapantula.				
17	Linoleic acid metabolite leads to steroid resistant asthma features partially through NF- κ B.	Lipsa Panda., Atish Gheware., Rakhshinda Rehman., Manish Yadav, Jayaraj B.S., SubbaRao V. Madhunapantula, Mahesh A. Padukudru, Anurag Agrawal, Balaram Ghosh.	Scientific Reports 7(1):9565. doi: 10.1038/s41598-017-09869-9. 2017	International	Indexed	4.525
18	Unmethylated Promoter DNA Correlates with p53 Expression and Apoptotic Levels Only in Vitamin B9 and B12 Deficient Megaloblastic Anemia But not in Non-Megaloblastic Anemia Controls	Yadav, M.K. Nandini, N.M., Vimalraj, S., and SubbaRao V. Madhunapantula.	International Journal of Biological Macromolecules. 109, 76-84, 2017	International	Indexed	4.784
19	Tricaproin isolated from <i>Simarouba glauca</i> DC inhibit human colorectal carcinoma cell lines growth by targeting class-1 histone deacetylases.	Jose, A., Chaitanya, M. V. N. L., Kannan, E., SubbaRao V. Madhunapantula.	Frontiers in Pharmacology. 9: 127, Mar 12, 2018	International	Indexed	3.831
20	Diagnostic Potential of Extracellular MicroRNA in Respiratory Diseases.	Pattarayan D, Thimmulappa RK, Ravikumar V, Rajasekaran S	Clin Rev Allergy Immunol. 2018 Jun;54(3):480-492	International	Indexed	7.328
21	Treatment with naringenin elevates the activity of transcription factor Nrf2 to protect pancreatic β -cells from Streptozotocin-induced diabetes <i>in vitro</i> and <i>in vivo</i> .	Rashmi R., Sireesh D., Magesh B.S., Ramkumar M.K., Suryanarayanan S., and SubbaRao V. Madhunapantula.	Frontiers in Pharmacology 9: 1562, 2019	International	Indexed	3.831
22	Increased accumulation and retention of rhFVIIa in knee joints of hemophilia A mice	Magisetty, J., Pendurthi, U.R., SubbaRao V. Madhunapantula,	Journal of Thrombosis and Hemostasis.	International	Indexed	4.733

	compared to wild-type mice.	Grandoni, J., Rao, L.V.M.	119(8), 1283-1294, 2019			
23	Tannic acid protects against experimental acute lung injury through downregulation of TLR4 and MAPK.	Sivanantham A, Pattarayan D, Bethunaickan R, Kar A, Mahapatra SK, Thimmulappa RK , Palanichamy R, Rajasekaran S	J Cell Physiol. 2019 May;234(5):6463-6476.	International	Indexed	4.522

Text Books Authored or/and chapters contributed by faculty

Sl. No.	Title of the Book/Chapter	Name of the Author / Editor	Position	Details of Publisher
1.	<i>Edited "Medicinal Plants Research Compendium – Volume-III"</i>	<i>Dr. M.V.S.S.T.SubbaRao</i>	<i>Associate Professor</i>	<i>JSS University, Mysuru, Karnataka</i>
2.	<i>Guest Editor "Latest different concepts of gynaecology"</i>	<i>Dr. M.V.S.S.T.SubbaRao</i>	<i>Associate Professor</i>	A Scientific Journal of Clinical Medicine, Published by Science Publishing Group. Volume 4, Issue 4-1, June 30 th 2015.
3	Drug Discovery from Herbs: Approaches and Applications (ISBN: 978-93-5130-8904)	Editors: Suresh Bhojraj, Tijen Talas-Ogras, Shamiem Adam and SubbaRao V. Madhunapantula	<i>Professor</i>	Center for Science and Technology of the Non-Aligned and Other Developing Countries (NAM S&T), New Delhi, India
4	Chapter: Animal (Mouse) models of melanoma. Name of the Book: Animal Models in Translational Drug Discovery	Madhunapantula, S.V. , Patel, T.N., Annageldiyev, C., and Sharma, A. Editors: Ramzi, M. Mohammad, and Asfer, S. Azmi,	<i>Professor</i>	Publisher, Elsevier S&T Books, Academic Press (AP), Volume 1, P.No. 401-418, 2019. ISBN 978-0-12-814704-7
5	Chapter: Animal (Mouse) Models of Acute Myeloid Leukemia. Name of the Book: Animal Models in Translational Drug Discovery	Patel, T.N., Madhunapantula, S.V. , Annageldiyev, C., Claxton, D.C., and Sharma, A. Editors: Ramzi, M. Mohammad, and Asfer, S. Azmi,	<i>Professor</i>	Elsevier S&T Books, Academic Press (AP), Volume 1, P.No. 429-438, 2019. ISBN 978-0-12-814704-7

Facilities Available

- a. Funded by JSS University- 1 Crore rupees
 - PCR machine
 - Gel documentation
 - CO₂ incubator
 - Inverted microscope
 - Shaker incubator
 - Ice flaker
 - Millipore water unit
 - -80° deep freezer
 - -20° deep freezer
 - Western blot unit
 - Gel Dryer
 - UV Transilluminator
 - Micropipettes-Single channel & multichannel

- b. Funded by ICMR – 4 lakhs (Non-recurring)
 - Fully automated ELISA reader and Washer

- c. Funded by
VGST – 1st Phase – 16 Lakhs (Non-recurring), 4 Lakhs (recurring)
 - Biosafety cabinet
 - High speed refrigerated centrifuge
 - Spectrophotometer
 - Laboratory refrigerator
VGST- 2nd Phase – 18 Lakhs (Non-recurring)
 - Gentle tissue dissociator
 - Magnetic Assorted Cell Sorter
 - Autoclave
 - Medium speed Centrifuge
 - Accessories for inverted microscope (Digital camera attachment & 60 X lens)
 - Filtration assembly with pump

- d. DST-FIST (to Dept of Biochemistry) – 88 lakhs in 50:50 mode (Non-recurring)
 - Real time PCR
 - Fluorescent microscope
 - Multimode plate reader
 - Computer laboratory
 - HPLC

- e. Funded by DBT-BioCARE 10 Lakhs (Non-recurring)
 - Plate reader (UV-Visible)
 - -80°C Freezer

- Multichannel pipettes
- f. Funded by DBT – 12 Lakhs (Non-recurring)
 - Probe sonicator
 - Biosafety cabinet (ClassIIA2)
 - HPLC Columns (C18)
- g. Funded by DST-CSRI – 15.0 Lakhs (Non-recurring)
 - CO2 incubator
 - Speed Vac concentrator
 - Nanodrop
- h. Funded by VGST-Seed Money for Young Researcher – 5.4 Lakhs (Non-recurring)
 - Nanodrop