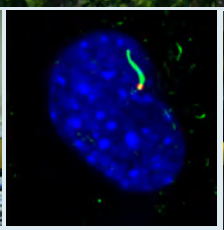
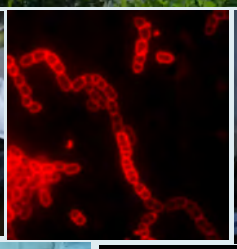
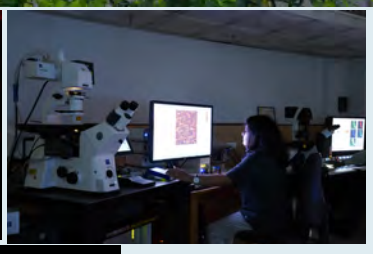
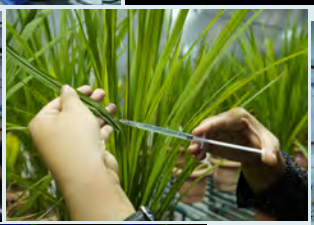
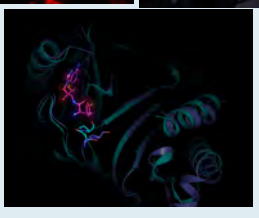
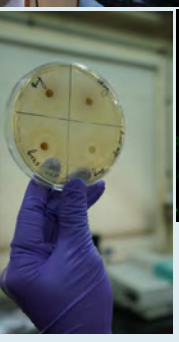
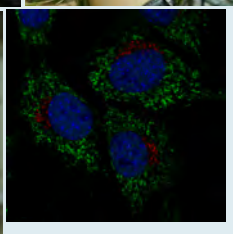
CCMB AT A GLANCE
2018





CSIR-CCMB

Information compiled by
Somdatta Karak
Science Communications and Public Outreach Officer,
CCMB

CCMB

A glimpse at the news and updates
from CCMB in 2018,
based on Director's presentations
at Research Council Meetings

Preface

The report gives an overview of various activities at CCMB in the year 2018. These include research as well as a variety of training and outreach programs. The document also gives a glimpse of our core strengths and capabilities.

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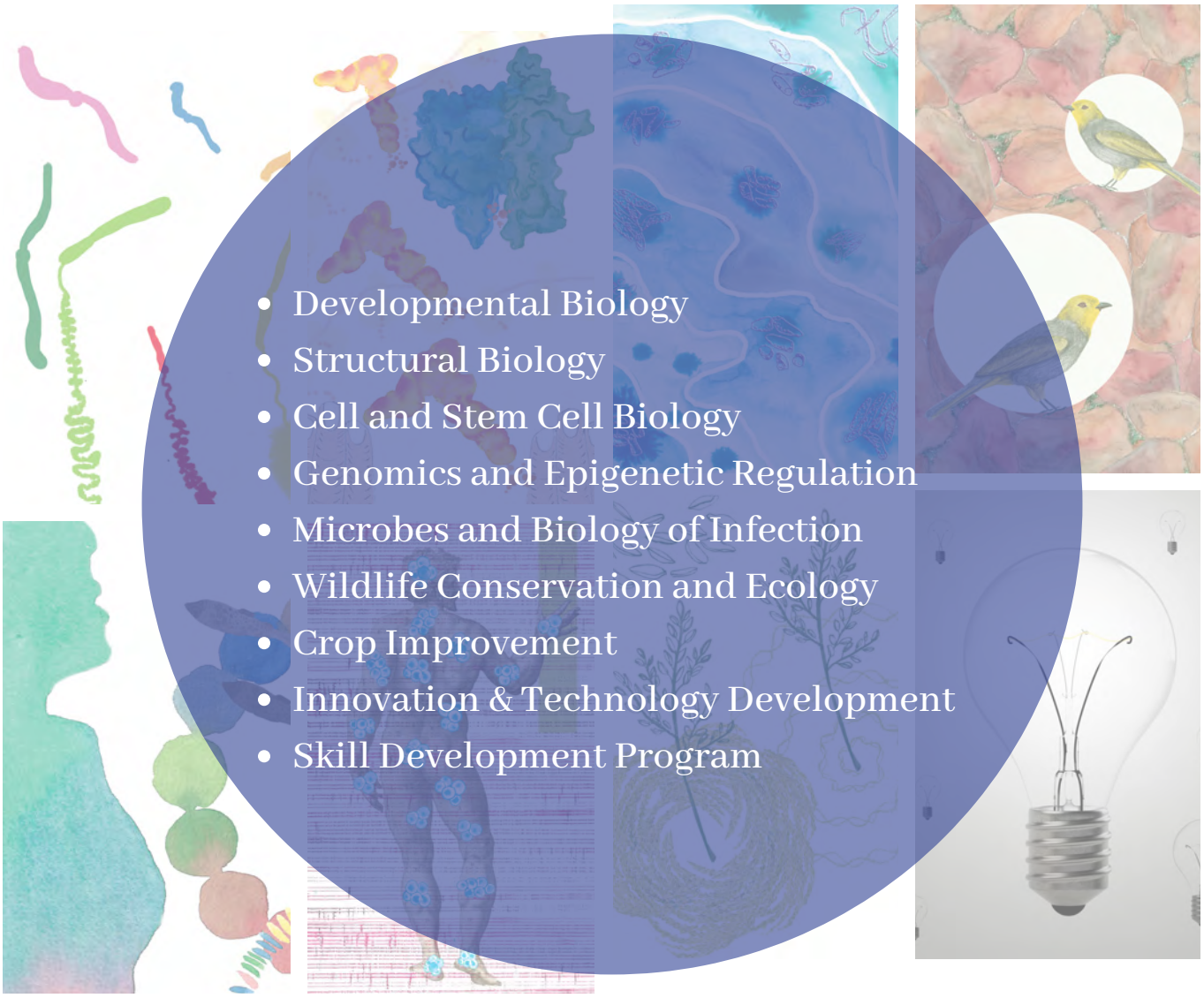
The Centre for Cellular and Molecular Biology (CCMB) is one of the constituent national laboratories of the Council of Scientific and Industrial Research (CSIR), New Delhi, India.

Charter

- To conduct research in frontier and multi-disciplinary areas of modern biology, and to seek potential applications of this work
- To carry out exploratory work in areas of biology with a view to aid the development of biochemical and biological technology in the country on a sound basis
- To train people in the advanced areas of biology to serve the needs of development in these areas, with special provision for short-term training of staff from other institutions in techniques for which adequate facilities may not exist elsewhere
- To provide centralized facilities in the country for new and modern techniques in the inter-disciplinary areas of biology, and to ensure that these facilities are so organized, maintained and administered that they can be put to maximal use by research workers from other laboratories and institutions in the country
- To interact adequately with other institutions doing basic or applied work in areas related to activities of the Centre
- To collect, collate and disseminate information relevant to biological research

Active Areas of Interest

The research and development activities at CCMB are grouped under the following key areas:



- Developmental Biology
- Structural Biology
- Cell and Stem Cell Biology
- Genomics and Epigenetic Regulation
- Microbes and Biology of Infection
- Wildlife Conservation and Ecology
- Crop Improvement
- Innovation & Technology Development
- Skill Development Program

Major Research Projects

The research projects at CCMB focus on understanding the cellular processes in several model organisms using multi-disciplinary approaches, as well as seek potential applications to solve societal challenges.

CSIR-Funded Research Projects

CSIR funds research under different schemes based on the scope of development of new areas of research, multiple institutes partnering to solve a huge challenge, readiness for translation or reaching out to society. Following are the different projects at CCMB that are funded under various schemes of CSIR.

MISSION MODE PROJECTS

- CSIR Sickle Cell Anemia Mission, Rs. 1415.90 lakh (2017-20)

G R Chandak and Puran Singh Sijwali

- Nano-Biosensors and Microfluidics for Healthcare, Rs.474.52 lakh (2018-20)

Vegesna Radha, Amit Asthana and C B Tripura

FAST TRACK TRANSLATIONAL PROJECTS

- Paper based affordable microfluidic kit for early pregnancy detection in cattle and buffaloes, Rs.53.22 lakh (2016-18)

G Umapathy and Amit Asthana

- Development of simple and affordable diagnostic protocols and diagnostic kit for genetic diagnosis of Musculopathies and Haemoglobinopathies , Rs.141 lakh (2016-18)

G R Chandak

- Development of male infertility diagnostic kits (DeMID), Rs.90 lakh (2018-20)

K Thangaraj

- Upscaling of high yielding/elite Samba Mahsuri mutant line SM93 for product translation, Rs.145 lakh (2018-20)

Hitendra K Patel

- Development of DNA-based identification system of plant bioresources for conservation, Rs.147 lakh (2018-20)

Sunil K Verma and Karthikeyan Vasudevan

NICHE CREATION PROJECTS

- Genome Regulatory Elements and evolution of complexity, Rs.70 lakh (2018-20)

Rakesh K Mishra

- Mechanistics and functional role of a chiral proof reading variant in Animalia, Rs.100 lakh (2018-20)

Rajan Sankaranarayanan

- Genomics and epigenetics in health and disease , Rs.170 lakh (2018-20)

K Thangaraj

- Genome sequencing of halophyte *Salicornia brachiata*, Rs.148 lakh (2018-20)

Hitendra K Patel

FOCUSED BASIC RESEARCH PROJECTS

- Towards product development in rice using mutants that have traits of agronomic importance, Rs 391 lakh (2018-20)

Hitendra K Patel

- Apomixis technologies for increasing agricultural production, Rs.230 lakh (2018-20)

Imran Siddiqi

- Mechanistic insights into bacterial growth and morphogenesis, Rs.55 lakh (2018-20)

Manjula Reddy

CSIR HARIT

- Popularization of Improved Samba Mahsuri, a bacterial blight resistant and diabetic friendly rice to increase farmers' income , Rs.190 lakh (2018-20)

Hitendra K Patel

Grant-in Aid Research Projects

CCMB competes for funding from reputed national and international sources for its research projects. Below are some of the major projects (with funding more than Rs 1 cr) at CCMB that are currently being implemented:

G R Chandak

- Role of epigenetics in the vicious cycle of diabetes and pregnancy (VICYDIP), Rs.391.27 lakh by DBT (2014-18)
- Epigenetic mechanisms linking maternal pre- conceptional micronutrient supplementation with offspring health in India and The Gambia, Rs.382.88 lakh by DBT/MRC (2016-19)

Rajan Sankaranarayanan

- Mechanistic and functional studies on chiral proofreading during translation of the genetic code, Rs.495.912 lakh by DBT, Centre of Excellence (2016-21)

Regalla Kumaraswamy

- Role of non-coding RNAs in cardiovascular diseases, Rs.356.35 lakh by Wellcome DBT India Alliance (2017-22)

Satish Kumar

- Transcriptome analysis in Indian Buffalo and the genetics of innate immunity, Rs.342.67 lakh, DBT (2014-18)

Imran Siddiqi

- Genetic and epigenetic control of plant meiosis, Rs.341.98 lakh by DBT, Centre of Excellence (2017-22)

Jyotsna Dhawan

- MUSTER-Musculoskeletal stem cells targeting, Rs.223.44 lakh by DBT (2017-21)

Sonal Nagarkar Jaiswal

- Deciphering the role of Cop9 signalosome in neural development, Rs. 355.05 lakh by Wellcome DBT India Alliance (2019-24)

Santosh Kumar

- Characterization of molecular events of transmembrane immunoreceptor signalling , Rs.357.30 lakh by Wellcome DBT India Alliance (2019-24)

Karthikeyan Vasudevan

- Improving capacity and strengthening wildlife conservation for sustainable livelihoods in Kashmir Himalaya, Rs 340.95 lakh, by National Mission on Himalayan Studies (2019-2022)

Research Highlights

Over the last one year, CCMB's research has appeared in international peer-reviewed journals including some of the most widely read and revered journals in the field. New faculty members with their specialized skills and a thorough academic experience have joined CCMB.

Publications

137 research papers from CCMB were published in 2018 - many of those in esteemed and widely read international academic journals.

EMBO reports

eLIFE

JCBFM Journal of Cerebral Blood Flow & Metabolism

nanomedicine
Nanotechnology, Biology, and Medicine

Genome Research

nature COMMUNICATIONS

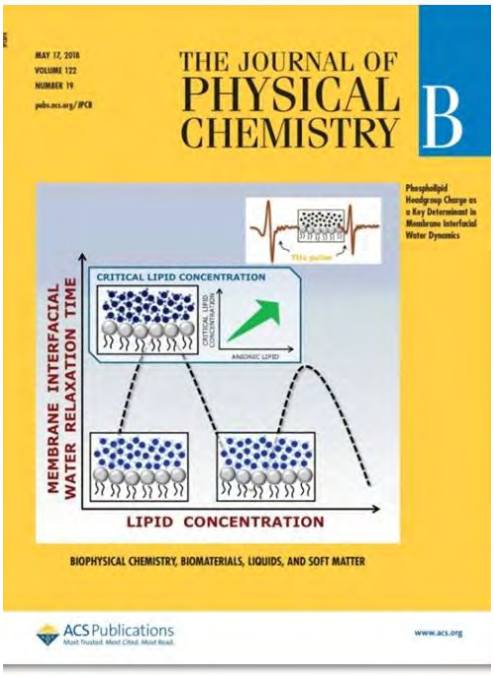
Science Signaling
AAAS

MCP MOLECULAR & CELLULAR PROTEOMICS

Some of the Key Findings

- ## Phospholipid headgroup charge as a key determinant in membrane interfacial water dynamics

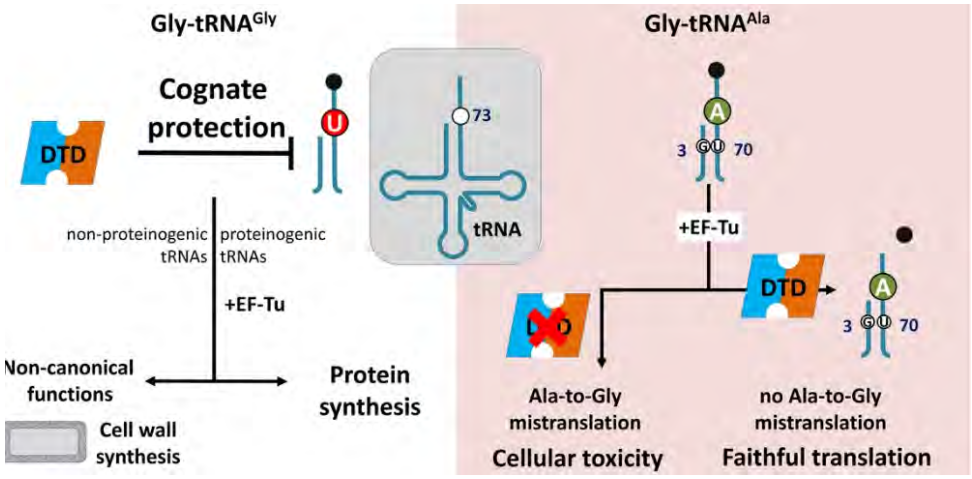
It is one of the first experimental evidences on modulation of membrane interfacial water dynamics by membrane lipid composition in a concentration-dependent manner using Terahertz (THz) spectroscopy (1 THz = 1012 Hz = 1 ps-1). It is a powerful, non-invasive, label-free aproach to explore membrane hydration dynamics. This study is important in the broader context of lipid-protein interactions in a membrane milieu. This has implications for various membrane processes such as membrane fusion and viral entry into cells. (Work from Amitabha Chattopadhyay's group, published in The Journal of Physical Chemistry)



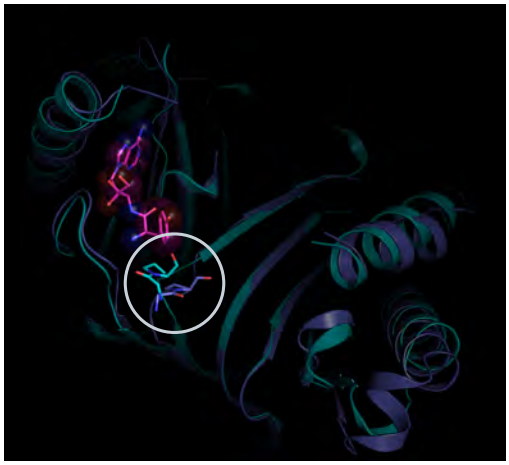
- ## CRISPR mediated deletion of Evolutionary Conserved Region (ECR) from casein locus in mice

The casein locus is 246kb long and is intron rich. This makes it a potential target for replacement with other genes by gene editing. However, the locus contains a 147 base pairs long conserved region (ECR) in all mammals and its function is yet known. A CRISPR mediated deletion of ECR in mice through CRISPR leads to an expression of an unknown protein and occasional discoloration of tongue and incisors. (Unpublished work from Dr Satish Kumar's group)

- Mechanisms to ensure a faithful translation of proteins

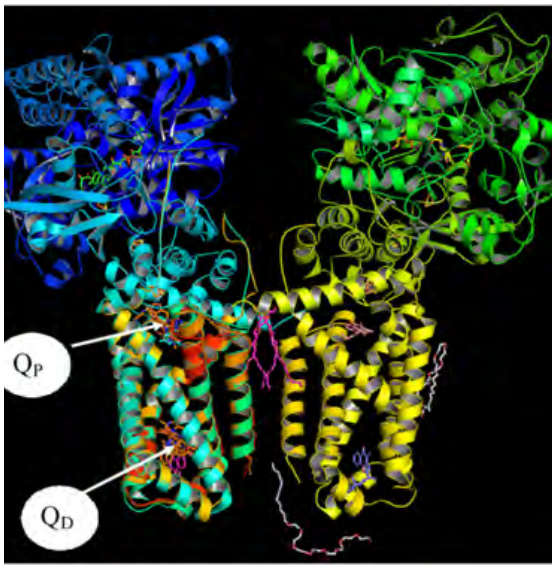


This study investigates how bacterial enzyme DTD cleaves glycine that is wrongly paired with tRNA*Ala* 1000 times more specifically than tRNA*Gly* correctly paired with glycine in bacteria. They report the DTD identifies if the nitrogenous base at position 73 (N73) in tRNAs is a purine or a pyrimidine. tRNA*Gly* houses an uracil (a pyrimidine) at N73 while tRNA*Ala* houses an adenine (a purine). N73, termed as the discriminator base enables DTD to identify if glycine is paired with tRNA*Gly* or mispaired with tRNA*Ala* with 100 times specificity. It also reports that identification of the G3.U70 pairing in the tRNA*Ala* structure enables DTD to cleave glycine paired with tRNA*Ala* with 10 times more specificity than with tRNA*Gly*. (Work from Rajan Sankaranarayan's group, published in eLife)



A variant of DTD (in green in the fig beside) in Animalia, called the ATD (in blue) have uncannily similar structures except the part highlighted in the circle. The difference in the positioning of the amino acids in ATD here creates an active site pocket for holding small L amino acids. Like DTD, ATD can also cleave wrongly paired tRNAs and amino acids . The case in point in this study is amino acid alanine mischarged on tRNA*Thr*. (Work from Rajan Sankaranarayan's group, published in Nature Communications)

- Three-dimensional models of *Mycobacterium tuberculosis* proteins and their docking analyses with unconventional drugs



Sildenafil, tadalafil and vardenafil drugs are known for their usage in treatment of erectile dysfunction. Bioinformatic analyses suggest that these drugs can bind to quinol binding sites of two of Mycobacterium tuberculosis (M tb) proteins – Rv1555 and Rv1554. Quinol binding is known to be important for anaerobic respiration in M tb. Thus, this study opens up the possibility of repurposing of drugs used in erectile dysfunction for its use in tuberculosis treatment. (Work from Guruprasad's group, published in BMC Structural Biology)

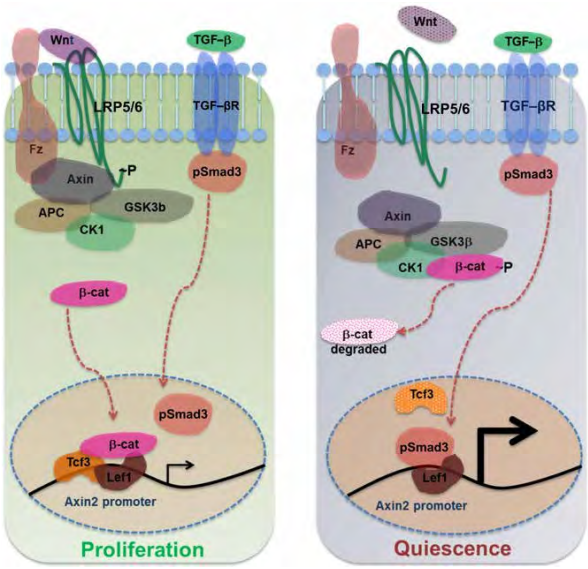
- Impacts of Vitamin B12 deficiency on cognitive function

Nutritional imbalance during early life acts as a physical stress for the developing brain. Vitamin B12 is an important micronutrient that is essential for brain development and functioning. Neuronal metabolic activity has been found to be reduced in vitamin B12 deficient female mice. The deficiency in these mice led to increased anxiety, memory impairment and impaired maternal care. Severe vitamin B12 deficiency in mice also induced depression. (Work from Dr Arvind Kumar's group, published in Nutritional Neuroscience)

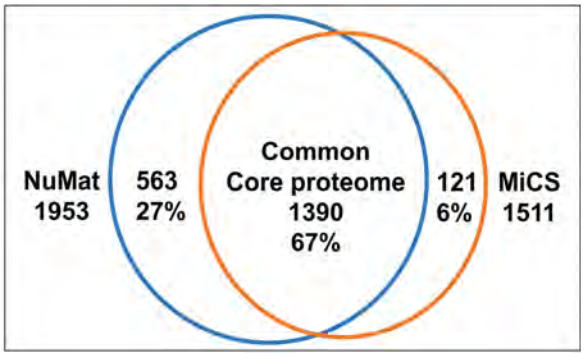
A parellel study shows decrease in the metabolic activity of glutamatergic (excitatory) and GABAergic (inhibitory) neurons. This suggests impairment of neurotransmission in vitamin B12 deficient mice. (Unpublished work from Dr Anant Patel's group)

- Transcription factor Lef1 switches partners from β-catenin to Smad3 during muscle stem cell quiescence

This study showed gene switching molecules change partners to help maintain stock of stem cells in muscles. The study showed transcription factor Lef1 interacting with β-catenin in activated muscle stem cells. However, during the quiescent stages of the muscle stem cells, Lef1 interacts with Smad3. The study also shows that in absence of β-catenin in activated muscle stem cells, Lef1 interacts with Smad3, and induce quiescent stages of muscle stem cells, and help in replenishing the stock of muscle stem cells. (Work from Jyotsna Dhawan's group, published in Science Signaling)



- Comparison of proteomes of nuclear matrix and mitotic chromosomes in Drosophila: Transmission of hallmarks of nuclear organization through mitosis

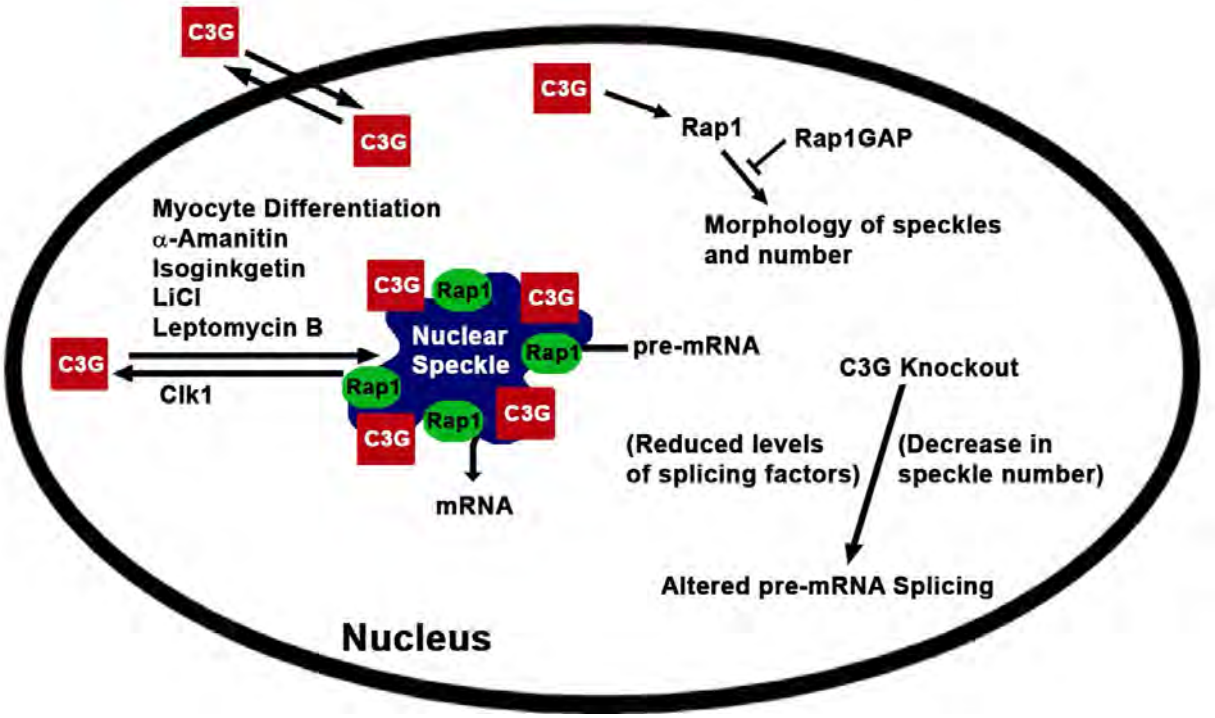


Bioinformatic analyses show that 1953 proteins comprise the nuclear matrix (NuMa) proteome while 1511 proteins make up the mitotic chromosomes (MiCS) proteome. Of these they share 1390 proteins, ie 67% of the NuMa proteome. The study also finds that the features of nuclear architecture, in the structural context of NuMat, are retained in MiCS, and possibly play an important role in maintenance of cell lineage specific transcriptional status during cell division. Thus, they might serve as components of cellular memory. (Work from Rakesh Mishra's group, published in Molecular and Cellular Proteomics)

- ## Impacts of anesthetics on neural function

Anesthetics are routinely used in surgical procedures in human, and to study the brain energy metabolism in different neurological conditions in rodents. The labeling of amino acids from glucose and acetate is reduced under both the anesthetics, isoflurane and urethane, suggesting reduced neuronal and astroglial metabolic activity under anesthesia. Of the two, the impact is greater on neuronal metabolic activity. Among neurons, the reduction in inhibitory function is more than excitatory activity. (Unpublished work from Anant Patel's group)

- ## Identification of RapGEF1 (C3G), as an important regulator of differentiation



This study shows that RapGEF1 is able to control nuclear functions like chromatin modifications and RNA splicing, in addition to control of cytoskeletal reorganization. These findings explain why RapGEF1 is essential for early embryonic development in mammals. These findings also suggest mutations in RapGEF1 may be associated with human developmental disorders. (Work from Vegesna Radha's group, published in Molecular Biology of the Cell)

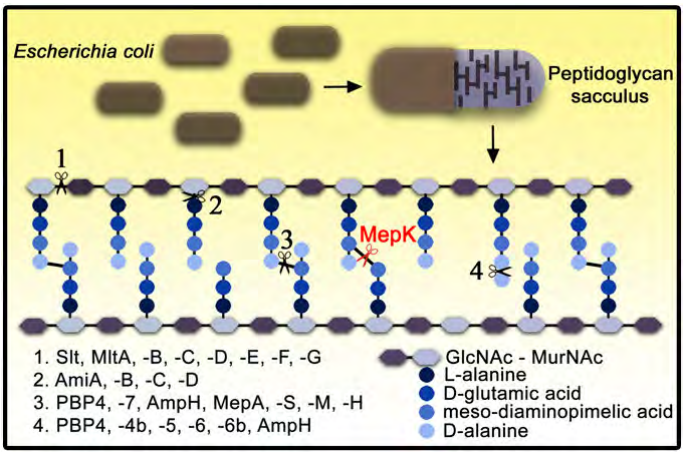
- ## Molecular basis of cholesterol sensitivity of Serotonin1A receptor

Serotonin1A receptor is a member of G-Protein Coupled Receptors (GPCR) family. GPCRs are transmembrane proteins that help transmit extracellular information to the inside of the cells. Their functions have been shown to be dependent on membrane cholesterol. There are cholesterol interaction motifs such as the cholesterol recognition/interaction amino acid consensus (CRAC) motif, which offer putative interaction sites on GPCRs to facilitate their cholesterol-sensitive functions. Earlier studies from CCMB have shown presence of conserved CRAC motifs in transmembrane helices II, V and VII of the serotonin1A receptor. Of these motifs, it is the Lys101 residue of the transmembrane helix II that mediates cholesterol sensitivity exhibited by serotonin1A receptor, is the highlight of this study. (Unpublished work from Amitabha Chattopadhyay's group)

- ## Reconstructing the demographic history of the Himalayan and adjoining populations

The prehistoric human settlement in the rugged terrains of the Himalayas is poorly understood. Through genome analyses, this study shows higher similarities of the Himalayan and adjoining populations (HAAPs) with those in East Asia than with the closer neighbours of South Asia. However, now the HAAPs form a distinct genetic cline due to different degrees of admixture with East and South Asians. The study also estimates a recent westward migration into Northeast India and Northern Nepal from the East Asia. (Work from K Thangaraj's group, published in Human Genetics)

- ## Space-maker peptidoglycan hydrolases in bacterial cell division



A bacterial cell is enveloped with two layers - an inner cytosolic membrane and an outer cell wall. The cell wall is primarily made of peptidoglycan (PG) - a single large mesh-like molecule, and completely encompasses the cytosolic membrane. When the bacterial cell divides, it is essential that the PG mesh has to break to allow more material to come in to make the new cell. This requires a class of enzymes called the PG hydrolases. This study identifies a new PG hydrolase enzyme, called the MepK. Identifying the PG hydrolases offers new targets for developing novel antibiotics. (Work from Manjula Reddy's group, later published in Proceedings of National Academy of Sciences of the USA)

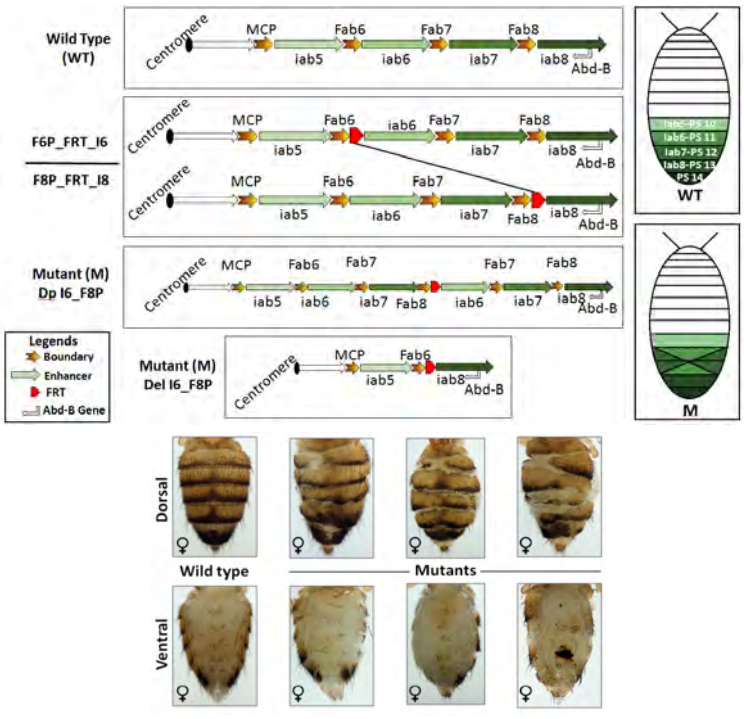
- ## Damage responsive elements in Drosophila regeneration

In response to an injury, cells proliferate. A cell's status of proliferating or otherwise is dictated by its gene expression profile. Thus, the proliferating cells change their gene expression patterns and trigger the regeneration programs encoded in the genes in cases of injuries. This study identifies DNA regions, namely the Damage Responsive Regulatory Elements (DRREs), which enable triggering the regeneration programs. The study classifies the DRREs into 3 kinds - 1. those which become more accessible during regeneration, 2. those that are used during both developmental stages and regeneration, and 3. those that act exclusively in damaged tissues. A complete regeneration process seems to require all 3 kinds. (Work in collaboration with Rakesh Mishra's group, published in Genome Research)

- ## A novel way to regulate calcium binding in a fungal protein through domain interaction

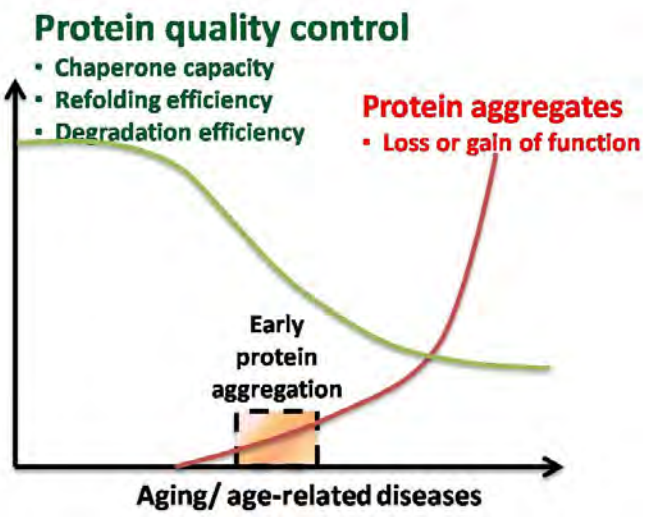
Many protein functions are dependent on binding of calcium ions at their signature calcium binding sites. These binding sites are made of units called amino acids. Their structure and electric charge typically decide their binding partners. So, in all known examples where a protein need not bind calcium, has either these binding sites completely absent or have them with alteration in sequence or form of amino acids. This study presents the first example of a fungal protein called APP, which cannot bind calcium though the signature calcium binding site is present. This is owing to interaction between its different domains and a resultant change the geometry of the protein. (Work from Yogendra Sharma and Dr R Sankaranarayanan's groups, published in Molecular Microbiology)

- ## Towards understanding the basis of body design in *Drosophila melanogaster*



All cells of the body contain the same set of genes, and yet they look and work differently. Expression of a special class of genes called the homeotic genes decide the identity of body structures and segments. In *Drosophila melanogaster*, the order of these genes and their regulatory sequences (on the same chromosome) roughly mirrors the order of the body structures that these genes are expressed. Ongoing work in Rakesh Mishra's group tries to understand the role of regulatory elements of homeotic genes in deciding the dorso-ventral, anterio-posterior and lateral body axes.

- Investigating early stages of protein aggregation



Living cells have robust protein quality control mechanisms to ensure their correct folding, functioning and degrading the proteins that are not required or damaged. With age, these control mechanisms are known to weaken, and cause proteins to misfold, aggregate and possibly cause toxicity in cells. This study investigates the players and mechanisms of early stages of protein aggregation. It shows that by inhibiting proteasomal machinery in cells, which helps in degrading proteins, Respiratory Chain Complex (RCC) proteins are one of the first ones to aggregate. It also shows that specific signatures in the protein sequence, called the Low Complexity Regions partially contribute to this aggregation. Aggregation of the RCC proteins could deregulate formation of functional protein complexes in mitochondria and lead to mitochondrial dysfunction. (Work from Swasti Raychaudhari's group, later published in Journal of Molecular Biology)

- Lyse and reseal erythrocytes - A simple method for *Plasmodium falciparum* transfection

Electroporation is a standard method for inserting DNA (transfection) into malarial parasites. Each transfection requires 50-100 ug DNA, high-end electroporators, and has varying success rates. A simple, inexpensive and high throughput method for transfection of malarial parasites has been developed that works with even 10 ug DNA. In this method, RBCs are lysed under controlled conditions in presence of DNA to allow for transfection. The cells are then resealed with a minor manipulation of the buffer. These resealed RBCs are efficiently infected by malarial parasites, which take up the transfected DNA. These parasites upon selection produce recombinant parasites. This method is termed as Lyse and Reseal erythrocytes (LRE), and it is as efficient as the electroporation method. (unpublished from Puran Singh Sijwali's group)

New Faculty Members

New research faculty members have joined CCMB with prestigious fellowships.

Santosh Kumar

Wellcome DBT India Alliance Intermediate fellow

Academic Experience

- PhD from National Centre for Biological Sciences, Bengaluru, India in Biochemistry
- Postdoctoral fellow at National Institute of Health

Research Interests

- Understanding the principles of immunoreceptor signaling, using in vitro reconstitution, fluorescence imaging, and cellular biochemistry
- Understanding the T cell and NK cell responses in human diseases, using tools of single cell sequencing, genomics, and cellular biochemistry

Sonal Nagarkar Jaiswal

Wellcome DBT India Alliance Intermediate Fellow

Academic Experience

- PhD from PhD from Bayreuth Univ, Germany in Genetics
- Postdoctoral fellow at Baylor College of Medicine, Houston, USA

Research Interests

- Identifying the mechanisms and the molecular players underlying self-renewal and differentiation of neural stem cells using state of the art genome editing tools and a diverse set of cell and molecular biology approaches in Drosophila's developing brain and human neuronal stem cells as model systems

Megha Kumar

DST Inspire Faculty

Academic Experience

- PhD from Clemson University, USA in Developmental Biology

Research Interests

- Elucidating the molecular mechanisms that regulate cell division dynamics to understand the basis of developmental disorders using zebrafish as a model system

Pavithra Chavali

Wellcome DBT India Alliance Intermediate Fellow

Academic Experience

- PhD from National Centre for Cell Sciences, Pune in Cell Biology
- Postdoctoral fellow at Goteborg University, Sweden, and University of Cambridge, UK

Research Interests

- Understanding spatio-temporal regulation of Microcephalyproteins and their implications in disease and development

Technology Development & Activities of Societal Relevance

Exploratory research at CCMB leads to development of innovative technologies. CCMB reaches out to public from our end to educate them of the technologies as well as opens up its leads for industries to follow up.

Patents

In 2018, 3 patents have been granted to CCMB, and 5 other applications are under review.

PATENTS GRANTED TO CCMB IN 2018

In India

- Novel porphyrin derivatives for photodynamic therapy (PDT)

by Danoboyina Ramaiah, Suneesh C Karunakaran, Ch Mohan Rao, K Sridhara Rao, with NIIST

In USA

- Recombinant protein-based method for the delivery of silencer RNA to target the brain

by Gopal Vijaya, Ghulam H. Dar

- Biomarkers useful for detection of types, grades and stages of human breast cancer

by Lekha Dinesh Kumar, Vinod Kumar Verma, Rekha A. Nair, Jem Prabhakar, Jayasree Kattoor

PATENTS APPLICATIONS FILED BY CCMB IN 2018

In China, UK, USA

- Protein nanostructures for the delivery of therapeutic agents to the anterior segment of eye

by Saad Mohammad Ahsan, Ch Mohan Rao

In India

- Method for rapid manufacturing of SERS substrates and SERS substrates thereof

by Amit Asthana, Ch Mohan Rao, SK Srivastava, Gopi Suresh Oggu

- Novel DNA repair protein and biomarker for melanoma

by Avinash Srivastava, Rakesh Mishra

CSIR-HARIT

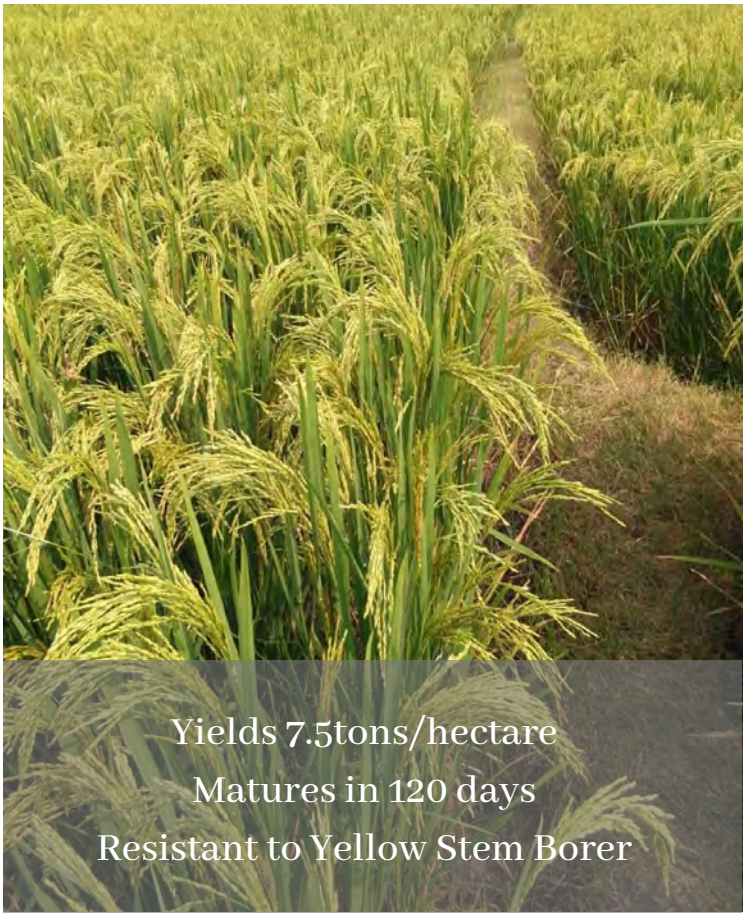
CCMB, with Indian Institute of Rice Research (IIRR), has developed a blight-resistant rice variety with a low glycemic index of 0.6 called the Improved Samba Mahsuri (ISM). Its traits make it a good choice for paddy cultivators as well as diabetic consumers. It has been successfully grown in 8 states of India covering over 3 lac hectares. The current trait value - the amount farmers have earned more by cultivating ISM - is estimated to be Rs 554 cr so far.

CCMB scientists regularly conduct seed distribution sessions with the farmers in many parts of the country.

ISM seed distribution to farmers at CSIR-CIMAP, Lucknow on May 31st, 2018, at Mahuadih and Pathardeva villages, Deoria District, UP on June 2, 2018

Next steps in CSIR-HARIT

CCMB is now developing a high yielding rice variety, SM93. It matures early with fine grain and cooking quality, resists Yellow Stem Borer, a rice pest found in areas of continuous flooding and damages the stem of the plant. It has already passed two years of national field trials under All India Coordinated Rice Improvement Programme.



SM93 in field trials in Telangana

Innovation Hub (iHUB)

CCMB's Innovation Hub supports early stage entrepreneurs in life sciences through its startup incubator. It houses Atal Incubation Centre (AIC-CCMB) for life sciences under Atal Innovation Mission and Common Research and Technology Development Hub under Department of Scientific and Industrial Research (DSIR).

Life Science Startups incubated at iHUB

The early stage startups housed at iHUB are provided with space and high end research equipments at a very reasonable cost.

Below are the 17 early stage life science startups that have been at iHUB in 2018.

- Tardigrade Pvt Ltd
- Kommareddi BioPharma Pvt Ltd
- Magellan Life Sciences *
- Oncosimis Biotech Pvt Ltd
- Theranosis Life Sciences Pvt Ltd
- Helixworks Technologies Pvt Ltd *
- Virupaksha Life Sciences
- Bioartis Life Sciences Pvt Ltd
- RR Animal Health Care Ltd
- Srikara Biologicals Pvt Ltd
- Althion Tech Innovations Pvt Ltd
- Avra Life Sciences
- BhaPra BioSolutions Pvt Ltd
- BionLine Diagnostics (OPC) Pvt Ltd
- Consytel Life Sciences Pvt Ltd

* graduated from AIC-CCMB

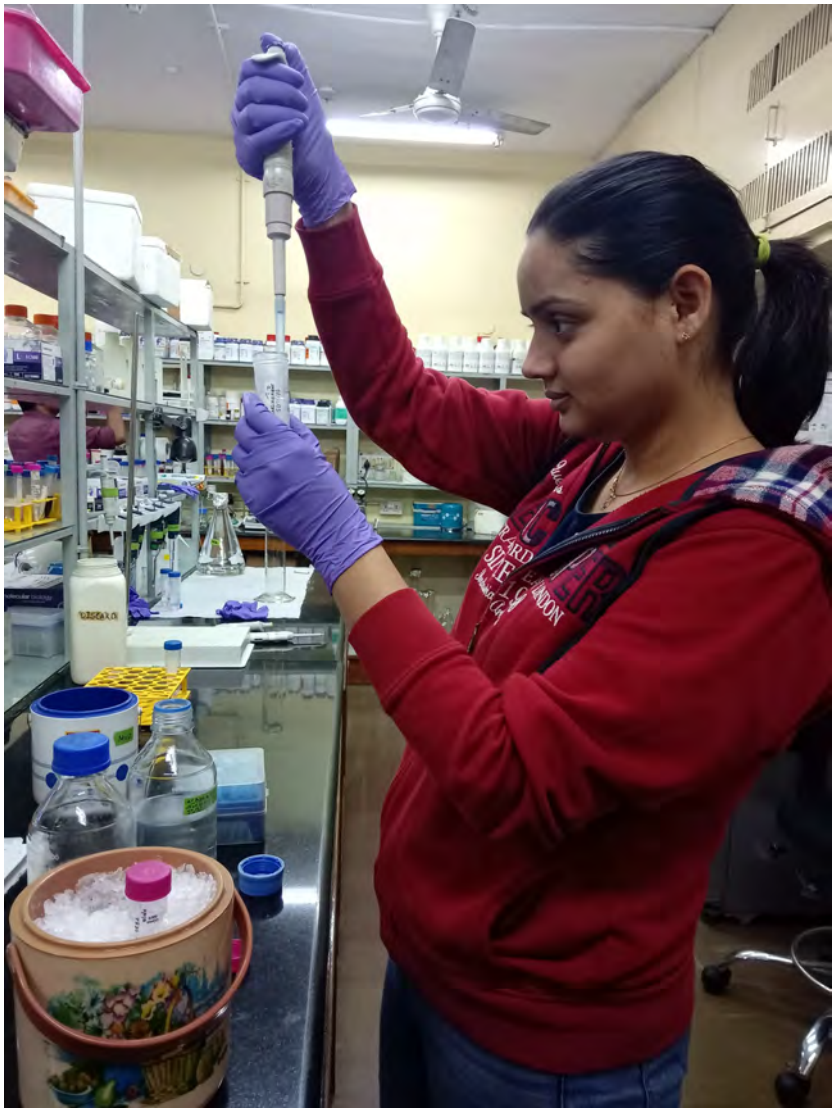
Training Programs

CCMB runs one of the most successful and well-established PhD programs in life sciences in the country. It also offers short term research training programs for post-graduate students who are interested in pursuing research in their careers.
In addition, it has initiated several skill development courses under Government of India's Skilling program.

PhD Program

CCMB trains young researchers through its rigorous PhD program - well-known for its success in building successful leaders in academia, research and life science industry. In the academic year 2018-19, 19 students from all across India joined the PhD program at CCMB. During this year, 7 students have been awarded their PhD degrees.

As on Jan 2019, 149 students are enrolled in the PhD program at CCMB.



Short-term Training Programs

CCMB invites and trains students of science and medicine through many of its programs. These programs allow students to be trained in research projects by being a part of the projects or learn relevant skills.

Various short-term training programs at CCMB are

- Dissertation Research Training Program

In 2018-19, 115 students pursuing M.Sc / M.Pharm/ M.Tech/ B.Pharm/ B.Tech in life sciences worked on their dissertations at CCMB. This research training helps them towards partial fulfillment of their educational degrees.

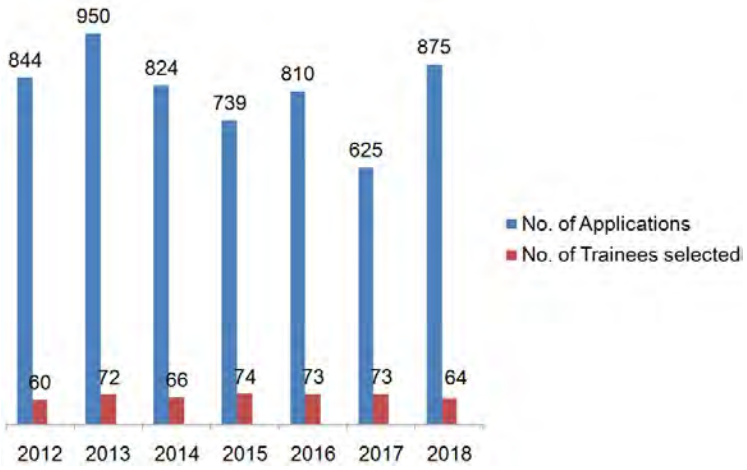
Dissertation research trainees at CCMB presenting their work in form of a poster after their training

- ## Project-based Training Program

CCMB runs a project-based training program for those who are not students anymore. In 2018-19, 44 participants attended the program at CCMB.

- ## Summer Training Program

Each year roughly 800 students from all over India apply for the summer training program at CCMB. Of the applicants, lesser than 10% are selected. In 2018, 64 students joined CCMB as summer trainees.



- Skill Development Programs

CCMB conducts multiple courses under its skill development program that run for one to a few weeks. These courses are aimed towards training personnel in and for academia and industry. In 2018-19, 189 participants attended the following courses.

- Analysis of Microbial Diversity
- Engineering Mammalian Cells with CRISPR Tools
- Wildlife Forensics Workshop
- Nanomaterials and Applications in Biology
- Molecular Cloning and Protein Expression
- Analysis of Next Generation Sequencing Data
- Basics in Cell Biology and Cell based assays
- LC-MS based Proteomics
- Basics of Stem Cells

Left: Participants of the Basics in Cell Biology and Cell-Based Assays course in Sept 2018, Right: Participants of Bioinformatics - NGS data analysis course in Aug 2018

- ## Observership Program for MBBS students

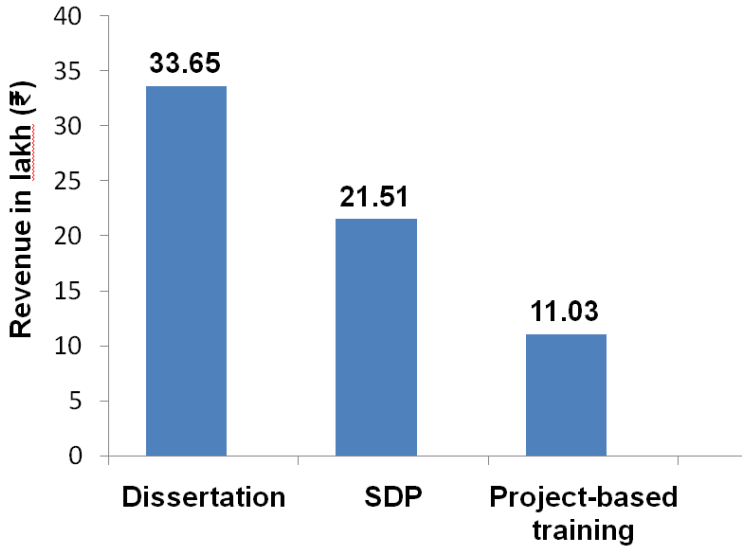
MBBS students from all over the country are invited to attend an observership program at CCMB for two weeks. The program aims to bridge the gap between life science research and medical practitioners, and sensitize the latter to the importance of research in medical practice. In 2018, 21 students attended the program. They came from King George's Medical University, Lucknow Government Medical College, Calicut, Maulana Azad Medical College Govt. Medical College, Nizamabad Osmania medical college The Apollo Medical College, Mahatma Gandhi Medical College and Research Institute, Sri Balaji Vidyapeeth, Kamineni Institute of Medical Sciences, Narketpally, AIIMS, Rishikesh, AIIMS, New Delhi, AIIMS, Raipur Kakatiya Medical College Government Medical College Thiruvananthapuram, Osmania Medical College, University of Delhi.

MBBS students in discussion with CCMB, Director Rakesh Mishra (in the centre)

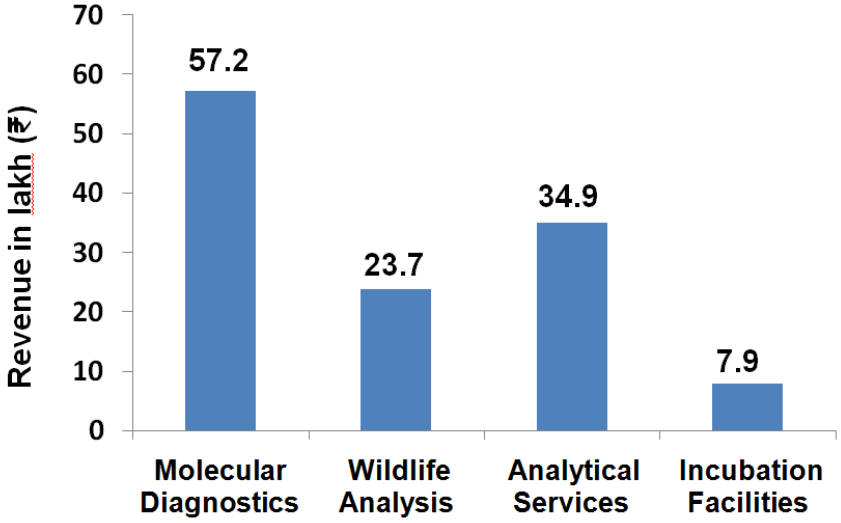
Revenue Generation

CCMB earned a total revenue of Rs 189.89 lakh through its various training programs and services.

- From Different Training Programs



- From Different Services



The revenue generated at CCMB through its training programs and services highlights their quality and their demand among people.

Awards & Honors

Our researchers and students have received multiple prestigious awards and fellowships celebrating their scientific achievements.

Faculty Members

K Thangaraj

- Dr. Joseph Thomas Memorial Lecture Award, IIT Madras, Chennai
- Member of Int'l Centre for Genomic Medicine in Neuromuscular Diseases, funded by MRC, UK (Other partners: UK, Brazil, South Africa, Zambia & Turkey)
- Prof. C. V. Pichappa Endowment Lecture Award, Department of Biochemistry, University of Madras, Chennai
- Prof. G. Jayaraman Endowment Lecture Award, Department of Genetics, University of Madras, Chennai
- Associate Editor for Tropical Medicine and International Health, Wiley Press
- Sun Pharma Research Award for the year 2018 in the field of 'Medical Sciences - Basic Research"
- Elected Fellow, National Academy Sciences – India, Allahabad
- Dr. Palle Rama Rao Award, by Government of Andhra Pradesh, at Andhra Pradesh Science Congress, Kadapa

G R Chandak

- Fellow at National Academy of Medical Sciences, New Delhi, India
- Prof. I C Verma Oration from Indian Society of Human Genetics
- Member, Advisory Committee, Mission program on Genomics and Computational Biology, DBT, New Delhi
- Member, Technical Advisory Committee, Indian Statistical Institute
- Dr Prabha Mehra Foundation Day Oration on the 88th Foundation Day of Dept of Obs & Gyn, KGMU, Lucknow
- Member, Technical Review Committee, SERB, DST
- Expert Member on the 'Chronic Disease Biology' TEC, DBT
- Member, SAC, National Institute of Biomedical Genomics, Kalyani
- Delivered SS Agarwal Memorial Lecture, SGPGIMS, Lucknow
- Member, Expert Committee for evaluation and review of Multi-Centric Network project on "Indian Human Microbiome Initiative"
- Member, PAC on Health Sciences, SERB

Yogendra Sharma

- Invited to be Adjunct Professor, IISER, Berhampur
- Elected Fellow, Indian National Science Academy
- Awarded J C Bose Fellowship

Amitabha Chattopadhyay

- Awarded SERB Distinguished Fellowship
- Elected as Fellow of TWAS
- Invited to be Distinguished Visiting Professor, IIT, Bombay
- Invited to be Adjunct Professor, IISER, Kolkata
- Invited to be a Lead Speaker at the Faraday Discussion on Photo-induced Processes in Nucleic Acids and Proteins, Kerala
- Elected as Member, Board of Studies of Biological Sciences, Academy of Scientific and Innovative Research
- Awarded 6th G.K. Manna Memorial Lecture Award

Rajan Sankaranarayanan

- Delivered Dr. M. R. Das Memorial lecture by INSA, New Delhi.
- Sun Pharma Research Award in Medical Sciences under Basic Sciences Category
- GD Birla Award for Scientific Research for the year 2017
- Delivered Sir J C Bose Memorial Lecture at NIPGR, New Delhi
- Delivered Prof A K Lala Memorial Lecture at IIT, Bombay

Manjula Reddy

- Member, Editorial Board, Journal of Bacteriology

Jyotsna Dhawan

- Invited speaker, FASEB Summer Research Conference on Muscle Satellite and Stem Cells, Keystone USA
- Chair, Raman Research Institute Trust
- President, Indian Society of Developmental Biology

Anant Bahadur Patel

- EK Zavoisky Fellowship from International Society for Magnetic Resonance in Medicine (ISMRM) to attend the joint Annual Meeting of ISMRM-ESMRMB, Paris, June 2018
- Two oral presentations, and posters in the joint Annual Meeting of ISMRM-ESMRMB, Paris, June 2018

Students & Postdocs

D V S Sudhakar

- Travel fellowship from European Society of Human Genetics (ESHG)for attending ESHG-2017 held at Copenhagen, Denmark
- Developing Country Travel Award to attend the American Society of Human Genetics Annual Meeting in San Diego, California, USA

Sunil Tripathi

- Travel fellowship from World Leish Organization to attend the 6th World Congress on Leishmaniasis held at Toledo, Spain

Nipa Basak

- Newton-Bhabha PhD Placements Award by the Department of Science & Technology and British Council to visit King's College, London, UK
- Best poster award at the 4th International Congress on Epigenetics & Chromatin" held during September 03-05, 2018 in London, UK
- Full bursary for "WGC Advanced Course: Next Generation Sequencing Bioinformatics" during October 07-13, 2018 at Wellcome Genome Campus, Hinxton, UK

Sneha Paturi

- Best Poster award 24th National Magnetic Resonance Society Meeting held at IISER, Mohali

Satya Brata Routh

- Indian National Science Academy - INSA MEDAL for Young Scientists 2018

Sreetama Pal

- Best Poster Award at the international conference "Recent Advances in Molecular Spectroscopy : Fundamentals & Applications in Materials and Biology" University of Hyderabad, India

Satyajeet Salunke

- Best Poster presentation at the XLII All India Cell Biology Conference of Indian Society of Cell Biology, held at BITS Pilani, K.K.Birla Goa campus, India in Dec, 2018

Mazeed Mohd.

- Best Poster Award at the 24th Congress and General Assembly of the International Union of Crystallography, IUCr-2017, held at Hyderabad International Convention Centre, India

Komal Ishwar Pawar

- Best Poster Award at the 11th AARS IUBMB Focused Meeting on Aminoacyl tRNA Synthetases, held at Florida, USA

Santosh Kumar Kuncha

- Best Oral Presentation at 9th RNA group meeting held at BHU, Varanasi, India
- DST-DFG Award for participation in the 68th Meeting of Nobel Laureates, Lindau, Germany

Suraj S Nongmaithem

- Award for best Short Talk from Indian Society of Human Genetics
- Dr S S Agarwal Young Scientist Award from Society of Indian Association of Medical Genetics

Meraj Ahmad

- Award for best Short Talk from Indian Society of Human Genetics

Lovejeet Kaur

- Abstract accepted for oral presentation at the 5th International Vitamin Conference 2018, Sydney , Australia

Shanti Swaroop Srivastava

- Ratna Phadke Award of Indian Biophysical Society (IBS), Annual Meeting at IISER - Mohali, India
- Selected as Fulbright-Nehru Fellow to work in USA (Aug 2018)

Radhika Khandelwal

- Carl Storm International Diversity (CSID) fellowship from Gordon Research Conference (GRC) to attend GRC-Calcium Signaling Conference at Renaissance Tuscany Il Ciocco Lucca (Barga), Italy
- DST-DAAD visitor (Nov 2018) to the University of Oldenburg, Germany

Pratibha Bhalla

- Travel grant for "15th Asian Conference on Transcription" held at Penang, Malaysia

Sadiya Parveen

- Young Scientist Award for the year 2017 by Telangana Academy of Sciences

Shagufta Khan

- Selection for poster presentation entitled"Transgenerational Epigenetic Inheritance via the Male Germ Line in Drosophila melanogaster"at Epigenetics and Chromatin meeting going to be held at Cold Spring Harbor Laboratory, New York, USA
- Travel award of ICMR, DBT and CSIR to present her work in Epigenetics and Chromatin meeting going to be held at Cold Spring Harbor Laboratory, New York, USA (11th – 15th Sept 2018)

Fathima Athar

- Presentation of poster entitled "Simple Sequence Repeats (SSRs) – Guardians o the Chromatin Galaxy" at the Annual Meeting of International Society for Stem Cell Research (ISSCR) held in Melbourne, Australia

Rahul Sureka

- Presentation of poster entitled "Evolutionary Conservation of Nuclear Matrix Proteins" at EMBO Conference Series on Nuclear Structure and Dynamics held in L'Isle sur la Sorgue, France

Gopal Kushawah

- Presentation of poster entitled "Functional Analysis of Extremely Conserved Non – Coding Sequences in Zebrafish" at the EMBO – EMBL Symposia: The Non – Coding Genome held in EMBL Heidelberg, Germany

Divya Tej Sowpati

- Oral presentation entitled "C-State: An Interactive Epigenome Browser" at the European Conference on Computational Biology (ECCB) held in Prague, Czech Republic

Anand Sharma

- DST-DAAD visitor (Nov 2018) to the University of Oldenburg, Germany

Ajoy Aloysius

- Platform Presentation award at ICCB at Hyderabad, India in Jan 2018 on "Quietly changing partners: Smad3 replaces β-catenin in Tcf/Lef transcriptional activation in quiescent muscle stem cells"
- DST-SERB Travel award to present a poster at the European Wnt Meeting in Heidelberg, Germany (Sept, 2018)

Swetha Sundar

- Travel grant by the organizers to attend Advances in Stem Cell Biology course in April 2018 at Institut Pasteur, Paris, France

Lamuk Zaveri

- ISSCR Travel Award to attend International Society of Stem Cell Research annual meeting in Australia, June 2018, to present a poster "Oct4 and KLf synergize to target cell cycle regulators during reprogramming"

Asmita Pawar

- Awarded EMBO Travel Grant for attending 'EMBO mPEPC1' course at EMBL, Germany (Sept 2018)

Ashish Jha

- Scholarship to attend Advanced Field course in Ecology & Conservation at Xishuangbanna Tropical Botanical Garden Chinese Academy of Sciences, Yunnan Province, China

Debarya Saha

- EMBL Travel award to attend the EMBL Conference on Transcription and Chromatin in Heidelberg, Germany

Parijat Sarkar

- Sun Pharma Science Scholar Awards-2018 in Biomedical Sciences and Pharmaceutical Sciences

Sujoy Deb

- Best Poster Award at the International conference on Genome Architecture and Cell Fate Regulation held at University of India, Hyderabad, India Dec, 2018

A Paramasivam

- Travel award from the American Society of Human Genetics (ASHG) to attend ASHG Conference 2018, San Diego, USA
- Travel award from the European Society of Human Genetics (ESHG) to attend ESHG Conference 2018, Milan, Italy

Chhavi Dawar

- Awarded GYAN scholarship to attend 8th International Nextgen Genomics, Biology, Bioinformatics and Technologies Conference (NGBT 2018), Jaipur India.
- Received "Nature Genetics Best Poster Prize"

S Manu

- National Geographic Early Career Grant (NatGeo Young Explorer Award) US $5000 for covering field expenses

Parna Saha

- Travel award of SERB to present her work at EMBL Conference: Transcription and Chromatin, EMBL Heidelberg, Germany (2018)

Avinash Srivastava

- Travel award of DBT, ICMR to present his work at EMBL Conference: Transcription and Chromatin, EMBL Heidelberg, Germany, 2018

Sohini Deb

- Best Poster Award at the 59th Annual Conference of Association of Microbiologists of India & International symposium on Host-Pathogen Inteeractions at University of Hyderabad, India

Pankaj Kumar

- Received Gordon Research Conferences' GRC Carl Storm International Diversity (CSID) Award and the ICMR travel Grant to attend the Gordon Research Conferences on Drug Resistance held at Bryant University in Smithfield, RI, USA

Events

CCMB organizes multiple talks, workshops, meetings and symposia that benefits not only the researchers at CCMB but the life science community , at large in the city and beyond.

- ## International Congress of Cell Biology 2018

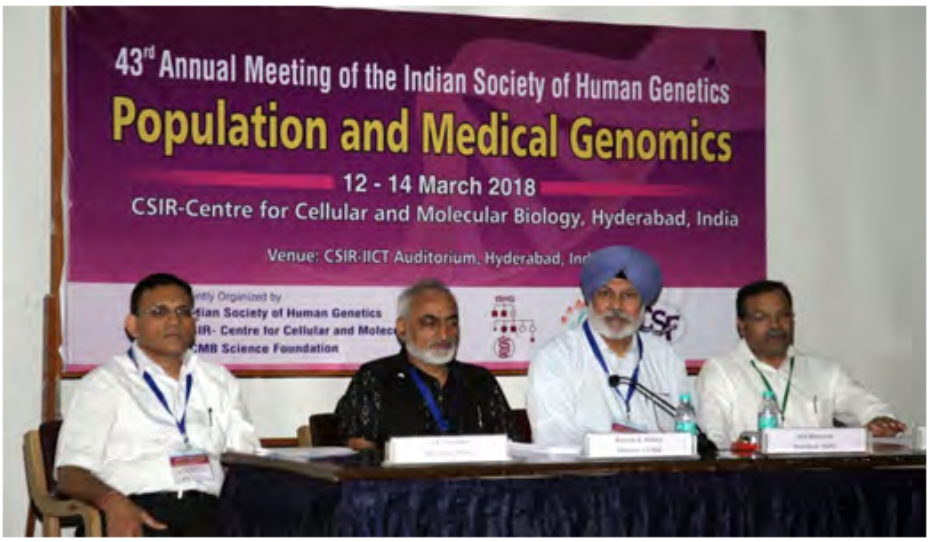
From Jan 27th-31st, 2018, CCMB hosted ICCB 2018 with about 1200 participants. The five day meeting saw 2 curtain raiser talks, 41 main symposia talks, 58 mini symposia talks, 58 oral student talks and 330 posters.

Clockwise: Jennifer Lippincott (in left) and Martin Chalfie (in right) delivering keynote lectures at ICCB 2018. Participants in an engaging poster session during the conference

Besides, the following satellite sessions were also organized:

- Pre-congress session on Cell Biology Education
- Hyderabad Science Lecture on "GFP: Lighting Up Life" by Prof. Martin Chalfie, Nobel Laureate
- Science Outreach Program for School Children (Classes IX to XII students interested in Biology) and Biology teachers
- Scientist-Clinician meet on the merits and need of connecting scientific fraternity with clinical care in the age of molecular medicine
- Biotech Start Up Synergy Session – Inaugurated by Y.S Chowdary, Hon'ble Minister of State for Science and Technology and Earth Sciences, Govt. of India
- Science policy session designed and moderated by Shahid Jameel, Wellcome Trust – DBT India Alliance
- All videos of interviews of speakers, students' views have been uploaded on the official YouTube channel of CCMB.
  https://www.youtube.com/channel/UCura12DSJisJl3GolbJrLyA

• Annual Meeting of Indian Society of Human Genetics



Convening the meeting at CCMB

The 43rd Annual Meeting of Indian Society of Human Genetics was organized and held at CCMB on Mar 12-14, 2018. The meeting was attended by 186 students and researchers with talks delivered by 44 speakers.

• Indian Zebrafish Investigators Meet 2018

Indian Zebrafish Investigators Meet (iZIM 2018) was organized and held at CCMB on Jul 3rd-4th, 2018. It is a biennial meeting held aiming to bring the growing number of zebrafish researchers in India together to form a community. 76 participants including 26 faculty members from various research institutes and universities in the country participated in the meeting.

Attendees of iZIM 2018

• Future of Protein Summit

AIC-CCMB, in partnership with Humane Society of India(HSI) hosted the Future of Protein Summit on Aug 24th, 2018. The meeting was attended byfood based startups, industries, research institutes, academics and politicians to explore and discuss the non-animal sources of protein in food. The meeting was attended by Ms Maneka Gandhi, Union Minister of Women and Child Development who strongly advocated for the cause.

Snapshots from the summit

• National Postdoc Symposium (NPDS 2018)

The postdoc organizers of the NPDS 2018

CCMB co-organized the 2nd National Postdoc Symposium with NCBS and inStem, Bangalore between Oct 3rd-5th, 2018. The symposium was attended by 70 postdocs from research institutes and universities across the country. The symposium, sponsored by IndiaBioScience and Wellcome DBT India Alliance, gave the attendees a fertile networking and mentoring platform, sessions on honing their skills and exploring career options.

• Course on Communicating Conservation Research

LaCONES-CCMB organized a week long residential course on Communicating Conservation Research with Dr Asad Rahmani, former Director of Bombay Natural History Society of India. The course focused on training students on different forms of communicating wildlife research for different audience. The course was attended by students in wildlife research all across the country.

Attendees of the workshop

- ## National Wildlife Genetic Resource Bank dedicated to the Nation

Harsh Vardhan, Union Minister of Science and Technology, Earth Sciences and Environment, Forest and Climate Change inaugurated the National Wildlife Genetic Resource Bank at LaCONES-CCMB on Aug 12th, 2018. It plans to work with zoos in the country to collect genetic samples from their animals and build a repository.

Harsh Vardhan inaugurating the National Wildlife Genetic Resource Bank (left), taking a look at the biological sample stored in the bank (right)

- ## Reintroduction of Indian mouse deer into the wild

An Indian mouse deer bred in Nehru Zoological Park, Hyderabad

LaCONES-CMCB in partnership with Telangana Forest Department, Central Zoo Authority and Nehru Zoological Park, Hyderabad conducted the first ever planned reintroduction of Indian mouse deer (or the spotted chevrotain) into the wild.Following seven years of breeding program, 230 individuals were raised from 6. The first batch of these animals were released into Farahabad range of Amrabad Forest Reserve on Aug 12th, 2018. Dr Harsh Vardhan flagged the first set of animals.

• Founder's Day Celebrations

The 2nd Founder's Day – SciSetu was celebrated on Feb 22nd, 2018 to commemorate birth anniversary of CCMB's Founding Director, PM Bhargava. The day was celebrated with talks from CCMB's PhD students and alumni. Alumni Aravind Penmatsa, now at MBU, IISc, Bengaluru and Rachana Tripathi, founder of RAS Life Sciences were invited to share their career stories.

Left: Aravind Penmatsa with Rakesh Mishra, Director, CCMB, Right: Rachana Tripathi, with Ghanshyam Swarup, scientist, CCMB

Arun Grover delivering his public lecture

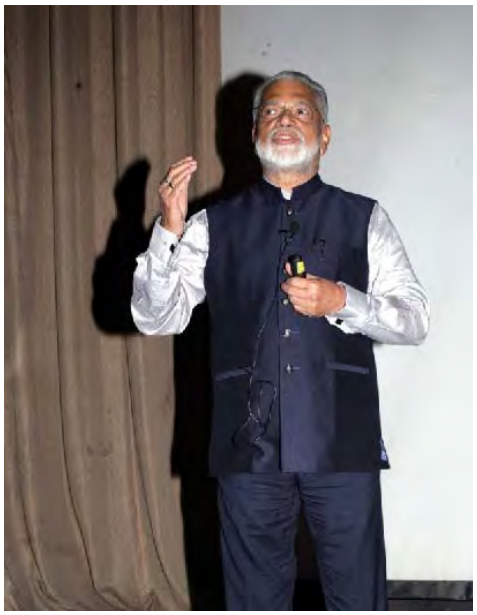
It was followed by the Founder's Day lecture by Arun Grover, Vice Chancellor, Panjab University- the Chief Guest for the Founder's Day celebrations. His talk was titled 'Nucleation of Higher Education and Research in Pre and Post Independent India: A Personal Perspective'. In the talk, he gave an insight into how the higher education space developed in India over the last last century.

• Foundation Day Celebrations

Each year, CCMB celebrates its Foundation Day on Nov 26th.

This year the well-known Indian space scientist, Kopillil Radhakrishnan, former head of Indian Space Research Organization was the Chief Guest at the celebrations. He interacted with the scientists and students at CCMB discussing their work and noting the facilities at CCMB.

It was followed by his public talk on India and the New Space Age, wherein he emphasized on the role of an institution like ISRO can play, and collaborate with other reseach partners in initiating newer research programs. The CCMB Annual Report 2017-18 was also released on this day.



Kopillil Radhakrishanan delivering his lecture

Kopillil Radhakrishanan releasing CCMB's Annual Report with scientists at CCMB

- ## Junior Civil Court Judges and IFS officers visit CCMB

Junior Civil Court Judges from Telangana and Andhra Pradesh visited CCMB and LaCONES-CCMB on Jul 16th and Dec 5th, 2018. These meets aim to initiate discussions among researchers and young judges to understand technologies that aid in better judicial decision making, like DNA fingerprinting and universal primer technology.

Civil Court judges at CCMB on Dec 5th, 2018

140 Indian Forest Service (IFS) officers visited LaCONES-CCMB on 5th Oct, 2018 for a week long program. The workshop aims to prepare these officers with the skills on how they should handle the wildlife samples to be sent for forensic studies.

IFS officers at LaONES CCMB on Oct 5th, 2018

- ## Exchange of MoU with Medical Institutes

An MoU was signed with Chhattisgarh Institute of Medical Sciences (CIMS) on Mission Mode Project on Sickle Cell Anemia (SCA) in Feb 2018. The MoU aims to reduce the burden of SCA in Chhattisgarh with the help of expertise of both the institutions.

- ## Exchange of MoU with APCARL

CCMB Director Rakesh Mishra with Hon'ble Chief Minister of Andhra Pradesh, Chandrababu Naidu (second from right) at the MoU signing

CCMB has signed an MoU with Andhra Pradesh Centre for Advanced Research on Livestock (APCARL) to provide technical inputs and support for the following:

1. Functionalize the Animal House and Biosafety labs at APCARL
2. Set up a Skill Development Program
3. Set up a Food Safety Laboratory

- ## Meeting with International Diplomats and Delegations

Rakesh Mishra, Director, CCMB with David Cameroon, former Prime Minister, UK

CCMB Director, Rakesh Mishra attended a private lunchtime meeting with Rt Hon David Cameroon, Former Prime Minister of the United Kingdom to explore the opportunities that await India through integration of genomics and genetic medicine into medical practice and acceleration of this medical revolution for all Indians. The meeting held on Jul 19, 2018, in Kolkata, focused on integrating and putting to best use clinical genomics in India.

In addition, multiple international science delegations have visited CCMB over the year, including from Spain, Japan and Germany.

• Cafe Mandala at iHUB

Atal Incubation Centre – CCMB at iHUB organizes Café Mandala - regular meetings aimed to build a peer community for the incubatees and encourage networking and mentorship outside of the incubator. Below are the talks and sessions that we were organized in the last one year:

- Prof. D. Balasubramanian talked about "Opportunities and Imperatives -Biotech in India" on April 16, 2018
- Lift-Off : A journey from idea to prototype – Start ups journey & their plans for Future on May 11, 2018
- Fundraising - How to charm VCs : An informative session by 50K Ventures on July 18, 2018

From the Fundraising - How to charm your VCs session

• Dagar at iHUB

Atal Incubation Centre – CCMB at iHUB organizes Dagar - workshops to train young entrepreneurs in various skills related to procure funding and understand regulations better. Below are the workshops that were held in 2018-19:

- How to write BIG applications
- Business Induction Workshop for life sciences/healthcare startups on Oct 25, 2018

From the Business Induction Workshop for Life sciences/Healthcare startups session

Outreach

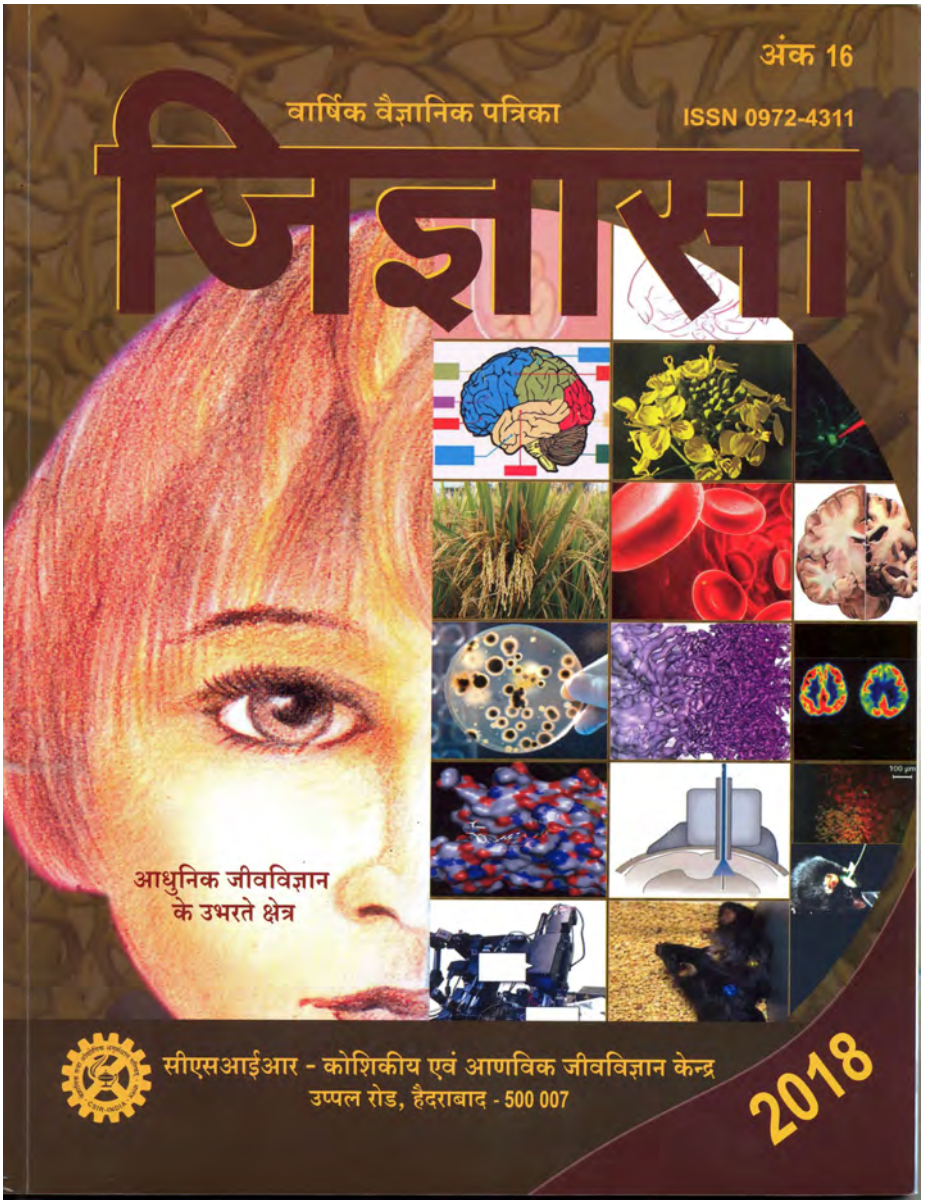
CCMB actively reaches out to students, educators and general public through various platforms. It aims to support the educational system through online and print content generation as well as hands-on events and interactive discussions.

Outreach

CCMB actively tries to reach and inform young students in schools and colleges as well as the general public about its research through its outreach arm. The different activities of 2018 are as follows:

- Jigyasa – an annual Hindi magazine

CCMB releases Jigyasa – an annual Hindi magazine on cutting edge topics in life sciences. The last Jigyasa edition that was released was themed on 'Adhunik Jeev Vigyan ke Ubharte Kshetra' (the Upcoming Areas in Life Sciences).



Cover page of Jigyasa 2018

- ## Open Day at CCMB

CCMB opens its gates to all on Sept 26th each year to commemorate the CSIR Foundation Day. Last Open day in 2018 saw more than 11,000 visitors who were mainly school and college students and educators. The visitors get to go around CCMB watching exhibits based on the research being done here and interacting with active researchers. There were also booths to talk about career opportunities in life sciences, to sell popular science books and merchandise that talk about work at CCMB. The forum was also used by two of the local colleges to showcase how they have been using Foldscope, a pocket paper micropscope in their classrooms.

Clockwise: Student visitors going through exhibit on model organisms used in life science research, DNA fingerprinting technology developed at CCMB; Seeing microscopic objects through Foldscopp; Hindi popular science magazine from CCMB on sale; Folders and greeting cards based on CCMB's research work on sale

- ## What the Science - Science videos on YouTube

The questions collected at the Open day from the visitors

During the Open day in 2018, CCMB collected questions from its visitors on a question board. These questions typically reflected what the visitors would have liked to understand better in life sciences. Using them as the primary cue, CCMB now has a video series on YouTube called the What the Science.
The playlist can be found at
https://www.youtube.com/playlist?list=PL6FAIj7XldHtgWriON8lGo2GudXSOsbxK

- ## CCMB Daak - Monthly newsletter from CCMB

CCMB has initiated its monthly newsletter - CCMB Daak which helps public to stay updated with the research and events at CCMB. This newsletter is circulated through email and CCMB's social media handles.

- Superheroes against Superbugs (SaS)

Clockwise, from top: Students at Telangana Social Welfare Residential School, Gowlidoddi participating in the SaS workshop; TSWRS students with their take aways in form of comics they developed; Dr Raghunand Tirumala, scientist, CCMB interacting with students at SaS workshop at Global Edge School, Madhapur; Rahul Sureka, PhD student, CCMB talks about antibiotic resistance at CCMB Open day; CCMB PhD students perform a skit for KV students during the antibiotic resistance awareness week; Interaction with parents and teachers at the Global Edge Schools art festival in their Kokapet campus.

Superheroes against Superbugs (SaS) is a program, funded by Wellcome DBT India Alliance to sensitize public on the causes and effects of antibiotic resistance. In the first leg of the program, it has focused on reaching out to and creating champions for the cause among high school students. CCMB has worked on SaS in developing the content for its workshops, and has also helped to conduct the workshops/ disseminate the information through school fairs and festivals, its own Open day.

- ## Partnering with other educational initiatives

Left: Students working on making a sparrow house; right: Students with their work from the Cells as Living Machines session where they conceptualized the nervous system as a computer and with their sparrow house.

With Ajahn Educational Foundation and Citizens' Action for Local Biodiversity Awareness and Conservation (CALBAC), CCMB hosted 250 school students from lower income schools in Hyderabad for 5 days as a part of the program - Adhbhuta. During this program sessions were organized on the following topics:

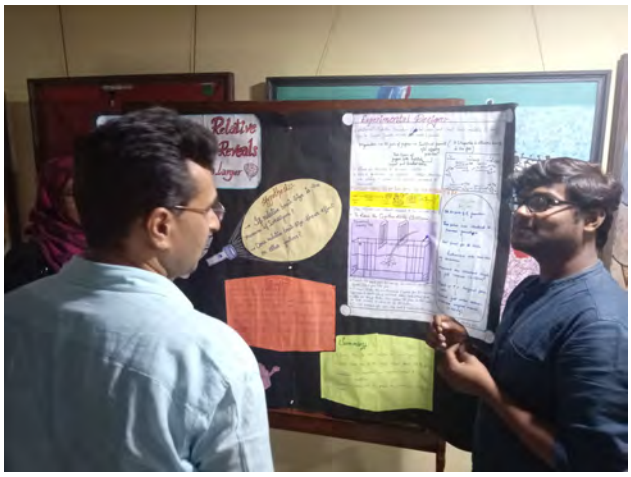
- Cells as Living Machines
- Antibiotic Resistance
- Why Save Tigers?
- Protecting Local Birds

- ## Sci-Setu - A bridge between students in CCMB and local colleges

Left: PhD students from CCMB at a local college, right: students from a local college attending the Sci-Setu session

CCMB PhD students run a program called the SciSetu where they visit local colleges, interact with their students. They discuss topics like what pursuing a PhD means, research at CCMB and the different career opportunities that open up with a degree in life sciences.

- Project Abhilasha - An undergraduate students mentoring program



Top: Undergraduate students from different colleges in a city attending a session by Sudar Olli, cofounder of Virupaksha Life Sciences at AIC-CCMB; Below: Amentee of Project Abhilasha explaining a research paper through a poster to a CCMB scientist

PhD students at CCMB mentor undergraduate students from local colleges on understanding scientific method of thinking through the Project Abhilasha. In the pilot run of this program in 2018-19, the undergraduate students were trained in understanding scientific method of thinking by dissecting a research paper. Through the process the undergraduate students were trained in developing hypotheses, building experiments to validate the hypotheses and inferring observations. As a final outcome the undergraduate students who were a part of this program presented a research publication in form of a poster, Powerpoint presentation as well as through a skit.

During these months of mentoring, the college students also had interactive sessions with scientist and startups at CCMB to understand the different kinds of career oppotunities that open up with research.

- Young Innovators' Program

To create awareness about science research among the students of grades VIII, IX and X, and motivate them in choosing scientific research as a potential career option in future, CCMB conducts Young Innovators Program (YIP) each year. Dr Harsh Gupta, scientist, CSIR-National Geophysical Research Institute inaugurated the program with a talk on India's success in predicting tsunamis. Of 105 students who attended the talk, 24 students were selected based on a written screening test. These students got two weeks of hands-on training in labs and interacted with research faculty members of CCMB to develop their skills and attitude in science.

Top: YIP participants in a lab session, Below: YIP participants in a discussion with N Madhusudhana Rao, CEO at AIC-CCMB

New Capabilities

CCMB is growing its
infrastructural capacities as well
as keeps up with cutting edge
research by designing its
research programs accordingly.

Research Facilities

The following instruments/facilities have been procured at CCMB:

- MSM System 400 Yeast Tetrad Dissection Microscope, Rs.30 lakh
- NGS Facility: Novaseq 6000 system, Rs.920 lakh
- High performance Flow cytometer for Stem cell sorting with Bio-Safety cabinet Class-II, Rs.250 lakh
- Infrared western blotting system, Rs.40 lakh
- High End Motorised Binocular Inverted Microscope with DIC, Rs.32 lakh
- High sensitive spectral confocal system, Rs.180 lakh
- Metasystems Flourescence Microscope [Upgradation], Rs.23 lakh
- Four Channel AVANACE NEO 600 MHz NMR Console, Rs.380 lakh
- Inverted Microscope with DIC, fl. attached, 2 CCD cameras, Rs.32 lakh

Infrastructural Facilities

The following infrastructural facilities have been built at CCMB:

- A 60 seater lecture hall cum class room has been constructed on the iHUB terrace, to be used for Skill Development Programs
- Civil renovation work has been done in 12 flats of SC-1 quarters for Skill Development Programs (can provide accommodation for 36 persons).
- The groundwork has begun for a multipurpose lecture hall in CCMB campus, with an approval of Rs 10 cr from CSIR.
- All molecular diagnostic services are centralized at iHUB and processes for sample collection to report generation have been streamlined. These are managed through ASPIRE (CCMB's Sec.8 company).
- Dedicated staff has been identified as in-charge of diagnostics
- A medical doctor and technical assistants have been recruited for the genetic analysis module.

- ## A new multipurpose lecture hall complex approved by CSIR

An artist's impression on the multipurpose lecture hall complex

CCMB has obtained CSIR's approval to build a multipurpose lecture hall complex. The complex will have an auditorium with a seating capacity of 350 persons, a lecture hall for 100 persons, two mini lecture halls for 50 persons each and two committee rooms for 30 persons each. In addition, it will have a lounge and poster presentation area.

- ## Online students' portal

CCMB has developed an online students' portal for taking care of all their administrative needs. Students can raise their issues and concerns on the portal and seek quick redressal.

Scan the QR code and subscribe to our newsletter, CCMB Daak- an easy way to stay updated with us.

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