



Achievements of Department of Biotechnology- Year Ender 2025

India's Bio-economy scaled 16-fold in a decade, growing from \$10 billion (2014) to \$165.7 billion (2024), with a clear trajectory to \$300 billion by 2030, positioning biotechnology as a core pillar of India's growth story

India's First National Biofoundry Network launched, establishing six biofoundries and a high-performance biomanufacturing platform to strengthen indigenous biomanufacturing under the BioE3 Policy

GenomeIndia Project achieved a national milestone with the launch of the Indian Genomic Data Set and operationalisation of FeED and IBDC portals, making 10,000 whole genome sequences accessible globally

Biomedical Research Career Programme (BRCP) Phase-III approved by the Union Cabinet, with a total outlay of ₹1,500 crore, strengthening India's long-term biomedical research talent pipeline

Major breakthroughs in Space Biotechnology, including India's first human muscle stem-cell experiment on the ISS (Axiom-4) and validation of microalgae and cyanobacteria growth in microgravity for future space missions

National Biopharma Mission delivered transformational health technologies, including ZyCoV-D and Corbevax vaccines, indigenous MRI scanner, biosimilars, diagnostics, bioreactors and ventilators

Data-driven TB elimination strengthened, with 18,000 MTB isolates sequenced, AI-enabled drug resistance mapping, and actionable lineage-specific insights supporting the TB-

Mukt Bharat mission

Major agricultural biotechnology breakthroughs achieved, including gene-edited high-yield rice (+20%), drought-resistant rice varieties (Arun), climate-resilient chickpea cultivars, and transgene-free CRISPR-edited mustard lines

Robust startup and innovation ecosystem expanded, with 75 BioNEST Centres, 19 E-YUVA Centres, support to 3,000+ startups, over 1,300 IP filings, and 800+ products progressing towards commercialization

World-class research infrastructure created, including commissioning of Animal BSL-3 Facility for Non-Human Primates, advanced Cryo-EM, stem-cell and imaging facilities, and nationwide access through DBT-SAHAJ platforms

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Biotechnology, recognized as a sunrise sector, is one of the key enablers for driving bio-economy of the country. India's bio-economy has grown from \$10 billion in 2014 to over \$165.7 billion in 2024, with projections to reach \$300 billion by 2030. India is ranked 12th in the world in biotech; 3rd in Asia-Pacific; 3rd largest Startups ecosystem globally; and the largest vaccine manufacturer.

The Department of Biotechnology (DBT), Government of India is at the forefront of promoting biotechnological innovation missions and entrepreneurship leveraging the strength of strategic partnerships and building capacities across the country. Through strong foresight and vision, efforts have been made by DBT to create and nurture a vibrant biotech research and innovation ecosystem across the country in alignment with national missions of our Government such as *AatmaNirbhar Bharat*, *Swasth Bharat*, *Swachh Bharat*, *Startup India* and *Make-in-India*.

DBT has emphasis on promotion of excellence and innovation driven discovery research in biotechnology and modern biology. The focus is also on promoting public-private partnership, nurturing innovation & entrepreneurship, bio-incubators, building capacity in cutting edge areas of research, scaling-up of existing infrastructure, creating right kind of new infrastructure, establishing national and international partnerships.

I. Key Highlights:

- Dr. Jitendra Singh, Hon'ble Minister of State (IC), unveiled India's 1st National Biofoundry Network to Strengthen Indigenous Biomanufacturing. These Bioenabler's are expected to augment research, innovation and scale up across these sectors.
- Echoing the Prime Minister's call for youth participation on 15th of August 2025, Dr. Jitendra Singh, Minister of State (IC) for Science and Technology, launched the "D.E.S.I.G.N for BioE3 Challenge"—

themed "Empowering Youth to Solve Critical Issues of their TIMES" to empower grassroots innovators, foster youth-lead change, and strengthen India's journey towards sustainable and self-reliant bioeconomy.

- Union Cabinet Chaired by the Prime Minister Shri Narendra Modi has approved the continuation of the Biomedical Research Career Programme (BRCP), Phase-III (2025-26 to 2030-31, with another six years (2031-32 to 2037-38), to service fellowships and grants approved till 2030-31, at a total cost of Rs. 1500 crore with DBT and WT, UK contributing Rs.1000 crore and Rs.500 crore respectively.
- Union Minister Dr. Jitendra Singh launched the 'Framework for Exchange of Data Protocols (FeED)' and the Indian Biological Data Centre (IBDC) Portals, making 10,000 whole genome samples accessible to researchers across India and the globe.
- Under the Data Driven Research to Eradicate TB – "*Dare2eraD TB*" programme 17000 MTB isolates from new tuberculosis patients spread across most of the states in India have been sequenced and the sequences analysed.
- A recent experiment on the Axiom-4 mission, successfully validated the potential of microalgae for space-based applications. On the other hand, a first proof of concept for the growth of cyanobacteria on urea in microgravity was achieved. Further, human muscle regeneration was significantly impaired in microgravity, with reduced mitochondrial function and slower differentiation
- DBT and IndiaAI, an Independent Business Division (IBD) under the Digital India Corporation, which is under the MEITY signed an MoU on 18th August 2025 for leveraging their respective expertise in biotechnology and artificial intelligence to drive innovation and development in India.
- Center for Biodesign, THSTI, Faridabad, has developed 3 prototypes: Septicheck- HPLC-based multiplex drug monitoring kit; Clevercup - a midstream urine collecting Device; and OncoAlert- a screening device for oral cancer
- A high yielding rice cultivar has been developed by editing DEP1 (DENSE PANICLE-1) gene which a negative regulator of yield. This advanced variety exhibited 20% increase in the yield compared to the wild type
- Two multi-epitope vaccine candidates, MEV1 and MEV2, were successfully cloned, expressed, and purified. Immunogenicity and challenge studies showed that both vaccines provided significant protection against *Brucella melitensis* and *Brucella abortus*.
- An Engineered Glucoamylase Secreting yeast strain as an import substitute during grain fermentation for 1G ethanol production was developed
- A rice variety ADT 39-Sub1 with tolerance to submergence released in 2025
- A drought resistant rice variety 'Arun' was developed by Assam Agricultural University, Jorhat, Assam and Assam Rice Research Institute, Titabar
- Animal Biosafety Level-3 (ABSL-3) Facility for Non-Human Primates was established at the Primate Research Centre, BRIC–National Institute of Immunology

- NBM has successfully delivered 02 COVID-19 vaccines, ZyCoV D and Corbevax, biosimilar Liraglutide for diabetes, pegylated interferon alpha-2b for COVID-19, first indigenous MRI scanner, single-use bioreactors, 09 Covid-19 diagnostic kits, ventilators and reagents

Achievements of DBT during the year 2025 are summarized below:

II. Policy reforms:

Key Highlights:

- 'Guidelines on Genetically Engineered Plants Containing Stacked Events, 2025' were notified.
- “Operational Guidelines for Implementing Scientific Entrepreneurship and Research Commercialization at iBRIC” were notified.
- The Department notified the '**Guidelines on Genetically Engineered Plants Containing Stacked Events, 2025**'. Biotechnology advancements have led to Genetically Engineered (GE) plants with stacked events, offering significant potential for agricultural innovation. The Review Committee on Genetic Manipulation (RCGM) has introduced '**Guidelines on Genetically Engineered Plants Containing Stacked Events, 2025**' for biosafety assessment, ensuring safe development and deployment. These guidelines provide a framework for organizations developing stacked GE plants in India, aligning with international standards and promoting innovation.
- **Operational Guidelines for Implementing Scientific Entrepreneurship and Research Commercialization at iBRIC** - DBT notified the “Operational Guidelines for Implementing Scientific Entrepreneurship and Research Commercialization at iBRIC” on 22nd January, 2025. The guidelines include details on process for approvals, time that can be spent by a Scientist wishing to avail the provisions of the Scheme while in employment at iBRIC and revenue sharing provisions amongst other things.

III. Quantitative Indicators:

Sl. No	Schemes/Outcomes	Achievements from Jan 2025 till date
1	No of Publications	##
2	No of Patents filed/Granted	##
3	No. of Product/Technology Developed	##
4	No. of Human Resources Trained	7446

5	New projects sanctioned	351
6	No. of principal investigators supported in new projects	482
7	No. of ongoing projects supported	1921
8.	No of Start ups supported	##

The inputs for Sl.No. 1,2,3 and 8 will be available in March 2026

IV. Sectoral Achievements:

Biomanufacturing and Biofoundry:

Key Highlights:

- 1st National Biofoundry Network to Strengthen Indigenous Biomanufacturing established
- The D.E.S.I.G.N for BioE3 Challenge for Youth was launched on 1st November 2025
- For the 1st time 3 researchers from DBT-BRIC Institutions participated in experiments on the International Space Station in the AXIOM-4 mission
- A “Stakeholders’ Consultation on Emerging Regulatory Pathways for Cell & Gene Therapy Products” was organized by DBT-BIRAC in February 2025
- 1st MoU has been signed between the DBT and the Government of Assam on 12th March 2025 for the establishment of BioE3 cell
- DBT IndiaAI, an Independent Business Division (IBD) under the Digital India Corporation, Technology signed an MoU on 18th August 2025 for collaboration in biotechnology and artificial intelligence
- **National Consultations on Thematic sectors**
- Under the BioE3 Policy, six thematic sectors/subsectors have been identified for implementation. These include: (i) Bio-based chemicals, biopolymers, active pharmaceutical ingredients (APIs) and enzymes, (ii) Smart proteins and functional foods, (iii) Precision biotherapeutics (cell & gene therapy, mRNA therapeutics and monoclonal antibodies), (iv) Climate-resilient agriculture, (v) Carbon capture and utilization; and (vi) Futuristic marine and space research. About 25 brainstorming sessions were organised

across the country with all stakeholders (academia, industry, SMEs and start-ups). As an outcome, the Strategic Roadmap/Landscaping Report has been formulated to implement these thematic sectors/subsectors under the Biomanufacturing initiative. The calls for inviting proposals for several thematic sectors/subsectors under the BioE3 Policy have been announced and over 2000 proposals were received. So far, 186 projects have been recommended for funding (Academia proposals: 131 and Industry / Industry-Academia proposals: 55).

- **Space Biomanufacturing:**

- A recent experiment on the Axiom-4 mission, under the BioE3 policy, has successfully validated the potential of microalgae for space-based applications. Two edible microalgal species, *Chlorella sorokiniana-I* and *Dysmorphococcus globosus-HI*, demonstrated a remarkable two-fold increase in growth in microgravity compared to ground controls.
- The second experiment provided a first proof of concept for the growth of cyanobacteria on urea. This opens the possibility for developing methods to utilise human wastes (CO₂ and urea) to generate useful nutritional supplements for astronauts during long-term space travel.
- India's first human muscle stem-cell experiment on the International Space Station demonstrated that human muscle regeneration is significantly impaired in microgravity, with reduced mitochondrial function and slower differentiation—mirroring features of sarcopenia on Earth. These preliminary results establish microgravity as an accelerated model of muscle aging.

- **Regulatory Conclaves**

- Regulatory conclaves are being organized to develop a framework for coordinated regulatory reforms for each of the thematic sectors/sub-sectors. A “Regulatory Conclave on Smart Proteins” was organised in April 2024. Subsequently, a “Stakeholders’ Consultation on Emerging Regulatory Pathways for Cell & Gene Therapy Products” was organized by DBT-BIRAC in February 2025. The regulatory conclaves for other areas are in the pipeline.

- **Setting up of BioEnablers**

- DBT-BIRAC ‘मूलांकुर’ BioEnablers including Bio-Artificial Intelligence (AI) Hubs, Biofoundries, and Biomanufacturing Hubs are being set up across the country. So far 21 proposals have been recommended for funding (Academia proposals: 6 and Industry / Industry-Academia proposals: 15) for setting up of Biofoundries and Biomanufacturing Hubs. These Bioenablers are expected to augment research, innovation and scale up across these sectors,
- India's 1st National Biofoundry Network comprising 6 Biofoundries and ‘High-Performance Biomanufacturing Platform under the BioE3 Policy’ were launched.
- A call for inviting proposals under Bio-Artificial Intelligence Hubs was also announced and over 250 proposals have been received. Pitch Talks and a workshop with various stakeholders were conducted. The

proposals are under various stages of evaluation.

- **Inter-Ministerial Collaborations:**

The Department of Biotechnology (DBT) under the Ministry of Science and Technology, and IndiaAI, an Independent Business Division (IBD) under the Digital India Corporation, which is under the Ministry of Electronics & Information Technology signed an MoU on 18th August 2025. The purpose of the MoU is designed to foster collaboration between the two organizations, leveraging their respective expertise in biotechnology and artificial intelligence to drive innovation and development in India.

- **Centre-State Partnerships:**

- In order to establish Centre-State Partnership under BioE3 Policy, a Centre-State Partnership Conclave on the BioE3 Policy, was chaired by the Hon'ble MoS (I/C), Ministry of Science & Technology, Dr. Jitendra Singh, on 7th February 2025. During the conclave the State Governments were urged to set up BioE3 Cells, which would serve as interconnected knowledge hubs linking State and National stakeholders. These cells are intended to ensure that biomanufacturing initiatives align with local priorities and resources, while remaining connected to the national objectives.
- “Operational Guidelines for Establishment of BioE3 Cells in the States” have been approved.
- Stakeholder Meetings have been held and follow-up action initiated for establishing State BioE3 Cell and formulating State BioE3 Action Plan with the states of Gujarat, Maharashtra, and Punjab. Discussion is in advance stages with Kerala, Karnataka, Odisha, and Telangana
- As an outcome, 1st MoU has been signed between the DBT and the Government of Assam on 12th March 2025, to formalize a strategic collaboration.
- Draft MoU has also been formulated with the Government of Odisha, Maharashtra and other states are in the pipeline.
- Network project on Large Cardamom is under Implementation with Sikkim State S&T Council in collaboration with iBRIC+. A BioE3 Cell has been notified in state of Sikkim.

- **Skill Development:**

- The D.E.S.I.G.N for BioE3 Challenge for Youth was launched on 1st November 2025. It is a nationwide call to young innovators under the theme “Design Microbes, Molecules & More” to conceptualize innovative designs and solutions using microbes, molecules, and biotechnology to address real-world challenges.

- **Outreach Activities:**

- Outreach activities for the BioE3 Policy are being carried out extensively through press meets, social media platforms, editorials, and school campaigns to highlight its significance.
- To broadcast the activities under the Biofoundry and Biomanufacturing Initiative, a dedicated Website for Biomanufacturing and Biofoundry has also been established.
- To further disseminate information about the BioE3 Policy and discuss thematic sectors/subsectors, DBT and BIRAC have launched a 'Webinar Series on Biofoundry and Biomanufacturing' Initiative. Fourteen Webinars have been organised under the series.

Healthcare: Medical Biotechnology:

Key highlights:

- Building Indian Tools for Indian Pregnancies: Key Findings and Insights from GARBH-INi
- Indigenous AI driven models redefining pregnancy dating Models for dating gestational age
- Genetic determinants of pre-term birth: A panel consisting of 66 SNPs has been developed which can predict sPTB in Indian women with a reasonable accuracy.
- Garb-Ini biorepository: A National Resource; Cohort with 12000 pregnant women, longitudinally collected 1 lakhs ultrasound images, 14 lakhs biospecimens
- Rapid dipstick-based assay for identification of PTB-associated bacteria in the reproductive tract.
- Consortia of *Lactobacillus crispatus* isolates with potential health benefits developed and technology transferred to a leading Indian nutraceutical company based in Ahmedabad, where it will be utilized for both nutraceutical and cosmetic applications.
- Several high impact factor publications in reputed international journals

• Ind-CEPI

Early-stage development of vaccine candidates for Chikungunya, Coronavirus and Monkey pox Setting up of well-equipped shared infrastructure for vaccine development at BRIC-THSTI, including BSL-3 facility, Bioassay laboratory (recognized as one of the 17 labs of CEPI centralized lab network) and Experimental Animal Facility. Conducting the 2nd Advanced Vaccinology Course (TIVaC 2024; from 27th May to 1st June, 2024) by BRIC-THSTI, with 56 participants from India and LMICs.

- NBM has successfully delivered 02 COVID-19 vaccines, ZyCoV D and Corbevax, biosimilar Liraglutide for diabetes, pegylated interferon alpha-2b for COVID-19, first indigenous MRI scanner, single-use bioreactors, 09 Covid-19 diagnostic kits, ventilators and reagents
- An enzymatic pathway for karyaphore degradation in Mycobacterium tuberculosis cultures and in the lungs of infected mice
- ITBPF and DBT signed an MoU to undertake joint research projects, focusing on areas such as human adaptability to high altitudes, biosecurity, biomedical devices, prosthetics and food biotechnology etc
- 3 prototypes: Septicheck- HPLC-based multiplex drug monitoring kit; Clevercup - a midstream urine collecting Device; and OncoAlert- a screening device for oral cancer were developed
- Leveraging Genomics and AI to map 'Drug resistance' for rapid and comprehensive identification of drug-resistant TB strains. Whole Genome sequencing of 18000 MTB isolates completed. It will support evidence-based strategies for more effective TB control and management
- Neonatal Sepsis program: Universal microbial sample transport medium for genomic and metagenomic studies. Technology transferred to: Ruhvenile Biomedical Pvt. Ltd.,

- 18 Patents (including 10 provisional patents) filed in 2025-26 in the area Bioengineering and Drug Discovery
- Technologies launched in market:
 - AInoHeal - Advanced Wound Healing Technology (Installed in 50+ hospitals, 6.5 Cr follow-up funding)
 - Hip Pro - elderly guardian smartbelt
 - Eternal (Device to prevent pressure ulcers in bed-ridden patients)
 - Functional Electrical Stimulator for Spastic Footdrop
 - Development of high performance, durable and cost-effective micro-scissors for microsurgical applications (Indian product comparable to imported scissors developed)
- GenomeIndia", a Flagship Programme of the Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India, recognizes the exceptional genetic landscape of the Indian population. On 9th January 2025, Hon'ble Prime in a special video address hailed DBT GenomeIndia Project as a defining moment in the country's biotechnology landscape. Under the leadership of Prime Minister Narendra Modi the Indian Genomic Data Set unveiled and Union Minister Dr. Jitendra Singh launched the 'Framework for Exchange of Data Protocols (FeED)' and the Indian Biological Data Centre (IBDC) Portals, making 10,000 whole genome samples accessible to researchers across India and the globe.
- **Data Driven Research to Eradicate TB – “Dare2eraD TB”** programme This is aligned with ‘**TB MukT Bharat**’ initiative of Govt. of India. As on date, 18000 MTB isolates from new tuberculosis patients spread across most of the states in India have been sequenced and the sequences analysed. Sequence analysis has revealed the distribution of distinct Mycobacterium tuberculosis lineages within the Indian population and highlighted their correlations with drug resistance profiles. The lineage 1 and 3, which are more prevalent in India historically, shows lower prevalence of drug resistance, while the lineages 2 and 4, which are relatively lower in numbers, show higher prevalence of Multi Drug Resistance.
- Enzymatic Pathway for Kupyaphore Degradation in Mycobacterium tuberculosis: Mechanism of Metal Homeostasis and Turnover. In this collaborative research, a novel metabolite degradation pathway has been identified. While the turnover of nucleic acids and proteins is well understood, the degradation of metabolites remains poorly explored. Until now, only the biosynthesis and function of metallophore metabolites had been studied. This study, however, delineates the degradation of metallophores into simpler, assimilable compounds within biological systems. Here, the researchers decipher an enzymatic pathway for kupyaphore degradation in Mycobacterium tuberculosis cultures and in the lungs of infected mice. (<https://doi.org/10.1021/acschembio.5c00078>)
- **Garbh-Ini:** Recognizing the enormity of the preterm birth syndrome and with an aim to find solutions for better birth outcomes, an interdisciplinary inter-institutional program, Garbh-Ini, is being supported. The

pregnancy cohort has completed the enrollment of 12000 pregnant women. The major achievements include Ultrasound and AI-driven tools for accurate assessment of gestational age and personalized prediction of birth outcomes, a Genome Wide Association Study on 6,211 women enrolled in the GARBH-INi cohort has identified 66 genetic markers that can predict the risk of preterm birth, a dipstick assay to identify mothers at risk for pre-term birth and a national biorepository with completely phenotyped longitudinal biospecimens (archived in 14 lakh aliquots) and 5 lakh ultrasound images has been created. The database includes longitudinal clinical data of 2000+ variables, & ultrasound images & videos from 10,000+ women.

- **Interministerial Collaboration:** Indo-Tibetan Border Police Force (ITBPF) and Department of Biotechnology (DBT) Sign MoU for Collaborative Biomedical Research and Training on 31st July 2025. This collaboration aims to harness the expertise of ITBPF's specialized medical and paramedical facilities and DBT's robust research and innovation ecosystem to address critical scientific and technological challenges of national importance. ITBPF and DBT will undertake joint research projects, focusing on areas such as human adaptability to high altitudes, biosecurity, biomedical devices, prosthetics and food biotechnology etc., as per the requirement of the forces. This partnership underscores the commitment of ITBPF and DBT to foster innovation, enhance research capabilities, and contributing to India's scientific progress, in alignment with the vision of a *Viksit Bharat by 2047*.
- **Biodesign and Biomedical Engineering:** Two products have been commercialized:
 - InoHeal - Advanced Wound Healing Technology; The device is a comprehensive wound healing technology to facilitate accelerated healing of medically complex wounds like diabetic foot ulcers, pressure sores and infectious wounds etc. It will overcome the challenges of halted wound healing by exudate removal, reducing inflammation and oedema, enhancing cell proliferation and tissue perfusion and controlling microbial growth.
 - Hip Pro - elderly guardian smartbelt. It provides instant protection by allowing the user to Automatic inflate the slim cushions with a simple press of a button. This ensures that the hips are cushioned before impact, reducing the risk of injury from falls.
- The Department of Biotechnology and World Intellectual Property Organization (WIPO) have partnered to support Global Health Innovation Fellowship. A MoU was signed between WIPO, Department of Biotechnology, Biodesign centre at IIT-Delhi and IIT-Bombay, in 2023-24 in New Delhi. Four international fellows, 2 each at IIT Delhi and IIT Bombay, have joined the Biodesign Program for duration of 24 months. Two fellows have completed the prototype development. WIPO has also developed customized IP courses for DBT-Biodesign fellows.
- The School of International Biodesign supported at AIIMS and IIT Delhi commercialized two products: (A) InoHeal - Advanced Wound Healing Technology, (B) Hip Pro - elderly guardian smartbelt.
- The School of International Biodesign supported at AIIMS and IIT Delhi licensed two products: (A) "Urovib: A Catheter Associated Urinary Tract Infection CAUTI prevention Device"; and (B) "Preztic - Precision Needle Navigation System for the Ultrasound Machines"

- Center for Biodesign, THSTI, Faridabad, has developed 3 prototypes: Septicheck- HPLC-based multiplex drug monitoring kit; Clevercup - a midstream urine collecting Device; and OncoAlert- a screening device for oral cancer.
- Cabinet approved National Biopharma Mission (NBM) Mission has supported 161 projects of which 80 projects have been completed and closed and 56 are in process of financial closure. About 25 projects are ongoing for achieving final milestones. In the last 07 years the Mission has successfully delivered 02 COVID-19 vaccines, ZyCoV D and Corbevax, biosimilar Liraglutide for diabetes, pegylated interferon alpha-2b for COVID-19, first indigenous MRI scanner, single-use bioreactors, 09 Covid-19 diagnostic kits, ventilators and reagents, Laboratory Information Management System, CHO Cell culture media, which have been developed and commercialized. Out of the supported projects for shared facilities, 21 facilities have been successfully established and 18 of them are providing services.
- In 2025, RePORT India (Regional Prospective Observational Research for Tuberculosis) delivered major scientific, clinical, and policy-impact achievements that strengthened India's leadership in global tuberculosis (TB) research. Across multiple partner institutions, RePORT India produced high-impact evidence, advanced multi-site cohort science, and contributed directly to WHO global guidelines and India's national TB strategy. Actively using archived samples for planned sub-studies and new concepts (anemia pathways, InTGS WGS, systems serology, broad PCR platforms), enabling Phase II multi-omics and immunologic work without new recruitment.
- **miR-451a: A Dual-Action Defender Against Hepatitis-Driven Fatty Liver Disease:** One of the studies implemented at IPGMER has significantly advanced our understanding of the severe fatty liver disease in chronic hepatitis and positioned a regulatory micro-RNA, mi-451a as a promising therapeutic target. Hepatitis C infection leads to a sharp drop miR-451a, triggering a cascade that accelerates harmful fat accumulation in the liver. This work is published in the Journal of Translational Medicine with an impact factor of 8.5 DOI: 10.1186/s12967-025-06286-9
- **Mitophagy Efficiency Requires VDAC1-Mediated PHB2 Unmasking:** Understanding how cells efficiently clear damaged mitochondria is crucial, as failures in this process contribute to many neurodegenerative diseases. A study supported at IICB Kolkata has shown the essential role of Voltage Dependent Anion Channel 1 (**VDAC1**) in mitochondrial clearance, providing new insight into mechanisms relevant to progressive neurodegeneration. VDAC1 enables exposure of the inner mitochondrial membrane protein, prohibitin 2 (**PHB2**) which is a key trigger for mitophagy. (DOI: 10.1080/15548627.2024.2426116)
- **Mgat4b-mediated selective N-glycosylation regulates melanocyte development and melanoma progression:** Understanding how glycosylation shapes cell behaviour is essential for linking normal development to cancer. A study supported at BRIC-NII, Delhi has shown that selective N-glycosylation mediated by a glycosyl transferase- Mgat4b is a key regulator of both melanocyte development and melanoma progression, revealing that Mgat4b modifies specific proteins to guide pigment cell maturation while also driving melanoma growth and spread. Mgat4b can thus be explored as a therapeutic target for melanoma treatment. This work is published in PNAS; impact factor 9.1(DOI: 10.1073/pnas.2423831122

- Pathogens sabotage host physiological processes to cause infection and disease. Mycobacterium tuberculosis (Mtb), the bacterium that causes tuberculosis (TB) in humans, is known to alter many of the host's antibacterial functions. In this study, ICGEB researchers reported a mechanism that allows Mtb to specifically alter host RNA splicing. RNA splicing is fundamental to eukaryotic gene expression, and altered splicing events can impact the functioning of the proteins thus made. The group showed that a secreted virulence protein from Mtb interferes with the assembly of molecular machinery called spliceosomes. Loss of this virulence protein in Mtb impacts its survival in the host macrophages and animal models. The ability to alter host RNA splicing could have contributed to the evolution of pathogenic Mtb. (<https://doi.org/10.1073/pnas.2423349122>)
- A small molecule chemical inhibitor -‘Disarib’ that targets BCL2, an antiapoptotic protein which is over expressed in various cancers. The first phase of pre-clinical toxicological studies has been completed and is being evaluated further in a non-rodent model at GLP certified laboratory. Patent filing and IND submission is underway for Ph I trial.

C. Agriculture Biotechnology, Animal Biotechnology, Aquaculture and Marine Biology:

Key Highlights:

- Genome of Linseed (alsi) variety (T 397) indigenously sequenced.
- A patent applied for SNP wheat array chip for genotyping filed.
- Reference genome of cultivated safflower species sequenced
- Maize hybrid JH20909 for high planting density under AICRP trials
- Genome edited lines of brassica juncea var Varuna for glucosinolate content under AICRP trials.
- A rice variety ADT 39-Sub1 with tolerance to submergence released in 2025
- Chickpea lines under AVT Trials of ICAR-AICRP on Chickpea.
- Erect-type lodging resistant chickpea suitable for mechanical harvesting introgressed with CabHLH121 : AVT2 Trial ICAR-AICRP on Chickpea
- Early-flowering high-yielding chickpea introgressed with CaCLV3_1 : AVT2 Trial ICAR-AICRP on Chickpea
- Extra-large high-yielding Kabuli chickpea introgressed with CaABCC3: AVT2 Trial ICAR-AICRP on Chickpea
- Salinity tolerant yield-stable chickpea introgressed with CaHKT1: AVT1 Trial ICAR-AICRP on Chickpea
- High-protein content yield-stable chickpea introgressed with CaNAC22: AVT1 Trial ICAR-AICRP on Chickpea
- Drought tolerant high-yielding chickpea (JG11) introgressed with CabHLH10: AVT1 Trial ICAR-AICRP on Chickpea

- **Two Superior Drought Tolerant High-Yielding Chickpea Varieties:** Two drought-tolerant chickpea varieties ADVIKA and SAATVIK developed by BRIC-NIPGR under this DBT program have been selected as promising pulse cultivars in Self-Reliance in Pulses Mission Initiative. These improved seed varieties contribute to over 30% of the total breeder seed indent highlighting their significant adoption among chickpea varieties released so far.
- A high yielding rice cultivar has been developed using gene editing. The DEP1 (DENSE PANICLE-1) gene is a negative regulator of yield. A mutation in the DEP1 gene has been created using genome editing in the genetic background of the popular rice variety, MTU-1010. The DEP-1 edited line yields 20% more than the wild type line.
- BRIC-NIPGR researchers have developed transgene-free Indian mustard (*Brassica juncea*) lines using CRISPR/Cas9-mediated knockout of the ALKENYL HYDROXALKYL PRODUCING 2 (AOP2) gene family, leading to highest glucoraphanin accumulation (up to 75 PPM in microgreens). These mustard lines also have reduced harmful glucosinolates and could serve as a new generation of superfood, with potential anti-cancer and chemopreventive benefits. Their various parts – sprouts, microgreens, leaves, oil and oilcake – could be used for human and animal diets and for producing glucoraphanin-based supplements and medicines on an industrial scale.
- An extensive survey across major walnut-growing districts of Kashmir resulted in the screening and identification of 63 elite walnut genotypes based on nut and kernel traits. These genotypes have now been successfully conserved in a gene bank at KVK Kulgam. Among the identified genotypes, one very promising walnut genotype stands out. It has an excellent kernel recovery (68%), very light-coloured kernels, kernels that come out easily from the shell, medium-strength shells, plump kernels and high yield potential. This genotype is now being prepared for release as a new variety, and is expected to greatly benefit walnut farmers
- High-fidelity whole genome sequences of *B. juncea* (cv Varuna), *B. nigra* (line Sangam), and *B. carinata* (line HC-20) were developed. Genome assemblies of *B. nigra* (line Sangam,) and *B. carinata* (line HC-20) were also put together. For *B. nigra*, genome assembly was carried out using Oxford Nanopore long-read sequencing and optical mapping.
- Reference genome of cultivated safflower species, *Carthamus tinctorius* was constructed with the final complete assembly of 1.09 Gb. Genome predictions revealed 65,289 genes of which, ~70% were functionally annotated. Further, a safflower pan-genome was assembled consisting of an additional ~114.5Mb, bringing the total length of the pan-genome to 1.20 Gb.
- A high-quality telomere-to-telomere genome assembly of the dominant variety of linseed (T-397), has been completed with a final assembly size of ~495 Mb, with 15 well-scaffolded chromosomes and 29 telomeres, and 15 centromeres. A total of 34572 protein-coding genes were predicted and annotated with different databases. Genotyping of 2557 accessions has been completed using whole genome resequencing

approach and total 17,13,507 SNPs have been identified. [Yadav H*, Singh, N, Singh B, Kaur V, Sawant, S (2025). (Plant Biotechnol J. pp. 1–15. doi: 10.1111/pbi.70183)]

- Two transfer of technologies to companies have been facilitated, one in mustard and one in cotton. White rust resistance varieties Varuna, Pusa bold, Pusa Jai Kisan and Rohini were transferred to eight seed companies through signing a tripartite Technology Transfer Agreement (TTA) involving Delhi University, BIRAC. Two transgenic events of Cotton (Tg2E-13 and TM2) containing Cry1Ac gene are being transferred through BIRAC.
- A germplasm duplicate identification and removal tool (G-DIRT) (<http://webtools.nbpgr.ernet.in/gdirt/>) has been developed to identify and remove the duplicates based on genotypic information. The duplicate identification can be carried out based on total genotypic difference and homozygous difference. (Sahu, T. K., Singh, A. K., Mittal, S., Jha, S. K., Kumar, S., Jacob, S. R., & Singh, K. (2022). G-DIRT: a web server for identification and removal of duplicate germplasms based on identity-by-state analysis using single nucleotide polymorphism genotyping data. *Briefings in Bioinformatics*, 23(5), bbac348).
- A Pan-genome SNP Genotyping Array “Indian Chickpea panArray (IndiCA)” is developed for a major pulse food crop chickpea. It enables researchers to target novel trait-associated genomic variations that are missing from the traditional reference genome. The IndiCA assay diverse cultivar-specific (pan-genome) genomic variations especially of Indian origin in addition to SNPs from reference genome.
- “Indian Rice panArray (IndRA)” is a first-ever pan-genome-based SNP genotyping assay developed for crop plants. It enables researchers to target population-specific genomic variation by assaying SNP markers unique to different rice populations (indica, aromatic, aus and japonica, etc.), in addition to markers from the japonica Nipponbare reference genome. Therefore, IndRA provides higher genomic coverage across diverse rice populations compared to other genotyping arrays available for rice.
- A high-quality SNP chip with 105,000 SNPs was developed and validated for high-density genotyping and trait mapping in wheat. The patent for wheat array entitled "Pan-genome Genic SNP Chip of Wheat and Applications Thereof" has been filed. Its patent application no. is 202511065089.
- A patent has been granted for an invention entitled “A method of expression of coat protein gene of Banana Bunchy Top Virus (BBTV) in bacterial host”.
- Maize hybrid JH20909 is under AICRP Advanced Varietal Trials I; suitable for high plant density planting (105,000 plants/ha).
- Telomere-to-telomere whole genome and Chloroplast genome of *Diplotaxis erucoides* (wild relative of Brassica) has been generated.
- In Brassica, *Alternaria* blight resistance line for monogenic dominant gene has been identified and mapping is underway.

- Rice ASD16 variety has been edited to generate SDN1 type mutation in OsBADH2 gene for enhanced aroma. These lines are now transgene free and may be taken for field testing.
- A microfluidic-based nano-fibre encapsulation system was developed to co-encapsulate arbuscular mycorrhizal fungi (AMF) spores and mycorrhizal helper bacteria (MHBs) in biodegradable alginate reinforced with calcium nanoparticles (ESP-BF-MHBs-AMF).
- Chitinase enzyme nanoformulation, particularly the ACNP formulation, were found to be the most effective method in controlling *P. viticola*, powder mildew *E. necator* of grapes and powdery mildew of tomato *Leveillula taurica*, even at a lower enzyme concentration. Chemical treatments were ineffective against the pathogen, emphasizing the potential of nanoformulations as a sustainable alternative.
- **National Certification System for Tissue Culture Raised Plants:** The National Certification System for Tissue Culture Raised Plants (NCS-TCP), established by DBT under the Seeds Act, 1966, continues to serve as India's flagship quality assurance framework for tissue-cultured planting material. The scale of NCS-TCP's impact is demonstrated by its certification of over 1.43 billion hardened plants since its inception. A notable milestone was reached in 2025 alone, with more than 210 million plants certified.
- 'Abu Saunf-440' fennel variety, a farmer-led innovation developed by Shri Ishaq Ali of Kachholi village, Sirohi, under the DBT Biotech-KISAN Hub is a climate-specific, drought-resistant, high-yielding, disease resistant variety. It was officially registered under the Protection of Plant Varieties and Farmers' Rights Act (PPV&FRA) in July 2025, marking the first fennel variety from Sirohi to receive national recognition. Cultivation has already spread over ~9,000 hectares in the foothills of Mount Abu, and an Abu Saunf Community Gene Bank has been established at Sirohi for biodiversity conservation.
- Ongoing research work at NIAB, Hyderabad on evaluating the vaccine potential of novel immunodominant proteins from the zoonotic bacterial pathogen *Brucella* has resulted in the development of vaccine candidates for brucellosis using three distinct approaches: immunodominant proteins, multi-epitope proteins, and target gene deletion. Two multi-epitope vaccine candidates, MEV1 and MEV2, were successfully cloned, expressed, and purified. Immunogenicity and challenge studies showed that both vaccines provided significant protection against *B. melitensis* and *B. abortus*.
- *Toxoplasma gondii*, an apicomplexan parasite with an intron-rich genome, has long posed a challenge to researchers seeking to understand how RNA splicing influences its biology. A study from NIAB showed the crucial role played by the splicing factor Cdc5, marking a major step forward in unravelling the parasite's gene-regulatory machinery. Identifying TgCdc5 as a master regulator of RNA splicing and parasite viability opens new doors for therapeutic and vaccine strategies against *Toxoplasma gondii*.

Key highlights:

- A total of 52 bioinformatics centers across the country are advancing and enabling cutting-edge biomedical research
- **IBDC web and data portals:** The IBDC web portal (<https://ibdc.dbtindia.gov.in/>) was developed and launched by the Honourable Union Minister of State for Science & Technology (I/C), Dr Jitendra Singh on 30th July, 2021. This portal acts as the entry point to all the services provided by the IBDC and summarises various aspects related to data submission, access, collaboration models, etc. Due to the size and complexity of the biological data, IBDC is being developed modularly. The data stored at the IBDC will enable big data analytics that will help identify emergent properties in biological systems and thus aid the development of novel solutions for problems faced by Indians in the areas of health, agriculture and the environment. IBDC operates through seven specialised data portals dedicated to managing diverse biological data types.
- A total of 52 bioinformatics centers across the country are advancing cutting-edge biomedical research, synthetic biology, and the development of AI-driven tools for healthcare and agriculture. These centers specialize in diverse domains, including structural bioinformatics, drug discovery, cheminformatics, metagenomics, and systems biology, making significant contributions to their respective fields.
- In DBT-Bioinformatics Center (BIC) at BRIC-National Institute of Immunology, a new machine-learning approach has been developed that can automatically identify new resistance-associated mutations and predict genotypic drug resistance without requiring prior knowledge of resistance markers. This study utilized 13,947 whole genome sequences from BV BRC, with known phenotypic drug resistance profiles, to train XGBoost and ANN classifiers for 5 first-line (Isoniazid, Ethambutol, Rifampicin, Streptomycin, Pyrazinamide) and 8 second-line (Kanamycin, Amikacin, Ethionamide, Ofloxacin, Moxifloxacin, Cycloserine, PAS, Capreomycin) tuberculosis drugs.

E. Energy and Environment and Bioresources

Key Highlights:

- An Engineered Glucoamylase Secreting yeast strain as an import substitute during grain fermentation for 1G ethanol production was developed by ICGEB
- BRIC-NABI developed an efficient photocatalyst to break down lignin into platform chemicals
- An Engineered Glucoamylase Secreting yeast strain as an import substitute during grain fermentation for 1G ethanol production was developed. ICGEB had earlier developed a Thermotolerant and inhibitor-tolerant *Saccharomyces cerevisiae* strain (NGY10) that is efficient in sugar fermentation for 1G ethanol production. This strain can be used for 1G ethanol production through grain fermentation when supplemented with glucoamylase externally. ICGEB has developed a Glucoamylase Secreting derivative

of *S. cerevisiae* NGY10 that enables ~ 50% reduction in external glucoamylase requirement during grain fermentation. The strain is Ready for industrial trial and subsequent transfer to industry.

- BRIC-NABI developed an efficient photocatalyst to break down lignin into platform chemicals; scaled up the reaction to a 500 mL photoreactor (patent granted, NDA signed with industry). Synthesis of lignosulfonate as a cement admixture from lignin waste (Indian Patent filed with application no. 202411103885) was achieved. Wood adhesive has also been prepared for wood powder board applications, which can replace the expensive urea formaldehyde-based resin. Polymer nanofibrous membrane fabrication with 40% lignin addition, replacing a large quantity of petroleum-derived polymer in filter membranes.
- A rapid, reproducible QUV (ASTM G154)-based protocol to screen plastics for biodegradability by simulating photo-oxidative ageing has been developed by ICT Mumbai. Films of LLDPE, PET, PLA, PBAT, and compostable plastics were evaluated through ΔE , tensile loss, and SEM analysis. PLA, PBAT, and compostable films showed 85–90% tensile loss and disintegration within 600–800 hours.

F. Emerging Frontiers in Biotechnology:

Key Highlights:

- Department has supported 230 projects in the current year. Projects are distributed PAN india

The Emerging Frontiers in Biotechnology (EFB) program of DBT is designed to promote innovative and high-risk research in emerging areas of biotechnology. It aims to address cutting-edge scientific challenges and create new knowledge and technologies that could have significant societal and economic impacts. 123 projects have been funded in the current year across the country.

v. Human Resource Development

- Better Mentorship & Monitoring: DBT Conducts Nationwide Webinars for 90 Star Colleges to Improve Programme Delivery
- Future-Ready Biotech Talent Pipeline: Over 700 Fellows Supported Through JRF, RA and Re-entry Grants
- DBT Initiatives Drive Higher STEM Enrolment and Lower Dropout Rates Across India

- **The Star College** programme supports colleges offering undergraduate education to enhance the quality of teaching of science subjects. Star Webinar sessions were organized to extend outreach to colleges, especially from Aspirational Districts, for providing mentoring and awareness towards networking opportunities as well as the various relevant schemes and programmes of the Government. To increase the footprint of the programme in North-East states, a special call has been announced for colleges from NER states. The Star College programme has enhanced the hands-on exposure to the Science students, enabled the colleges to take up student research projects, helped them to conduct more seminars and expert talks, etc.
- **A snapshot of DBTs support to various HRD programmes**

S.No	Program Name	New fellows joined in FY 2025-26
1.	JRF	501*
2.	RA	52
3.	PG Teaching	771
4.	TWAS	6
5.	BioCARE	67
6.	RRF	36

*154 activated their fellowship

VI. Infrastructure

Key Highlights:

- Accelerating India's Research Ecosystem: Advanced BSL-3, Cryo-EM, Stem Cell and Imaging Facilities Commissioned

DBT - Scientific Infrastructure Access for Harnessing Academia University Research Joint Collaboration (DBT-SAHAJ) is to creating “national” service facility/research resource/platform to provide access to resources that could not be provided by any single researcher's laboratory or scientific department:

- Under the BUILDER programme, support has been extended to 45 universities and institutes, including 9 central universities, 14 state universities, and 22 private universities or postgraduate colleges. Collectively, 177 departments have benefited from this initiative—34 in central universities, 56 in state universities, and 87 in private institutions.
- Under the **Research Resources and Facilities Programme (RRSFP– SAHAJ)**, the Department of Biotechnology (DBT) has supported **twelve state-of-the-art research facilities** across leading institutions to strengthen national capabilities in life sciences and biomedical research.

VII. North Eastern Region (NER) Programme

Key Highlights:

- A drought resistant rice variety ‘Arun’ was developed
- A modified syringe for detection of various enzymes captured by aptamer
- A technology for “Extraction of high-purity Theaflavins from fermented CTC tea leaves and black tea” was developed
- A drought resistant rice variety ‘Arun’ was developed by Assam Agricultural University, Jorhat, Assam and Assam Rice Research Institute, Titabar and released in November 2025 by Agriculture Minister, Government of Assam. The ‘Arun’ rice variety was developed by combining the popular traits of ‘Kolong’ with enhanced drought tolerance from ‘IR64-Drought’. This variety offers farmers a practical solution for sustainable rice production under increasingly variable climatic conditions.
- A modified syringe has been developed for detection of various enzymes captured by aptamer comprised of a magnet for prevention of attachment of streptavidin magnetic beads over the paper matrix in inverted position and paper wick for dye entrapment and capture to detect the specific enzyme from solution. A patent titled “A modified syringe for detection of various enzymes for various instrument free detection applications (Patent no. 568397)” has also been granted for the same.
- Value added products including squash, juice, jam, jelly, pickle, fruit bar, fermented health drink, candies, wine and mouth freshner has been developed from the wild apple collected from Nagaland and Meghalaya. These products were developed in collaboration with self-help group in Kamrup and Goalpara districts of Assam including local entrepreneurs and Krish Vigyan Kendra, Goalpara. These wild apple beverages will provide consumers with a nutritious, preservative-free drink while creating entrepreneurship and income opportunities for ethnic communities. Community-based cultivation and the establishment of cold-storage facilities will support reliable raw material supply and generate employment.
- A technology for “Extraction of high-purity Theaflavins from fermented CTC tea leaves and black tea” was developed. The present invention relates to a novel and efficient process for extracting black tea polyphenols, specifically Theaflavins (TF) of high purity, from fermented CTC (crush tea and curl) tea leaves and CTC black tea. Theaflavins exhibit health benefits such as antioxidant, anti-inflammatory, and antiviral effects, and are widely used in food, healthcare, medicine, and cosmetics. The process is low-cost, time-efficient, and yields high-purity theaflavin powder with a theaflavin content exceeding 40% by weight. A Patent (Application Number 202531087727) has been also filed for the same.
- Under the Advanced Level Institutional Biotech Hub project at the Institute of Advanced Study in Science and Technology (IASST), Guwahati, Assam, Kombucha has been successfully prepared using standard fermentation techniques involving green or black tea, sugar, and a SCOBY starter culture. Further value addition has been achieved by developing fruit-blended variants using locally available produce such as

watermelon, jackfruit, and pineapple. A patent filing is currently in progress for the innovative jackfruit-blended Kombucha formulation.

- Under the Biotech Hub Programme, a total of 44 workshops, symposia, and trainings were organized during this financial year, benefiting 1386 individuals. The programme also resulted in 23 publications and the development of 4 value-added products. 54 North East-specific germplasm and bioresources were collected. Furthermore, 8 technological interventions and field demonstrations were conducted. In addition, 218 beneficiaries, including farmers and local entrepreneurs, received targeted training through these initiatives.
- Under the Himalayan Bioresource Mission program, efficient agro-technology for *Swertia chirayita* and product development for direct use was achieved. *Gaultheria fragrantissima* oil rich in methyl salicylate is being optimized for pain-relief soap. Field training on cultivation and value addition of both species was conducted at BRIC-IBSD, Shillong. A success story was shared in Imphal to motivate farmers, and 1,000 saplings *Swertia chirayita* were supplied to CSIR-IIIM, Jammu for distribution to farmers of Jammu and Kashmir.
- Under the Himalayan Bioresource Mission program, a total of 17 workshops, symposia, and trainings were organized during this financial year, benefiting 368 individuals. The programme also resulted in 6 publications and the development of 12 value-added products. 126 North East-specific germplasm and bioresources were collected. Furthermore, 7 technological interventions and field demonstrations were conducted. In addition, 83 beneficiaries, including farmers and local entrepreneurs, received targeted training through these initiatives.

VIII. Regulatory Reforms

RCGM, DBT has taken several reforms including empowering of IBSCs, hence stringent mechanism to monitoring the IBSCs through their Minutes, Annual Compliance Reports and Medical Surveillance Reports has been started with IBKP portal. RCGM Secretariat is facilitating RCGM in the monitoring of IBSCs and assessment of compliance documents.

IX. National Resources/Facilities

Key Highlights:

- Animal Biosafety Level-3 (ABSL-3) Facility for Non-Human Primates was established at the Primate Research Centre, BRIC–National Institute of Immunology

BSL-3 Non-Human Primate Facility Inaugurated at BRIC–NII: On 10 November, coinciding with the 2nd BRIC Foundation Day, Dr. Jitendra Singh, Hon’ble Minister of State (Independent Charge), Ministry of Science & Technology, inaugurated the Animal Biosafety Level-3 (ABSL-3) Facility for Non-Human Primates at the Primate Research Centre, BRIC–National Institute of Immunology. The new ABSL-3 unit can accommodate up to 18 macaques, enabling high-containment in vitro and in vivo studies, including preclinical evaluation of vaccines and therapeutics.

x. Global Innovations:

Key Highlights:

- Union Cabinet Chaired by the Prime Minister Shri Narendra Modi has approved the continuation of the Biomedical Research Career Programme (BRCP), Phase-III

Biomedical Research Career Programme:

- **Union Cabinet Chaired by the Prime Minister Shri Narendra Modi has approved the continuation of the Biomedical Research Career Programme (BRCP), Phase-III** (2025-26 to 2030-31, with another six years (2031-32 to 2037-38), to service fellowships and grants approved till 2030-31, at a total cost of Rs. 1500 crore with DBT and WT, UK contributing Rs.1000 crore and Rs.500 crore respectively. The Department of Biotechnology (DBT), in alignment with Viksit Bharat goals for fostering skills and innovation, has launched the Phase III of Biomedical Research Career Programme (BRCP). The program will nurture top-tier scientific talent for cutting-edge biomedical research and promote interdisciplinary research for translational innovation. It will also strengthen systems supporting high-quality research, and reduce regional disparities in scientific capacity, to create world-class biomedical research capacity with global impact.
- DBT has signed a **Letter of Intent (LoI) on ‘UK-India FEMTECH (Women-Orientated Health Tech) Partnership’** with National Institute for Health and Care Research, Department of Health and Social Care, United Kingdom on 3rd March, 2025 as per Technology Security Initiative (TSI), Govt. of India.
- **A Letter of Intent (LoI)** has also been signed between the **ICMR-DBT, India and SNSF, Switzerland** on 11th March, 2025 desiring to promote interdisciplinary research and cooperation between the scientific communities of India and Switzerland to address the global health challenges, particularly in the context of One Health, which integrates human, animal, and environmental health. A new call is being prepared for inviting proposals.

xi. Biotechnology Research and Innovation Council (BRIC)

Key Highlights:

- BRIC has fostered 47 integrated multidisciplinary inter-institutional network programmes with the participation of over 100 Scientists.
- i3c BRIC RCB PhD Program enrolled 58 students
- The One Day One Genome mission released 244 annotated genomes

DBT has created one Autonomous Body, BRIC (Biotechnology Research and Innovation Council) subsuming the governance of 13 elite autonomous research institutions while retaining their distinct research identities. BRIC aims to profoundly impact Biotechnology research, education, entrepreneurship

in the country through culminating independent endeavours of the individual institutions. There are 13 BRIC institutions called 'iBRIC' and inclusion of two other DBT institutions RCB and ICGEB makes it 15, called 'iBRIC+'. The activities of BRIC are listed below

(i) Integrated Research Initiatives

- Networked Interdisciplinary Research Programs - BRIC has taken significant steps to consolidate and synergize research efforts across institutions by developing integrated research programs under iBRIC+. BRIC has fostered 47 integrated multidisciplinary inter-institutional network programmes with the participation of over 100 Scientists.
- **The i3c BRIC RCB PhD Program:** The year 2024 marked a revolutionary step in 'PhD' education in India. Dr. Jitendra Singh, Union Minister of State (IC) for Science and Technology and Earth Sciences launched the **i3c BRIC RCB PhD Program** in Biosciences. The programme will foster greater academic and research interaction among the institutions of the DBT BRIC (iBRICs), RCB and ICGEB, and will increase the professional networking opportunities for the Ph.D. scholars. With its first call opened in June 2024, a total of 58 students have been enrolled in its very first batch.
- **iBRIC+ Biotech Spotlight Series** – The iBRIC+ Biotech Spotlight Series is conducted every month. Each session features scientific presentations by researchers from three iBRIC+, showcasing their recent outstanding research articles or technologies. In addition, a special address is delivered by the Director. The BRIC Secretariat also provides updates on various governance and administrative matters. The Secretary, DBT/ DG BRIC, presents ongoing initiatives undertaken by BRIC and invites suggestions from all participants. 300+ Scientists of iBRIC+ participate. Since its launch in December 2024, a total of seven webinars have been held under this series. The talks have ranged across wide variety of topics, including antifungal vaccines, molecular and cellular basis of neuropsychiatric disorders, therapeutic strategies to impede ovarian aging, management of fungal diseases in crops and so on. The initiative enhances the visibility of research being carried out across iBRIC+ and fosters opportunities for collaboration.
- **The One Day One Genome mission** was launched on 9th November 2024 during the first BRIC Foundation Day celebrations. The programme has been conceptualized to catalogue the rich and unique microbial diversity of our nation and share it in an interesting manner with the general public. BRIC-NIBMG, Kalyani has been entrusted with the task of posting details of one microbial genome sequenced at iBRIC+ in simple terms per day through social media handles for the masses. Till date, 244 annotated microbial genomes have been released.

(ii) Zero Waste Life initiative - The Zero Waste Life on Campus programme promotes sustainability across iBRIC+ campuses through the 5Rs—Reduce, Reuse, Refuse, Recycle, Repurpose—enhanced by a sixth, Research Insights, and aligns with the national Mission LiFE movement. Diverse campus environments help test and refine recycling technologies and management models. Some of the key Initiatives by iBRIC+ are as follows:

- BRIC-RGCB achieved an A+ green protocol rating for excellence in waste, water, energy, and biodiversity conservation.
- ICGEB developed an in-house inoculum that produces 60–70% methane biogas in 16 days, reducing food waste from ~60 kg/day to <3 kg/day.
- BRIC-THSTI recycled 4,400 kg of paper into diaries, pens, and reams, creating a closed-loop system.

- BRIC-NABI incentivises nearby villagers to collect plastic waste, offering incentives such as 1 kg rice for 2 kg plastic.
- BRIC-THSTI, BRIC-NIAB, RCB promote electric vehicles and charging infrastructure.
- BRIC-NIPGR installed Retrofit Emission Control Devices in diesel generators, cutting harmful emissions by up to 70%.
- BRIC-THSTI & BRIC-CDFD repurpose packaging (wood/cardboard) into functional campus items such as furniture, pedestal bases, step ladders, almirah legs, and tender boxes.
- Installation of solar panels/heaters lowers energy costs and carbon footprint.
- Single-use plastics discouraged in daily operations, meetings, and events.
- BRIC-NIAB reuses RO wastewater for gardening.
- BRIC-NABI established herbal garden to foster a self-sustaining ecosystem.

XII. Biotechnology Industry Research Assistance Council (BIRAC)

Key Highlights:

- 75 BioNEST Centres and 19 E-YUVA Centres are contributing to a cumulative incubation space exceeding 9,00,000 sq. ft.
- The E-YUVA scheme has demonstrated substantial growth, expanding its national footprint from 10 to 19 pre-incubation centres across 15 States and Union Territories
- **Bio-incubators Nurturing Enterprise for Scaling Technologies (BioNEST):** BIRAC's Incubation network has expanded to comprise 75 BioNEST Centres and 19 E-YUVA Centres contributing to a cumulative incubation space exceeding 9,00,000 sq. ft. and supporting over 3000+ entrepreneurs & Start-ups, more than 1300 IPs have been filed by the incubatees, and over 800 products have reached various stages of market deployment.
- **EYUVA (Encouraging Youth for Undertaking Innovative Research Through Vibrant Acceleration):** E-YUVA scheme is an initiative of BIRAC designed to cultivate a culture of applied research and innovation among young students across India. The scheme provides structured support to student innovators at the undergraduate, postgraduate, and doctoral levels through mentorship, fellowships, research grants, and access to incubation facilities. The E-YUVA scheme has demonstrated substantial growth, expanding its national footprint from 10 to 19 pre-incubation centres across 15 States and Union Territories. Through two national calls, the scheme has supported over 460 Fellows, comprising undergraduate, postgraduate, and postdoctoral students.
- **Selected technologies/products that are now being used commercially**
- Immuneel Therapeutics Pvt. Ltd Initiated sales of Varnimcabtagene autoleucel, IMN-003A (also ARI-0001) is a novel CD19-targeted Chimeric antigen receptor (CAR) T cell therapy targeting B cell malignancies. It involves using body's own immune system to treat cancer after genetic modification of lymphocytes.

- Vibrasense + T is a portable, handheld, rechargeable device designed for comprehensive quantitative sensory testing (QST). It offers precise quantification of Vibration, Warm, and Cold perception thresholds. By assessing both large and small nerve fiber function, Vibrasense + T provides a more complete picture of neurological health.
- Biodimension (supported by BIRAC under BIG scheme): The company has already generated approximately ₹35 lakhs in revenue, including income from other tissue models
- Xmachines (Flic Farm Private Limited) (supported by BIRAC under SBIRI scheme): Raised INR 3 Cr from Coromandel Fertilizers which is a Murugappa groups company; Part of Shark tank India Season 3; secured funding of INR 50L from Ritesh Agarwal of Oyorooms & Namita Thapar of Emcure Pharma; Exported 3 Robots to Europe, Spain & Australia and have received more orders this year from Saudi Arabia & Latin America
- Bioscan Research Pvt Ltd (supported by BIRAC under SBIRI scheme): Cerebo ® - Instant Intracranial Bleed Detector, a handy, non-invasive, fully automatic device for detecting intracranial haemorrhage within a min.
- Techsolver Communications and Innovative Platforms Pvt. Ltd. (supported by BIRAC under Amrit Grand Challenge- ज्ञानCARE): Completed 200 clinical trials at AIIMS Jodhpur.
- M. J. Biopharm Pvt. Ltd. (supported by BIRAC under BIPP): Received market authorization from DCGI.
- Briota Technologies Pvt Ltd (supported by BIRAC under ज्ञानCARE): Live projects in pilot phases with various state NHMs. Included as part of National Program of NCDs and ready to scale with funding support from DST and VCs.
- Irillic Pvt. Ltd. in collaboration with CMR University (supported by BIRAC under ज्ञानCARE): Product has been marketed and commercialized.

NKR/AK

(रिलीज़ आईडी: 2204756) आगंतुक पटल : 2275
इस विज्ञप्ति को इन भाषाओं में पढ़ें: Urdu , हिन्दी