

Marker-trait association identified candidate starch biosynthesis pathway genes for starch and amylose-lipid complex gelatinization in wheat (*Triticum aestivum* L.)

Scientists at DBT's National Agri-Food Biotechnology Institute (NABI), Mohali measured the gelatinization properties in a set of 226 wheat varieties using Differential Scanning Calorimetry (DSC) and their thermograms identified two endothermic peaks: first peak of starch gelatinization and second peak of amylose-lipid complex. The four parameters (onset temp, peak temp, conclusion temp, and enthalpy) of both gelatinization peaks showed wide variation among the varieties. Marker-trait association studies using the genotyping data of 258 SSRs and gelatinization data on the wheat varieties identified 24 and 6 markers associated for starch and amylose-lipid complex gelatinization properties, respectively.



Using wheat reference genome sequence and LD decay information, 12 starch biosynthesis pathway genes (SBP) were identified, which were co-located within 50Mb of the associated markers. Four out of 12 genes (*SSIV*, *SBEIIb*, *PHO*, and *PUL*) were located within 5.2Mb. Out of 24, 17 markers were involved in epistatic interactions. These markers are novel for wheat starch gelatinization properties, and would be useful for gene discovery and marker assisted selection for the improvement of starch quality in wheat.

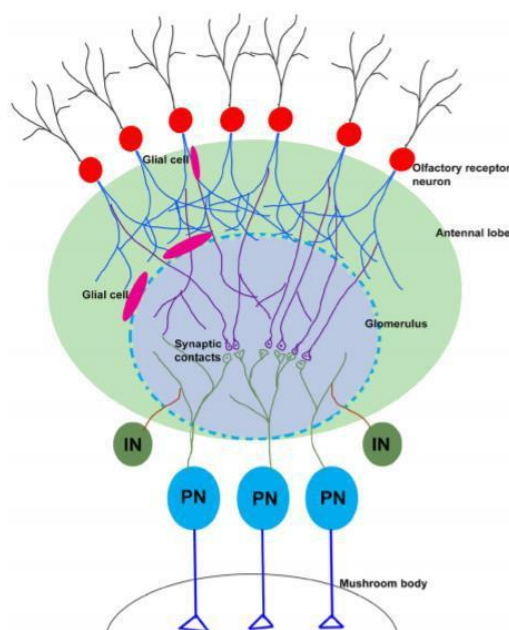
During processing of wheat flour, its starch component undergoes gelatinization, an important physicochemical property, affecting cooking and nutrition quality of its food products. Genetic loci controlling gelatinization properties of starch and amylose-lipid complex is unknown in wheat.

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01BB_1Sep2020.pdf

Understanding brain development – Indian researchers' past, present and growing contribution

Indian developmental neurobiologists have contributed immensely to this understanding utilizing a variety of model systems used for studying brain development. The survey conducted by scientist at DBT's Institute for Stem Cell Science & Regenerative Medicine (inStem), Bengaluru highlights the significant contributions made by Indian researchers in the study of brain development. As an ever-growing research field, and with newer genetic and molecular tools, together with several new centres of excellence, India's contribution to this fascinating field of study is continually rising.

The survey thus emphasizes the seminal discoveries in the past and looks into the future where by using human induced pluripotent stem cells (iPSCs) as *in-vitro* disease modelling systems, researchers will make new discoveries and findings into understanding the human brain development and its disarray in neurodevelopmental disorders.



This work is a part of issue in the journal *International Journal of Developmental Biology* showcasing the pioneering developmental biology research works carried out in India. The author, Dr. Bhavana Muralidharan, is a member of the faculty at the Brain Development and Disease Mechanisms (BDDM) theme at inStem and a Wellcome Trust DBT India Alliance-Intermediate Fellowship awardee. Her lab studies cerebral cortex development in health and disease using the mouse and patient-derived human iPSCs as model systems.

The brain is a complex organ, and the vast array of neural cell types and their connectivity determine its function. Brain development and the vast array of neurons and glia it produces is a baffling mystery to be studied. Neuroscientists using a vast number of model systems have been able to crack many of the nitty-gritty details using various model systems. One way has been to size down the problem by utilizing the power of genetics using simple model systems such as *Drosophila* to create a fundamental framework in order to unravel the basic principles of brain development. Scientists have used simpler organisms to uncover the fundamental principles of brain development and also to study the evo-devo angle to brain development. Complex circuitry has been unravelled in complex model systems, such as the mouse, to reveal the intricacies and regional specialization of brain function.

Link:<http://www.ijdb.ehu.es/web/paper/190204bm/understanding-brain-development-indian-researchers-past-present-and-growing-contribution>

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Apoptosis-inducing factor deficient mice fail to develop hepatic steatosis under high fat high fructose diet or bile duct ligation

A study conducted at DBT's National Institute of Immunology (NII), New Delhi tried to find that mitochondria dysfunction could trigger inflammation of the liver. Thus, the study tried to evaluate the apoptosis inducing factor a protein that regulate the permeability of the mitochondrial membrane, function as respiratory chain and an antioxidant.

A mouse model system, Harlequinmouse (Hq Mice) that has defect in apoptosis inducing factor was employed in the present study for investigating the role of AIF in the development of NAFLD. The Hq mice were fed high fat high fructose (HFHF) diet and ligation of bile duct to create inflammation in liver. Further, pathophysiology of NAFLD in mouse model system was evaluated.

Based on the study, team tried to understand that Hq mice failed to develop diet induced hepatic steatosis, suggestive of a role of AIF mediated pathway in the initiation and progression of liver inflammation. Thus, partial loss of AIF appears to be hepato protective.

The study involves the pathophysiology of NAFLD (Non-alcoholic fatty liver diseases) commonly called as fatty liver. This disease includes simple fatty liver (steatosis) where the fat is deposited in the liver and diagnosed accidentally during regular health check-up. This condition is usually reversible by life style modifications. If not controlled, this leads to non-alcoholic steatohepatitis (NASH) where the liver gets further damaged and it develops in fibrosis (scarring of liver) and if not controlled it leads to cirrhosis – the most severe stage, occurring after years of inflammation, where the liver shrinks and liver stops working properly and may lead to liver cancer.

There are several mechanisms that cause steatosis (fatty changes). a. It includes increase in fat supply to the liver, b. decreased fat export from the liver, c. decreased free fat oxidation from the mitochondria and causing stress to liver cells, and d. by increased fatty acid production from carbohydrate food. Apart from this, various cytokines and gut microbes have some role in initiating this process.

Hepatocytes (Liver cells) are normally rich in mitochondria and each hepatocyte contains about 800 mitochondria occupying about 18% of the entire liver cell volume. Mitochondria are the power house of the liver cell. Mitochondria play an important role in hepatocyte metabolism. They help for the oxidation of fatty acids and production of ATP (energy for cells). There are many reasons to indicate that hepatic mitochondrial dysfunction could lead pathogenesis of liver causing NAFLD. Mitochondrial dysfunction may not only cause fat accumulation, but also may lead to the generation of ROS and cytokine production contributing to progression of NAFLD by inducing liver inflammation and fibrosis.

Link: <https://onlinelibrary.wiley.com/doi/abs/10.1002/cbf.3579>

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Recent Awards & Honours earned by Scientists at the DBT's NCCS, Pune



Dr. Arvind Sahu

Dr. Arvind Sahu, scientist at the DBT's National Centre for Cell Science (DBT-NCCS), Pune in Pune, has been awarded the prestigious J.C. Bose National Fellowship, in recognition for his outstanding performance in the field of immunology. Dr. Sahu's research at the DBT-NCCS over two decades has been specially focused on complement biology. This award is given by the Science and Engineering Research Board (SERB) of the Department of Science and Technology (DST), Government of India.



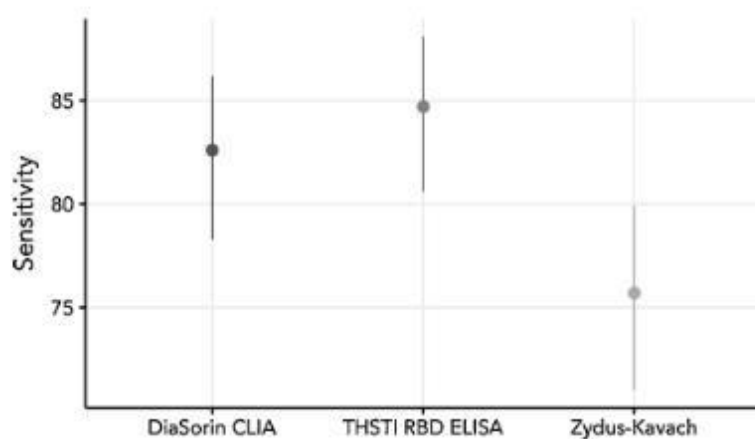
Dr. Jomon Joseph

Dr. Jomon Joseph, scientist at the DBT's National Centre for Cell Science (DBT-NCCS) in Pune, has been elected as a member of the prestigious 'Guha Research Conference' (GRC). The GRC, which is named after Bires Chandra Guha, is a scientific society set up by Indian scholars to develop the field of Biochemistry. This professional assemblage of distinguished scientists meets annually for extensive scientific discussion of their work in a stimulating atmosphere. Dr. Joseph was elected to this prestigious society in recognition of his extensive research and expertise in the field of cell biology.

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DBT-THSTI-RBD-ELISA assay used for Pune COVID-19 serosurveillance study

Blood samples from 1664 consenting individuals, chosen as per the study design, were collected (from 20th July to 5th August) and processed to detect the presence of IgG antibodies against the receptor-binding domain (RBD) of the viral spike protein using the highly specific (100%) and sensitive (84.7%) THSTI-RBD-ELISA assay. IgG antibodies against the receptor-binding domain (RBD) of the viral spike protein was detected using the highly specific (100%) and sensitive (84.7%) THSTI-RBD-ELISA assay. This assay has been extensively characterized and compared with other commercially available tests for SARS-CoV2 IgG at DBT's Translational Health Science and Technology Institute (THSTI), Faridabad.



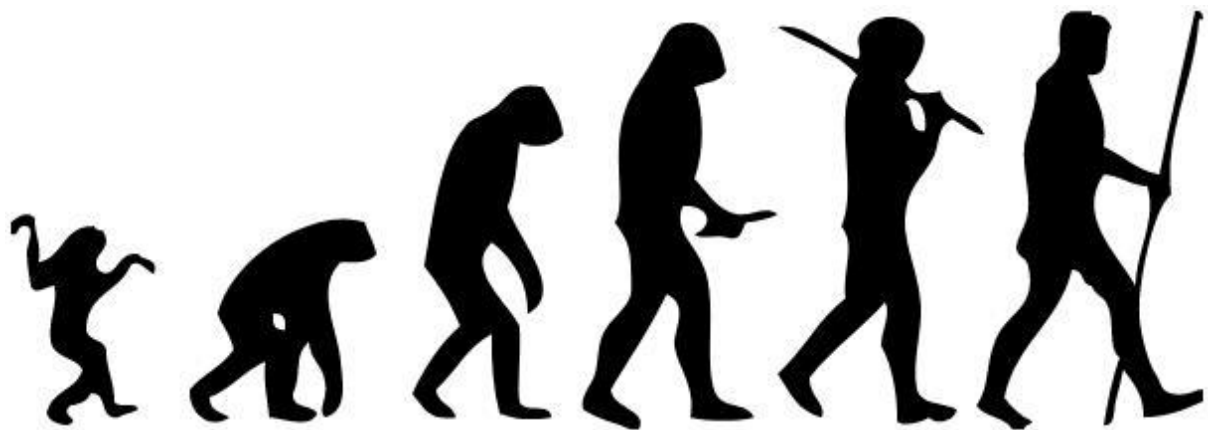
The other participating organizations were Christian Medical College (CMC), Vellore, and the Pune Municipal Corporation (PMC). The survey specifically targeted selected high-incidence *prabhags* of Pune city. The study is supported by the Persistent Foundation.

On 17th August, Pune had more active cases of COVID-19 than Mumbai city. An epidemiological and serological surveillance of COVID-19 was conducted in Pune. The leading institutes were IISER Pune and Savitribai Phule Pune University (SPPU), Pune. THSTI's in-house Receptor-Binding Domain (RBD)-ELISA assay was used for testing the clinical samples.

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DBT-NIBMG study to unravel the adaptive history of S.Asian populations

Anatomically Modern Humans (AMH) inhabit a diverse range of environmental conditions across all the continents except Antarctica. After their origin in Africa approximately 200,000 years ago, they started dispersing out of Africa around 60,000 years ago to different parts of the world. They rapidly colonized different habitats across the world despite encountering a host of novel environments such as the extreme cold climate in the Americas and Eurasia during the last glacial maximum, changes in exposure to sunlight and new pathogens, among many others. Moreover, cultural inventions such as the advent of agriculture and improved hunting techniques altered their dietary habits.



Therefore, like most other living organisms, the Anatomically Modern Humans have also adapted to these novel environments through means of Darwinian natural selection. Biological adaptation by natural selection is primarily a genetic process and manifests in changes to patterns of genetic variation. Consequently, the effect of natural selection on human populations, similar to other evolutionary events such as migration, divergence and admixture between populations and changes in population size, is expected to leave its imprint on individual genomes. Whole genome sequence data therefore provides an access to study the rich history of human adaptations.

The primary focus of a team of researchers at the Department of Biotechnology's National Institute of Biomedical Genomics (DBT-NIBMG), Kalyani, West Bengal, has been to infer the adaptive history of South Asian (SAS) human populations by studying their whole genome sequences. South Asia harbours a heterogeneous group of human populations with varied ancestry that inhabit diverse geographic regions. The genetic diversity of these populations is therefore expected to reflect not only the different ancestral admixture and demographic events but also local adaptations to these varying environments.

The team led by Dr. Diptarup Nandi, a National Postdoctoral Fellow (SERB), has detected several genomic regions that have been under selection, while investigating the genomes of different South Asian ethno-linguistic groups belonging to the 5 main language families that are found on the Indian mainland (Indo-Aryan, Dravidian, Austroasiatic, Tibeto-Burman) and the Andaman and Nicobar islands (Andamanese).

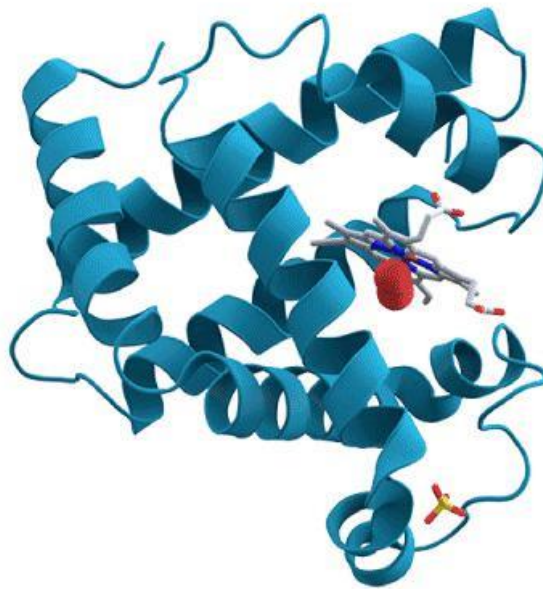
These genomic imprints of natural selection in the SAS populations indicate shared adaptive histories with other global populations as well as selective events specific to South Asia. Differences in the genomic signatures of selection between the different SAS populations also imply their distinct adaptive histories.

Using machine learning based tools, they are attempting to further identify the genes involved in these adaptive processes and to ascertain the traits that have potentially played a key role in the evolutionary histories of these populations.

Link:https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01S_1Sep2020.pdf

Study gets deeper insight on a protein of importance in Huntington disease

A major research focus of Dr Akash Ranjan's laboratory at the Department Of Biotechnology's Centre for DNA Fingerprinting and Diagnostics (DBT-CDFD) has been to understand the evolution and the function of HYPK proteins in the context of cellular proteostasis. These HYPK proteins were first identified as one of many human proteins that interact with huntingtin proteins that causes Huntington disease – a human neurodegenerative disorder. These HYPK proteins sequesters different aggregation-prone proteins of higher eukaryotic cells and are integral part of cellular proteostasis machinery.



Recently, Dr Ranjan's laboratory has shown that HYPK mRNA is differentially translated from an internal start/initiation codon to generate an amino terminal-truncated isoform (HSPC136) of HYPK protein. In this work, Dr Ranjan's team has provided a mechanistic detail of HYPK mRNA's translation initiation control that results in HYPK136/HYPK-ΔN which is a shorter isoform of full length HYPK protein. The HYPK136/HYPK-ΔN isoform lacks the nuclear localization and the functional ability to deal with aggregation of the mutant p53 (p53-R248Q) protein.

Dr Ranjan's research has shown that an IRES-dependent translation initiation of HYPK mRNA is responsible for the formation of the HSPC136/HYPK-ΔN isoform of HYPK protein. This IRES-driven translation product-HYPK-ΔN lacks the N-terminal tri-arginine

motif that acts as the nuclear localization signal (NLS) in the full-length HYPK protein. While the full-length HYPK protein translocate to the nucleus and prevents the aggregation of the mutant p53 (p53-R248Q) protein, the HYPK-ΔN lacks this activity.

Dr Ranjan's work has further shown that the NLS of HYPK is not evolutionarily conserved. NLS is exclusively present in the HYPK protein of higher eukaryotic organisms. Dr Ranjan's team argues that the recently acquired NLS offers an additional advantage to the HYPK proteins of higher animals in tackling both the cytosolic as well as the nuclear protein aggregates. Hence, the presence of the NLS in full-length HYPK allows this protein to manage the nuclear protein aggregates that intern affects the cell cycle.

DBT-THSTI scientist gets Africa-India Mobility Fund

A senior research scientist at DBT- Translational Health Science and Technology Institute, Dr. Sweety Samal has won the Africa-India Mobility Fund. Under this, she and her group will support the development of a high throughput assay on Chikungunya to be transferred to the Centre for Research on Infectious Diseases, Cameroon (CRID-CAM).



The Africa-India Mobility Fund is a two-year programme designed to provide researchers from Africa and India with opportunities for short visits in either direction to explore opportunities for building and strengthening scientific collaboration. This grant was signed between DBT-THSTI and Medical Entomology Department, Centre for Research in Infectious Diseases (CRID), Cameroon that will support the exchange visit between scientists of Cameroon and THSTI, to facilitate research activities in Chikungunya virus.

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_01S_3Sep2020.pdf

DBT-IBSD holds 16th session of webinar series on Reimagine Ethnopharmacology

The Department Of Biotechnology's Institute of Bioresources and Sustainable Development (IBSD) has organised the Sixteenth Session of the webinar series - Reimagine Ethnopharmacology in collaboration with Society for Ethnopharmacology (SFE), India and International Society for Ethnopharmacology (ISE), Switzerland.

There were three talks: (1) Prof Alexander N Shikov, St Petersburg State Chemical Pharmaceutical University, spoke on 'Fucoic acid and Covid19: Some bimolecular Mechanisms', (2) Dr Arun Kumar Sharma, DG, DST-NECTAR Shillong on 'Technology Intervention in North East India and NECTAR's role' and (3) Prof Goutam Sutradhar, Director NIT Manipur on job opportunities in different sectors during Covid and post Covid19

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Webinar series **Session-16** **Date and time:**
Reimagine Ethnopharmacology **29th August 2020**
5:00 pm to 8:00 pm

Moderator **Speakers**

Prof. Pulok K. Mukherjee
Director
Institute of Bioresources & Sustainable
Development, A National Institute under DBT
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Prof. Alexander N. Shikov
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Dr. Arun Kumar Sharma
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Shillong, Meghalaya,
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Prof. Goutam Sutradhar
Director
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NIT Manipal
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Topics:

- Fucoic acid and COVID-19: Some Biomolecular Mechanisms
- Technology Intervention in North East India and NECTAR's Role
- Job Opportunities in Different Sectors During COVID and Post COVID-19

To witness the digital revolution in natural product, ethnomedicine and ethnopharmacology join us.

Registration link: <https://event.webinarjam.com/channel/RE-Session-16>

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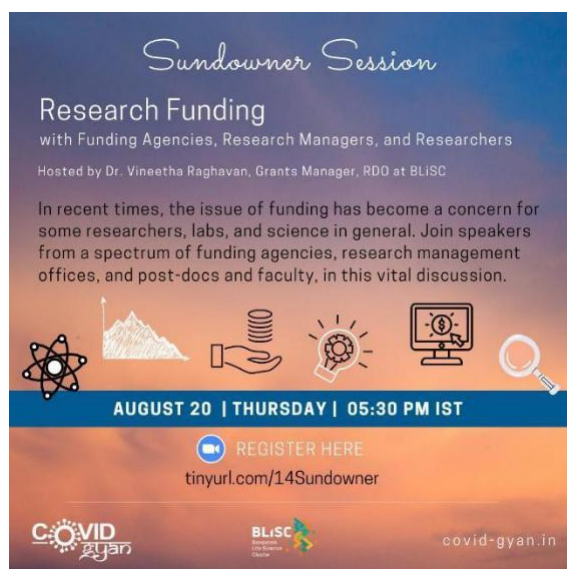
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DBT-InStem Sundowner Session on ‘Research Funding’

The Department of Biotechnology’s Institute for Stem Cell Science and Regenerative Medicine (DBT-InStem) is one of the founding partners of COVID-Gyan, a pan-institutional website that has been proactive in COVID-19 outreach efforts. The website started conducting sundowner sessions during Lockdown 1.0 in collaboration with Bangalore Life Science Cluster (BLiSc) every week for the benefit of the scientific community. The sessions focus on various topics relevant to the COVID-19 crisis.

The Sundowner Session on August 21 focused on ‘Research Funding’, a topic that’s relevant to the entire research community. In recent times, the issue of funding has become a cause of concern for science. The session was hosted by Dr. Vineetha Raghavan, Grants Manager at BLiSc.



The discussion panel included Dr. Meenakshi Munshi of Department of Biotechnology, Dr. Ajay Pillai, Head of the Project Cell, NCCS-Pune, Dr. Anirban Chakraborty, Director-Research & Development at Ashoka University, Vidhya Krishnamoorthy, Grants Coordinator at THSTI-Faridabad, Dr. Vivek Dham, Advisor - Research & Innovation Delegation of the European Union to India, and Dr. Srinivasa Kaveri, Director-CNRS Office in India.

Apart from funding agencies, this session was attended by research managers/administrators, students, postdoc fellows, faculties and scientists- from early and senior career stages from various research organisations.

The thrust of the discussion was on how the current pandemic has impacted funding agencies and thus the availability of funds to researchers. The discussion highlighted that existing funding from DBT, DST, EU and CNRS has not abated and, instead, more COVID specific avenues have opened on fast-track mode.

DBT fellowships have been extended to reduce the impact on graduate students and postdoc fellows, especially those in the last phase of their work completion and program tenures. Research in foreign universities, new EU and French funding opportunities, and visa related concerns were also discussed in this 100 minute session.

Scientists from organizations like CCMB, Hyderabad, IISER-Pune, and NCBS-Bangalore acknowledged that researchers with fellowships have not been financially impacted, but those on PI funding have been. Also, the COVID crisis has brought to the fore issues that have simmered in the background for years, e.g. the need for childcare, incentives and career development support for early career researchers. How these six to eight months of lockdown and its aftermath will be assessed on job and fellowship applications remains unclear though. This session is available on the COVID-Gyan YouTube channel. DBT-inStem also did live tweets during the session.

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RCB signed the MoA with Government Medical College Thrissur, Kerala, Covid 19 testing

The Department of Biotechnology's Regional Centre for Biotechnology (RCB), Faridabad signed the memoranda of agreements (MoAs) with Government Medical College Thrissur, Kerala, to identify the scope of services for the Antiviral activity testing against SARS-CoV-2.



To meet the growing need for the *in vitro* antiviral assays for the new drug candidate/test substance (TS), the Department of Biotechnology's Regional Centre for Biotechnology (RCB), Faridabad is providing antiviral activity testing against SARS CoV-2 in the cell culture model at a non-cytotoxic concentration of the TS, while Government Medical College Thrissur, Kerala shall be reimbursing the cost of services.

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A field-based quantitative analysis of sublethal effects of air pollution on pollinators

Dr. Dhandapany Perundurai from the Centre for Cardiovascular Biology and Disease (CCBD) and a Wellcome Trust DBT India Alliance intermediate Fellowship awardee, at DBT- Institute for Stem Cell Science & Regenerative Medicine (inStem), Bengaluru has made measurements on the cardiac functions of bees as part of a collaborative endeavour with lead author Shannon Olsson (National Centre for Biological Sciences, TIFR Bangalore), Axel Brockman (NCBS) and others to study air pollution in honey bees, especially in highly polluted areas. Bees from more polluted areas showed significant differences in heart rhythmicity, blood cell count, and the expression of genes coding for stress, immunity, and metabolism. Repeating these experiments with lab-reared *Drosophila*, author found similar effects, suggesting that the impact of air pollution is not species-specific nor likely the result of other environmental factors.

The research findings '*A field-based quantitative analysis of sublethal effects of air pollution on pollinators*' were recently published in *Proceedings of the National Academy of Sciences (PNAS)*. This work has been further featured in various newspapers last week like The Hindustan Times, The Times of India, and The Bangalore Mirror.

Link: https://vigyanprasara.gov.in/wp-content/uploads/vigyan_samachar_dbt_02BB_2Sep2020.pdf

DBT-NCCS Scientist has been elected to the Executive Board of the ICSP

Dr. Yogesh Shouche, scientist at Department of Biotechnology's National Centre for Cell Science (NCCS), Pune, has been elected to the Executive Board of the International Committee on Systematics of Prokaryotes (ICSP). He is the only Indian scientist on the Executive Board that will become functional from 1st September, 2020. The ICSP is the international body that defines the system, and determines the rules for naming and grouping prokaryotes. Prokaryotes are microorganisms that lack a nucleus and other cellular components that are membrane-bound. These include bacteria and archaea; the latter constitute a group of ancient microorganisms that are similar to, but separate from bacteria, and that are usually found in extreme environmental conditions where most other organisms cannot survive.

Scientists predict that the vast majority of the micro-organisms, from the trillion microbial species estimated to inhabit the earth, are yet to be discovered. It is not surprising therefore, that ever so often, microbiologists who study prokaryotes from various ecosystems, find new microbes that were hitherto unknown. Once these are discovered, a specific standardized protocol is followed to appropriately group them with reference to the known microbes, and to give them scientific names (called taxonomy and nomenclature).

The ICSP plays a vital role in providing a uniform taxonomic framework, which is followed by scientists who study prokaryotes across the world. For a newly discovered prokaryote to be officially accepted as a novel microorganism by the scientific community, certain rules laid down by the ICSP for grouping and naming need to be followed. Further, a description of this new microbe and its proposed name need to be published in the International Journal of Systematic and Evolutionary Microbiology (IJSEM), the official scientific journal of the ICSP. Being elected to the Executive Board of the ICSP is testimony to Dr. Shouche's extensive experience and expertise in the field of microbial taxonomy. The discovery of several new microbes by his research group at DBT-NCCS has resulted in around 50 research publications in the IJSEM. His research in microbiology spans about three decades, and encompasses diverse areas, including microbial taxonomy, microbial ecology, and the human microbiome in health and disease. He also heads the world's largest individual microbial culture collection at the DBT-NCCS, called the National Centre for Microbial Resources (NCMR).

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COVID-19 Outreach Effort WebGyan Session on 'Contact Tracing and Aarogya Setu'

DBT-Institute for Stem Cell Science & Regenerative Medicine (DBT-inStem), Bengaluru is one of the founding partners of COVID-Gyan that has been proactive in COVID-19 outreach efforts. In the seventh WebGyan session, Prof. V. Kamakoti of Department of Computer Science and Engineering, IIT Madras, spoke about '**Contact Tracing and Aarogya Setu**'.



The Aarogya Setu, a cell phone application (commonly called as app), was developed in response to the need for contact tracing and generating data on infection during the COVID19 pandemic. Aarogya Setu, is an open-source COVID-19 'contact-tracing, syndromic mapping and self-assessment' digital service, developed by National Informatics Centre under the Ministry of Electronics and Information Technology (MeitY). The app was installed by more than 100 million in just 1.5 months of its launch. The source code was made public on May 26, 2020 amid growing privacy and security concerns.

In his talk, Prof. Kamakoti discussed the motivation, novelty, and process, which kick-started this effort. Highlighting the challenges, he stated that this kind of large-scale data driven system needed a lot of interdisciplinary efforts and experts, from computer scientists, epidemiologists, and social scientists, to people for legal advice on data privacy. As one of the core members involved in developing this app, he also spoke about what they have

learned from this effort, and how he sees the future of such data-driven interventions in healthcare and other sectors in India. He concluded his talk with how the individual user on one end and healthcare users on the other need to be using the app/its data responsibly for it to be effective in contact tracing and modelling.

The session was moderated by Prof. Rajesh Gopakumar, ICTS- Bangalore, Dr. Prahladh Harsha, TIFR-Mumbai and Dr. Uma Ramakrishnan, NCBS. This 90 minutes session was LIVE streamed on [COVID-Gyan YouTube channel](#). It was recorded on August 27, 2020 and can be watched here.

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02BB_4Sep2020.pdf

Drug screening for SARS CoV2 at DBT-ILS, Bhubaneswar

Research group headed by Dr Anshuman Dixit at DBT's Institute of Life Sciences (ILS), Bhubaneswar, have used state of the art bioinformatics techniques to screen the FDA approved drugs against thirteen SARS-CoV2 proteins in order to identify drugs for quick repurposing. The strategy was to identify potential drugs that can target multiple viral proteins simultaneously and originates from the fact that individual viral proteins play specific roles in multiple aspects of viral lifecycle such as attachment, entry, replication, morphogenesis and egress, and targeting them simultaneously will have a better inhibitory effect.



Furthermore, Dr Dixit team has analyzed that if the identified molecules can also affect the host proteins whose expression is differentially modulated during SARS-CoV2 infection. The differentially expressed genes were identified using the analysis of NCBI-GEO data (GEO-ID: GSE-147507). A pathway and protein-protein interaction network analysis of the identified differentially expressed genes led to the identification of network hubs that may play important roles in SARS-CoV2 infection. Therefore, targeting such genes may also be a beneficial strategy to curb disease manifestation. The group has successfully identified molecules that can bind to various SARS-CoV2 and human host proteins. This study will help researchers in the identification and repurposing of multipotent drugs for the treatment of COVID-19.

The SARS-CoV2 is a highly contagious pathogen that causes a respiratory disease named COVID-19. The COVID-19 pandemic has affected about 23 million people globally

(identified cases as on 24th August 2020). Unfortunately, there is no standard cure for the disease, although some drugs are under clinical trials. There is an urgent need of drugs for the treatment of COVID-19 and a lot of efforts are being directed towards the identification of molecules that can be helpful in the management of COVID-19.

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Breast cancer treatment takes a big leap forward

Breast-cancer is the most common cancer in women in India. Estimated one in twenty-eight women is likely to develop breast cancer during her lifetime. In urban areas, one in twenty-two women is likely to develop breast cancer during her lifetime as compared to rural areas where one in sixty women develops breast cancer in her lifetime.

Earlier research had demonstrated that breast cancer patients had reduced production of a protein in the body called Estrogen-related receptor beta (ERR β), that resulted in proliferation or rapid division of breast cancer cells and their migration to other parts of the body, and that if the protein can be over expressed in breast cancer patients, it can result in an improved prognosis and prolonged relapse-free survival. However, it was so far not known as to how and why the production of ERR β protein was reduced in breast cancer patients.



A new study by the cancer research group at the Department of Biotechnology's Institute of Life Sciences (DBT-ILS) has resolved the mystery and promises to pave the way for developing better drugs for breast cancer. The researchers have unraveled the molecular mechanism for the phenomenon. It is found that the ERR β protein is a key substrate of the SCF complex and deregulated activation of the SCF complex due to the NEDDylation of Cullin subunits of the SCF complex, targets ERR β for degradation in breast cancer. Consequently, the team led by Dr. Sandip K Mishra has demonstrated that a molecule called MLN4924 can restore the expression of the ERR β protein and help reduce cell proliferation and migration of breast cancer cells.

The study has also demonstrated that restoration of ERR β expression in breast cancer with the help of MLN4924, promotes the production of two important tumor suppressors p21 and E-cadherin, involved in the arrest of cell proliferation and migration.

Breast cancer is the predominant cause of cancer deaths in underdeveloped countries, representing 14.3% of all cancer deaths. In 2018, 1,62,468 new cases and 87,090 deaths were reported for breast cancer in India. The incidence rates in India begin to rise in the early thirties and peak at ages 50-64 years.

The therapeutic options are very limited for patients with advanced breast cancer that developed acquired drug resistance and/or disease recurrence or metastasis following first-line chemotherapy. The new study could help address these issues.

The researchers have published their findings in the scientific journal, Nature's Cell Death and Disease. The study was conducted in collaboration with the Imperial Centre for Translational and Experimental Medicine (ICTEM), Hammersmith Hospital, Imperial College, London, and All India Institute of Medical Sciences (AIIMS), Bhubaneswar. The team consisted of Sanoj K. Naik, Eric W.-F. Lam, Monalisa Parija, Surya Prakash, Yannasittha Jiramongkol, Amit K. Adhya, and Dilip K. Parida, besides Sandip K. Mishra.

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02S_1Sep2020.pdf

DBT-CIAB scientist delivers talks on sustainable feedstocks for chemicals and fuels

Dr S. Saravanamurugan, Scientist from DBT-Center of Innovative and Applied Bioprocessing (DBT-CIAB) delivered a talk for an online short-term course on “trends and prospects in biorefinery” organised by the Department of Biotechnology, NIT Jalandhar, Punjab on 13th June 2020. There were 100 participants including faculty from various academic/research institutes and students. The title of the presentation was “biomass conversion: production of biochemicals and fuels from lignocellulosic biomass feedstock.”

During the talk, he explained the mandated activities of CIAB to attract the young and dynamic research scholar and exhibit the main research activities of CIAB at the national level. Further, he pinpointed the importance of sustainable feedstock for the production of biochemicals which can substitute fossil-based chemicals. Moreover, the necessity of transforming second-generation biomass, such as rice straw, to valuable products was accentuated during his presentation as this paves the way for doubling the farmer's income (one of the Govt. of India's policies). Furthermore, it was highlighted during the presentation that the second generation biomass would be an indispensable source of carbon to produce biochemicals which can keep the value-chain in the future.

One Week TEQIP-III sponsored
Online Short-Term Course
on
“Trends and Prospects in Biorefinery”
June 10-14, 2020

Organizing Committee

Chief Patron
Prof. Lalit Kumar Awasthi
Director, NITJ

Patron
Prof. Ajay Ramesh
HOD, Biotechnology

Convener
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For Registration: Visit the link below or scan the QR code
<https://forms.gle/nFWG5Gm5z7X11R96>

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The Management, Principal, Faculty members
& Students of
P.G. & Research Department of Chemistry
PACHAIYAPPA'S COLLEGE
Chennai - 600 030
Tamil Nadu

Cordially Invite you for the One-day National Webinar on
Recent Trends in Sustainable Chemistry 2020 (RTSC 2020)
on
17-06-2020 (Wednesday)

Session I (10.00 am - 11.15 am):
Dr. S. Saravanamurugan,
Scientist-E, Center of Innovative & Applied Bioprocessing (CIAB),
Mohali-140 306, Punjab.

Topic: Biorefinery: Lignocellulosic Biomass as Future Feedstock
for the Production of Sustainable Chemicals and Fuels

Session II (11.30 am - 12.45 pm):
Prof. Dr. P. Sakthivel,
Nanoscience & Technology, Bharathiar University,
Coimbatore-641 046, Tamil Nadu.

Topic: Organic Materials for solar cell applications

No registration Fee.
For registration: <https://forms.gle/8xFSU4ow5B3ZWw5N9>

Convener:
Dr. P. Venkatesh, Associate Professor & HoD of Chemistry.

Organising Secretaries:
Dr. V. Sivamurugan, Assistant Professor of Chemistry (sivamuruganv377@gmail.com).
Dr. R. Ganesh Kumar, Assistant Professor of Chemistry.

Dr Saravanamurugan also delivered a talk titled “Biorefinery: Lignocellulosic Biomass as Future Feedstock for the Production of Sustainable Chemicals and Fuels” in the one-day webinar on “Recent Trends in Sustainable Chemistry 2020” on 17 June 2020 organised by the Department of Chemistry, Pachaiyappa’s College, Chennai. The concept of biorefinery and the salient features of utilising the sustainable feedstocks were discussed during the presentation.

Link:https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02S_3Sep2020.pdf

DBT-funded bioinformatics facility generates many potential drug targets

The bioinformatics centre at Dr. B.R. Ambedkar Center for Biomedical Research (ACBR), New Delhi, which is funded by the Department Of Biotechnology, has effectively used computational drug design and bioinformatics for guiding the design of novel potential drug molecules, identifying drug targets and for assisting bench experiments, in addition to the analysis of the large amount of data available in the public domain to derive novel pathways through network analysis.



The work at the centre has provided many promising leads and potential novel drug targets, especially combinatorial therapy combining classical cell division regulators and epigenetic drugs. Under the infectious disease area, the Bioinformatics Facility (BIF) has been utilized for in depth understanding of drug resistance in *Neisseria gonorrhoeae*. The BIF has also been utilized for genome mining for novel epigenetic regulatory tool-kit of the human genome. This has yielded both novel cis-elements and also novel functions for known epigenetic modifiers.

Patent Granted: A new Fluorescent Beacon probe based diagnostic Tool/Kit for molecular detection of Translocation t(9;22)/ BCR – ABL1 in Leukemic patients and Method of Working for the same patent No: 327607 (application number IN 1569/DEL/2013 Dated 24/5/13).

Societal impact

1. Responsible and transparent dissemination of research findings and implementation in clinical practice and health-related policymaking.
2. Development of Diagnostic kits for sexually transmitted diseases at affordable prices.
3. Increased community awareness about diseases by delivering lectures at health conferences and symposia.
4. Setting of future research priorities through finding newer ways to combat diseases, identifying targets, studying genetic links with human diseases etc.

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02S_4Sep2020.pdf

DBT –IBSD provides surface disinfectant to Meghalaya Government

The Department of Biotechnology's Institute of Bioresources and Sustainable Development (DBT-IBSD), Shillong, Meghalaya, distributed the Institute made surface disinfectant to the Veterinary Department of the State Government of Meghalaya in the presence of Dr.A.K.N. Lamare, Assistant Director, Indo Danish Project, and his team, on 20-08-2020, for disinfection of the cow shed areas and other milk processing units at Upper Shillong.



The initiative was taken up under the guidance of the Director, IBSD, Prof. Pulok K. Mukherjee with an aim to protect COVID-19 frontline workers. It may be noted here that DBT-IBSD Centres in different parts of North East India are actively participating and serving the society during COVID-19 pandemic through distribution of Institute made sanitizer, disinfectant and face mask. The Institute will continue its distribution to the city's numerous front-liners.

Links to news clips of above outreach activity

1. <https://theshillongtimes.com/2020/08/21/disinfectant-for-veterinary-dept/>
2. <http://www.shillongmail.com/dbt-ibsd-contributes-disinfectants-to-the-vet-dept/>
3. <https://www.mawphor.com/index.php/2020/08/22/da-ki-dawai-pyniap-khniang-ba-pynmih-hi-sam-ka-dbt-ibsd-ha-ka-thain-upper-shillong/>

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_02S_31Aug2020.pdf

THSTI and National Medicinal Plants Board partner to evaluate plant-based formulations to mitigate the new coronavirus

Translational Health Science and Technology Institute (THSTI), Faridabad entered into an agreement with National Medicinal Plants Board for the project entitled “*Preclinical and Pharmacokinetics Evaluations of select AYUSH Herbal Extracts/Formulations for mitigating SARS-CoV2 Associated Pathologies*”. The principal investigator of the project is Dr. Madhu Dikshit, National Chair, THSTI and former Director of CSIR’s Central Drug Research Institute.



The National Medicinal Plants Board (NMPB) was established by Government of India to coordinate with all matters relating to medicinal plants and support policies and programs for growth of trade, export, conservation and cultivation. The board is working under Ministry of Ayurveda, Yoga & Naturopathy, Unani, Siddha & Homeopathy (AYUSH).

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_03BB_4Sep2020.pdf

DBT-RCB signs MoAs for antiviral activity testing against SARS CoV-2

The Department of Biotechnology's Regional Centre for Biotechnology (DBT-RCB) has signed memoranda of agreements with Zealous Health Pvt. Ltd., Hyderabad and Government Medical College, Thrissur, Kerala, to identify the scope of services for the Antiviral activity testing against SARS-CoV-2.



Under the MoA, DBT-RCB will provide antiviral activity testing against SARS CoV-2 in cell culture models at a non-cytotoxic concentration of the test substance to meet the growing need for in vitro antiviral assays for the new drug candidate/test substances. Zealous Health Pvt. Ltd. Hyderabad and Government Medical College Thrissur, Kerala shall reimburse the cost of services. Earlier, a similar MoA was signed with Satej Global Science, Ahmedabad.

Link: https://vigyanprasar.gov.in/wp-content/uploads/vigyan_samachar_dbt_03S_31Aug2020.pdf