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BIOTECH EXPRESS

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Pinarayi Vijayan CM to inaugurate Biotech Lab At Life Sciences Park, Thiruvannthapuram

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Prof Ashok Pandey

Chief Mentor- BRSI,
CSIR-IITR, Lucknow, India

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https://nhbt2023.in/

Contact Person: Dr P Binod, Convener, NHBT-2023,
Email: binodkannur@niist.res.in, binodkannur@gmail.com,
Phone: +91-471-2515361, 944-701-4980

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Chief Editor
Dr. Seema P. Upadhye

Managing Editor:
Kamal Pratap Singh

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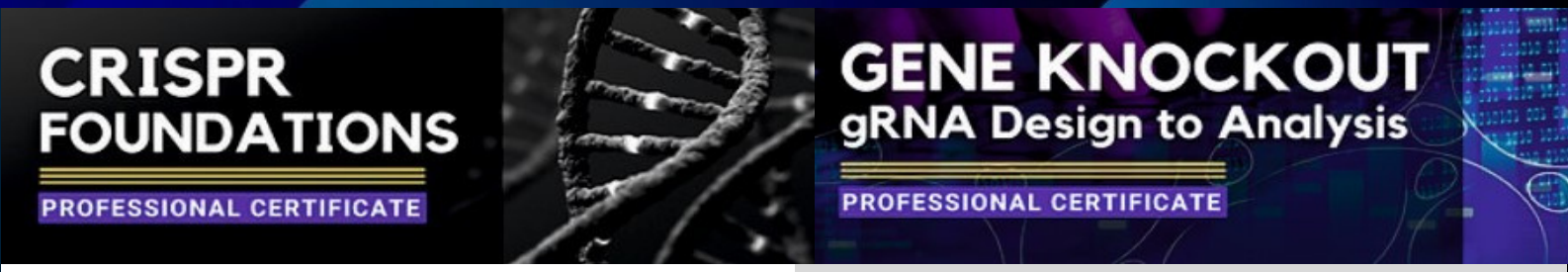

- Master the building blocks of CRISPR genome engineering
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Editorial

US Announced New Bold Goals for Harnessing Biotechnology and Biomanufacturing

The COVID-19 pandemic highlighted the critical role of biotechnology and biomanufacturing in addressing global healthcare needs. Now Every country including India is realizing the potential of biotechnology and making new guidelines to take benefits of this technology which has potential to advance every sector of the economy.

Arati Prabhakar, Ph.D., is Director of the White House Office of Science and Technology Policy (OSTP) and Assistant to the President for Science and Technology. In this capacity, Prabhakar is the President's Chief Advisor for Science and Technology, a member of the President's Cabinet, and co-chair of the President's Council of Advisors on Science and Technology (PCAST). Prabhakar's family immigrated from India to the United States when she was three years old.

In this article we will see what USA is now planning to harness the potential of Biotechnology and what are its next move.

On March 10, 2022, The Biden-Harris Administration has announced new bold goals and priorities through an Executive Order which was compiled by The White House Office of Science and Technology Policy.

Earlier in September 2022, the Biden administration issued an Executive Order on Advancing Biotechnology and Biomanufacturing Innovation. The overall intent of the Executive Order was to bring a "whole-of-government" approach to the advancement of economic activity derived biotechnology and biomanufacturing (i.e., the bioeconomy) in the United States.

Importantly, the Executive Order contains a promise to clarify — and potentially simplify — regulatory pathways for genome-edited microorganisms used in fermentation and related manufacturing processes. The currently applicable regulatory framework, known as the Coordinated Framework, was established in 1986. Like the current Executive Order, the Coordinated Framework seeks to strike a balance

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Box 1: Bold Goals For U.S. Biotechnology And Biomanufacturing in

Food and Agriculture

Theme 1: Improving Sustainability and Resource Conservation While Increasing Agricultural Productivity

Goal 1.1 Increase Agricultural Productivity – Over the next 10 years, increase agricultural total factor productivity growth to meet global food and nutrition security needs while improving natural resource use efficiency and conservation, toward the global goal of increasing agricultural productivity by 28% in the next decade.[23]

Goal 1.2: Increase Climate-Smart Feedstock Production and Biofuel Usage – By 2030, increase climate-smart production of conventional and alternative agricultural and forestry feedstocks for biomanufacturing, biobased products, and biofuels; reduce the lifecycle greenhouse gas intensity of biofuels by 50%; and expand overall biofuel blend rates in U.S. liquid transportation fuels by 50%.

Goal 1.3: Reduce Nitrogen Emissions – Within the next 5 years, develop technologies to reduce nitrogen emissions from agriculture, including by decreasing the need for applied nitrogen by increasing nitrogen use efficiency in plants and improving fertilizer products and practices.

Goal 1.4: Reduce Methane Emissions – By 2030, reduce methane emissions from agriculture, including by increasing biogas capture and utilization from manure management systems, reducing methane from ruminant livestock, and reducing methane emissions from food waste in landfills, to support the U.S. goal of reducing greenhouse gas emissions by 50%[24] and the global goal of reducing methane emissions by 30%[25].

Goal 1.5: Reduce Food Loss and Waste – By 2030, reduce food loss and waste by 50%[26], including by developing and commercializing new technologies and encouraging adoption of new and existing technologies.

Theme 2: Improving Food Nutrition, Quality, and Consumer Choice

Goal 2.1: Develop New Food and Feed Sources – Develop new food and feed sources, including production of novel or enhanced protein and fat sources at scale, to support the United Nations Sustainable Development Goal to eliminate global hunger by 2030[27].

Goal 2.2: Enhance Nutrient Density in Foods – Within the next 20 years, enhance nutrient density in agricultural plants and animals, develop underutilized plants and animals that have enhanced nutrient density, and build on traditional ecological knowledge to better utilize and conserve culturally important and nutritionally relevant plants and animals.

Goal 2.3: Reduce Foodborne Illness – Reduce incidence of foodborne illness, including with new and improved screening tools, toward meeting goals set in Healthy People 2030,[28] such as a 25% reduction in *Salmonella* illnesses.

Theme 3: Protecting Plants and Animals Against Environmental Stressors

Goal 3.1: Increase Capacity to Detect and Mitigate Pests and Pathogens – Within the next 5 years, improve capacity to detect and mitigate high-consequence existing and emerging animal and plant pathogens and pests, especially disease-vectoring and damaging pests.

Goal 3.2: Improve Resilience to Biotic and Abiotic Stress – Within the next 20 years, increase resilience of agriculture and forestry and develop tools that increase resilience to biotic stress (disease and pest threats) and abiotic stresses (including extremes in drought, heat, cold, and precipitation).

Box 2: Bold Goals For U.S. Biotechnology And Biomanufacturing in

Human Health

Theme 1: Accessible Health Monitoring

Goal 1.1: Identify Bio-Indicators of Health – In 5 years, leverage novel sensors to identify at least ten next-generation bio-indicators of health that can be monitored as part of standard healthy living and preventative medicine practice, such as immune competency or microbiome composition.

Goal 1.2: Integrated Health Diagnostics – In 20 years, develop and distribute a simple-to-use, affordable home diagnostic assay kit ("Health Kit") leveraging novel bio-indicators of health, useful in the clinic and community, and meeting the needs of diverse populations to decrease disparities in health outcomes by 50%.

Theme 2: Precision Multi-Omic Medicine

Goal 2.1: Collect Multi-Omic Data – In 5 years, collect multi-omic measures in large cohorts with participants from diverse populations and identify which measures are most relevant to the diagnosis and management of at least 50 diseases with high incidence and impact.

Goal 2.2: Enable Personal Multi-Ome – In 20 years, develop molecular classifications for diagnosis, prevention, and treatment to address leading causes of disease-related mortality in the U.S. and make these actionable with development of the $1,000 multi-ome.

Theme 3: Biomanufacturing of Cell-Based Therapies

Goal 3.1: Increase Therapeutic Efficacy – In 5 years, expand the technologies used to develop cell-based therapies to achieve at least 75% cell viability in patients.

Goal 3.2: Enable Scale-Up – In 20 years, increase the manufacturing scale of cell-based therapies to expand access, decrease health inequities, and decrease the manufacturing cost of cell-based therapies 10-fold.

Theme 4: AI-Driven Bioproduction of Therapeutics

Goal 4.1: Increase Manufacturing Speed – In 5 years, leverage a national network of resource labs to address barriers in autonomous production and bioproduction of existing biotherapeutics, increasing manufacturing speed of ten commonly prescribed therapeutics by 10-fold.

Goal 4.2: Increase Manufacturing Diversity – In 20 years, integrate artificial intelligence and machine learning (AI/ML) into the national network of resource labs to design novel biotherapeutics, increasing the speed of novel drug discovery and production by 10-fold.

Theme 5: Advanced Techniques in Gene Editing

Goal 5.1: Increase Editing Efficiency – In 5 years, further develop gene-editing systems for clinical use to enable, with little to no side effects, cures for ten diseases with known genetic causes.

Goal 5.2: Enable Scale-Up – In 20 years, strengthen the biomanufacturing ecosystem to produce at least 5 million doses of therapeutic gene-editing systems annually.

between regulation that protects public health and the environment and allowing for flexibility to avoid impeding innovation.

Based on an understanding of biotechnology as simply an extension of existing methods of production, the Coordinated Framework directed regulatory agencies, including the Food and Drug Administration (FDA), Environmental Protection Agency (EPA), and Department of Agriculture (USDA), to rely on existing statutory frameworks to regulate the products of biotechnology. As such, regulatory authority is distributed among multiple agencies depending on the nature of the product. This often results in multiple overlapping — and evolving — regulatory requirements for products relying on synthetic biology or genome editing, including fermentation-based products. The Coordinated Framework was updated in 2017 "to increase public confidence in the regulatory system and to prevent unnecessary barriers to future innovation and competitiveness," but the appropriate route to market continues to be complex for those using fermentation processes.

The Executive Order also nods to the increasing importance of genomics data in the bioeconomy and promises support to ensure that such data is interoperable and available over the long term. Both of these reflect long-term goals of industry and academic researchers alike and stake the administration's position on the importance of such data for ongoing U.S. innovation.

Regulatory Streamlining

As noted above, the Executive Order explicitly recognizes these challenges and calls for regulatory clarity and efficiency. This will all take place on a relatively short turnaround. The FDA Commissioner, USDA Secretary, and EPA Administrator are asked to engage with developers and external stakeholders to provide the administration, with information identifying ambiguity, gaps, or uncertainties in the Coordinated Framework and its related updates.

The Agencies are also instructed to provide to the

The President's E.O. calls on Federal departments and agencies to harness biotechnology and biomanufacturing innovation to further societal goals and transform industries related to:

(1) climate change solutions,
(2) food and agriculture innovation
(3) supply chain resilience
(4) human health
(5) cross-cutting advances

This oder includes five sections responsive to the E.O., individually authored by the following agencies and input from other Federal departments and agencies.

(1) Department of Energy (DOE)
(2) Department of Agriculture (USDA)
(3) Department of Commerce (DOC)
(4) Department of Health and Human Services (HHS)
(5) National Science Foundation

Box 3: Bold Goals For U.S. Biotechnology And Biomanufacturing in

Climate Change Solutions

Theme 1: Transportation and Stationary Fuels

Goal 1.1: Expand Feedstock Availability – In 20 years, collect and process 1.2 billion metric tons of conversion-ready, purpose-grown plants and waste-derived feedstocks and utilize >60 million metric tons of exhaust gas CO_2 suitable for conversion to fuels and products, while minimizing emissions, water use, habitat conversion, and other sustainability challenges.

Goal 1.2: Produce Sustainable Aviation Fuel (SAF) – In 7 years, produce 3 billion gallons of SAF with at least 50% (stretch 70%) reduction in GHG lifecycle emissions relative to conventional aviation fuels, with production rising to 35 billion gallons in 2050.

Goal 1.3: Develop Other Strategic Fuels – In 20 years, develop technologies to replace 50% (>15 billion gallons) of maritime fuel, off-road vehicle fuel, and rail fuel with low net GHG emission fuels.

Theme 2: Chemicals and Materials

Goal 2.1: Develop Low-Carbon-Intensity Chemicals and Materials – In 5 years, produce >20 commercially viable bioproducts with >70% reduced lifecycle GHG emissions over current production practices.

Goal 2.2: Spur a Circular Economy for Materials – In 20 years, demonstrate and deploy cost-effective and sustainable routes to convert bio-based feedstocks into recyclable-by-design polymers that can displace >90% of today's plastics and other commercial polymers at scale.

Theme 3: Climate-Focused Agricultural Systems and Plants

Goal 3.1: Develop Measurement Tools for Robust Feedstock Production Systems – In 5 years, develop new tools for measurement of carbon and nutrient fluxes in agricultural and bioeconomy feedstock systems that contribute to a national framework.

Goal 3.2: Engineer Better Feedstock Plants – In 5 years, engineer plants and manipulate plant microbiomes to produce drought tolerant feedstocks capable of growing on underutilized land with >20% improvement in nitrogen and phosphorus use efficiency.

Goal 3.3: Engineer Circular Food Protein Production Systems – In 5 years, demonstrate viable pathways to produce protein for food consumption including from biomass, waste, and CO_2 that achieve >50% lifecycle GHG emissions reduction and cost parity relative to current production methods.

Theme 4: Carbon Dioxide Removal

Goal 4.1: Develop Landscape-Scale Biotechnology Solutions – In 10 years, develop technologies to expand implementation of landscape-scale soil carbon sequestration and management techniques on tens of millions of acres, increasing soil health and drought resilience and supporting U.S. climate targets.

Goal 4.2: Enable Biomass with Carbon Removal and Storage (BiCRS) – In 9 years, demonstrate durable, scalable biomass CO_2 removal for <$100/net metric ton, on a path to enabling gigaton-scale removal.

general public, "plain-language information regarding the regulatory roles, responsibilities, and processes of each agency, including which agency or agencies are responsible for oversight of different types of products developed with biotechnology, with case studies, as appropriate." To further facilitate innovation, the agencies must include this information on the existing Unified Website for Biotechnology Regulation.

Even more, the agencies are tasked to develop a one-stop shop for "developers of biotechnology products to submit inquiries about a particular product and promptly receive a single, coordinated response that provides, to the extent practicable, information and, when appropriate, informal guidance regarding the process that the developers must follow for Federal regulatory review[.]"

The new March Executive Order aims to streamline the existing Coordinated Framework for Biotechnology and thus ease the path to market for a range of innovative products using synthetic biology or genome editing.

This is an important opportunity for regulators and industry alike to revisit the mechanisms being applied to the products and processes of fermentation-based production, including FDA's General Recognition of Safety notification process; USDA's Sustainable, Ecological, Consistent, Uniform, Responsible, Efficient (SECURE) Rule; EPA's regulation of biotechnology under the Toxic Substances Control Act (TSCA) Microbial Commercial Activities Notification (MCAN) process; the Federal Food, Drug and Cosmetic Act (FDCA); the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); and other laws governing whether a biotechnology product could adversely affect human health or the environment.

Each of the five sections presents bold goals that highlight what could be possible with the power of biology. These goals are intended to provide a broad vision for the U.S. bioeconomy and what can be achieved with concerted action from industry, academia, nonprofits, the Federal Government, and other organizations.

The bold goals set ambitious national targets for the next two decades to help establish R&D priorities that will be critical to advance the bioeconomy. They are not meant to represent commitments by an agency or department to undertake specific activities. Each section also outlines the essential R&D needed to achieve these bold goals for the U.S. bioeconomy, opportunities for public private collaboration, and recommendations for enhancing biosafety and biosecurity.

Underpinning all this work is the Administration's commitment to growing the U.S. bioeconomy safely, ethically, and equitably. Achieving these goals will require significant prioritization of R&D investments and other efforts across the U.S. government, as well as actions from the private sector; state, local, and tribal governments; and international partners. In the upcoming months, the White House Office of Science and Technology Policy will lead the development of a strategy and implementation plan to execute on R&D priorities and other actions identified in this report.

Bold goals for the U.S. bioeconomy include:

• Climate: In 20 years, demonstrate and deploy cost-effective and sustainable routes to convert bio-based feedstocks into recyclable-by-design polymers that can displace more than 90% of today's plastics and other commercial polymers at scale.

• Food and Agriculture: By 2030, reduce methane emissions from agriculture, including by increasing biogas capture and utilization from manure management systems, reducing methane from ruminant

Box 4: Bold Goals For U.S. Biotechnology And Biomanufacturing in

Supply Chain Resilience

Theme 1: Alternative Supply Chain Pathways via Biotechnologies and Biomanufacturing to Promote Economic Security

Goal 1.1: Improving Supply Chains for Critical Drugs – In 5 years, deploy broad synthetic biology and biomanufacturing capabilities to produce at least 25% of all active pharmaceutical ingredients (APIs) for small molecule drugs.

Goal 1.2: More Sustainable Chemical Production – In 20 years, produce at least 30% of the U.S. chemical demand via sustainable and cost-effective biomanufacturing pathways.

Goal 1.3: Accelerating Development of Biomanufactured Products – In 20 years, implement new biotechnologies into biomanufacturing workflows to produce ten new biomanufactured products in each of at least 3 sectors with identified supply chain bottlenecks.

Theme 2: Biomanufacturing Innovation to Enhance Supply Chain Resilience

Goal 2.1: Predictive Capabilities – In 5 years, enable prediction of at least 50% of supply chain weaknesses and direction of real-time biomanufacturing adjustments to address bottlenecks.

Goal 2.2: Real-time Biomanufacturing Process Adjustments – In 5 years, operationalize monitoring systems to measure and adjust biomanufacturing parameters in real time.

Goal 2.3: Adaptive Supply Chains – In 20 years, deploy a suite of advanced biomanufacturing platforms and capabilities to respond to supply chain bottlenecks within one week of identification.

Goal 2.4: Supply Chain Flexibility – In 20 years, implement 80% of viable biomanufacturing technologies to address domestic production capability needs.

Theme 3: Standards and Data Infrastructure to Support Biotechnology and Biomanufacturing Commercialization and Trade

Goal 3.1: Data Infrastructure – In 5 years, launch a data infrastructure, including effective and secure data sharing mechanisms, via advances and integration of data standards, tools, and capabilities.

Goal 3.2: Standards Infrastructure – In 20 years, establish a robust standards infrastructure to enable the rapid development and deployment of biomanufactured products and processes.

livestock, and reducing methane emissions from food waste in landfills, to support the U.S. goal of reducing greenhouse gas emissions by 50% and the global goal of reducing methane emissions by 30%.

• Supply Chain: In 20 years, produce at least 30% of the U.S. chemical demand via sustainable and cost-effective biomanufacturing pathways.

• Health: In 20 years, increase the manufacturing scale of cell-based therapies to expand access, decrease health inequities, and decrease the manufacturing cost of cell-based therapies 10-fold.

• Cross-Cutting Advances: In 5 years, sequence the genomes of one million microbial species and understand the function of at least 80% of the newly discovered genes.

In forthcoming reports and plans, departments and

Box 4: Bold Goals For U.S. Biotechnology And Biomanufacturing in

Supply Chain Resilience

Theme 1: Leverage Biodiversity Across the Tree of Life to Power the Bioeconomy

Goal 1.1: In 5 years, sequence the genomes of one million microbial species and understand the function of at least 80% of the newly discovered genes.

Goal 1.2: In 20 years, speed discovery of new gene sequences, metabolisms, and functions by 100-fold over current practice across all types of organisms.

Theme 2: Enhance Predictive Modeling and Engineering Design of Biological Systems

Goal 2.1: In 5 years, increase the ability to predictably design small molecules or enzymes capable of binding selectively to any desired target, and reduce the time needed for this process to 3 weeks.

Goal 2.2: In 20 years, leverage multidisciplinary advances in theory to enable high-confidence (90%) design of purposeful engineered biological systems at all scales, from molecular to ecosystem level.

Theme 3: Expand Capabilities to Build and Measure Performance and Quality of Biological Systems

Goal 3.1: In 5 years, develop the capabilities to read and write any genome, epigenome, transcriptome, and expressed proteome to enable the construction and measurement of any single cell within 30 days.

Goal 3.2: In 20 years, build a synthetic minimal plant that can be used as a chassis for food, feedstock, chemical, or pharmaceutical production.

Theme 4: Advance Scale-Up and Control of Biological Systems

Goal 4.1: In 5 years, advance bioprocess design, optimization, and control tools to enable predictable scale-up to commercial production of any bioprocess within 3 months with a 90% success rate.

Goal 4.2: In 20 years, advance integration of all aspects of feedstock use, organism design, process design, and end-of-use disposal with technoeconomic analysis such that sustainability and commercial goals can be achieved for more than 85% of new bioprocesses within the first year of deployment.

Theme 5: Innovate Biomanufacturing Approaches

Goal 5.1: In 5 years, reproducibly manufacture devices that integrate living and non-living components such as organ-chip or human-robotic interfaces that maintain over 90% viability and connectivity of components, paving the way for innovations in biomanufacturing including the development of human-assistive devices that will enable healthier aging.

Theme 6: Enable Ethical, Safe, and Equitable Co-Generation and Translation of Biotechnology Products

Goal 6.1: In 5 years, include broad public and end-user participation; technology co-generation; rigorous assessment; integration of social, behavioral, economic, and socio-technical sciences; and formal evaluations in all biotechnological and biomanufacturing projects from their beginning.

agencies will outline recommendations and steps that are underway to advance the following:

• Data for the bioeconomy – establishing a Data Initiative to ensure that high-quality, wideranging, easily accessible, and secure biological data sets can drive breakthroughs for the U.S. bioeconomy.

• Domestic biomanufacturing infrastructure – expanding domestic capacity to manufacture all the biotechnology products we invent in the United States and support a resilient supply chain.

• Workforce development – growing training and education opportunities for the biotechnology and biomanufacturing workforce of the future.

• Regulatory clarity and efficiency – improving the clarity and efficiency of the regulatory process for biotechnology products to help ensure products come to market safely and efficiently.

• Biosafety and biosecurity – creating a Biosafety and Biosecurity Innovation Initiative to reduce risks associated with advances in biotechnology and biomanufacturing.

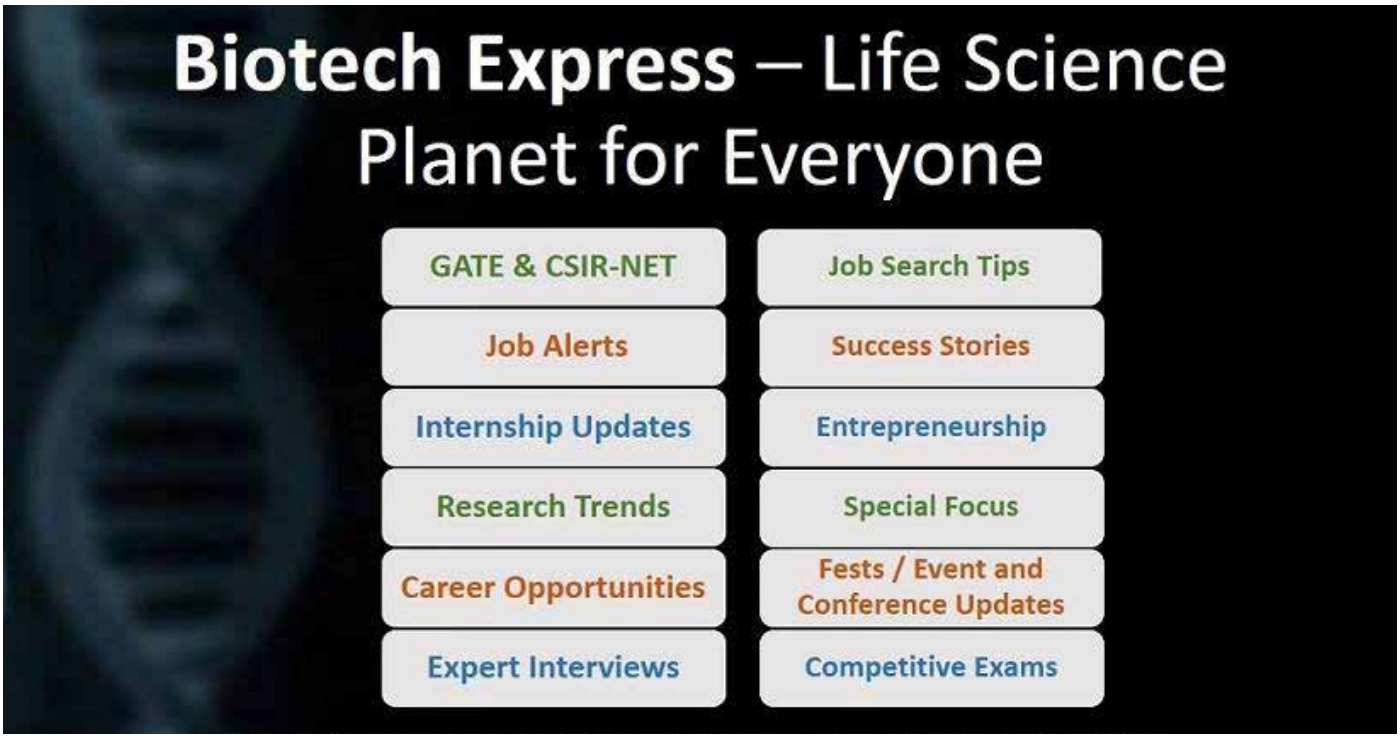
• International engagement R&D – pursuing cooperation through joint research projects and data sharing, while mitigating risks and reaffirming democratic values.

Conclusion:

The recent order from US office highlights the importance of biotechnology and biomanufacturing in different sectors of the economy. Using this document as reference countries like India and others can also modulate their biotechnology policies and goals to enhance their bioeconomy. Recently after pandemic India has emerged as top player in biotechnology but there is much more that can be done in this sector and US order in this direction can be a good reference material.

Reference:

https://www.whitehouse.gov/wp-content/uploads/2023/03/Bold-Goals-for-U.S.-Biotechnology-and-Biomanufacturing-Harnessing-Research-and-Development-To-Further-Societal-Goals-FINAL.pdf



Organisers

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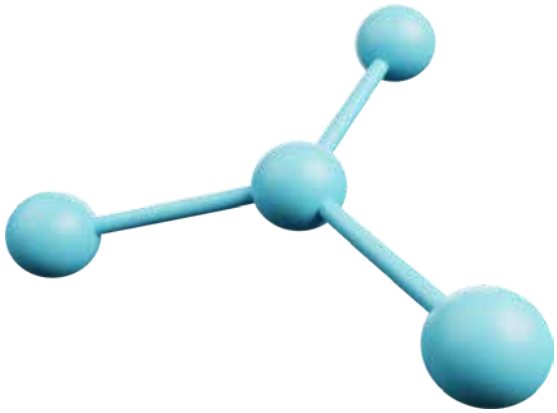
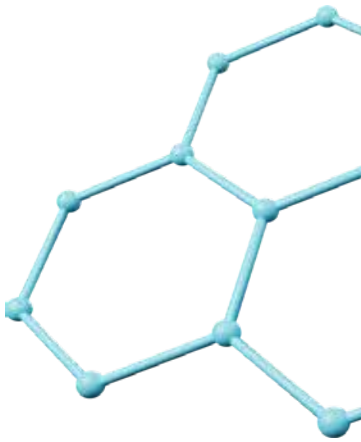
Event Highlights

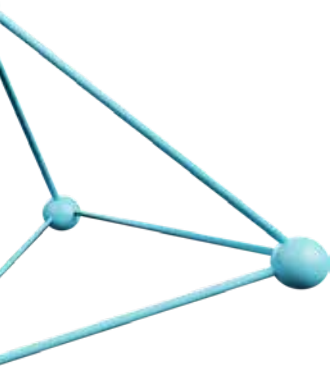


A REPORT ON

DRUG DISCOVERY & DEVELOPMENT WORKSHOP

MARCH 13 - APRIL 02, 2023





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The Drug Discovery & Development virtual workshop was a 3-week event that began on March 13th, 2023 and ended with a valedictory program on April 2nd, 2023.

This marks the fourth insightful workshop, which aimed to bring together professionals from the pharmaceutical industry to share their knowledge and expertise in the field of Drug Discovery and Development. The event attracted 91 participants from 12 different countries, including a few start-ups. The success of this workshop would not have been possible without the support of our sponsors, partners, etc., whose contributions played a crucial role in making the event a success.

Here are a few snippets and details from the workshop:

The whole program featured eight comprehensive sessions covering a range of topics related to drug discovery and development with expert speakers drawn from academia, industry, and regulatory bodies.(Detailed program will be accompanied by this document for your perusal).

Session 1: Discovery Sciences
Session 2: Computational Biology and Preclinical Development
Session 3: Drug Manufacturing
Session 4: Clinical & Regulatory
Session 5: Diagnostics
Session 6: Speciality Drugs
Session 7: Pharma/Biotech Success Stories
Session 8: Panel Discussion & Conclusion

Day 1 of The Drug Discovery and Development Workshop 2023 commenced with an inauguration by Dr. Radha Rangarajan, Director of CSIR-CDRI. Dr. Rangarajan has emphasized on Developing Drugs for India: Opportunities and Challenges, and the importance of drug discovery in improving healthcare by addressing unmet medical needs. She also emphasized the role of AI/ML in nextgeneration drug discovery programs and how quickly they could develop some of the novel molecules and speed up the process of clinical trials.

She highlighted how the technology-driven Indian service sector can be a partner in this space. During her inaugural address, she highlighted the role of Academia-Industry interactions and startups in the development of important drug candidates in the

Chief Guest, Dr. Radha Rangarajan at the opening ceremony

field of neglected tropical diseases, antimicrobial resistance, etc. She also urged the participants to make the most of this opportunity and enhance their skills and knowledge in this field.

Following that around 50 speakers from around the world shared their knowledge on various aspects of drug discovery and development and patiently answered the participants queries.

They also covered several concepts covering biologics, small & large molecules, artificial intelligence and several other topics related to drug discovery.

All the talks from the experts were meticulously planned and executed following the pipeline of drug discovery. Each talk was roughly for 45 minutes and allowed for 15 minutes discussions. Participants were encouraged to ask doubts and get clarifications from the speakers directly.The highlights of all these talks are provided in the form of press notes that that are attached with this document separately.

Valedictory function:

To conclude the whole event, a valedictory event (hybrid mode) was organized at the National Institute of Animal Biotechnology (NIAB), Hyderabad. This event was made available to the public to attend either online or in person at NIAB. There were over 300 registrations for the event, with approximately 60 attending in person and the remainder participated virtually via Zoom.

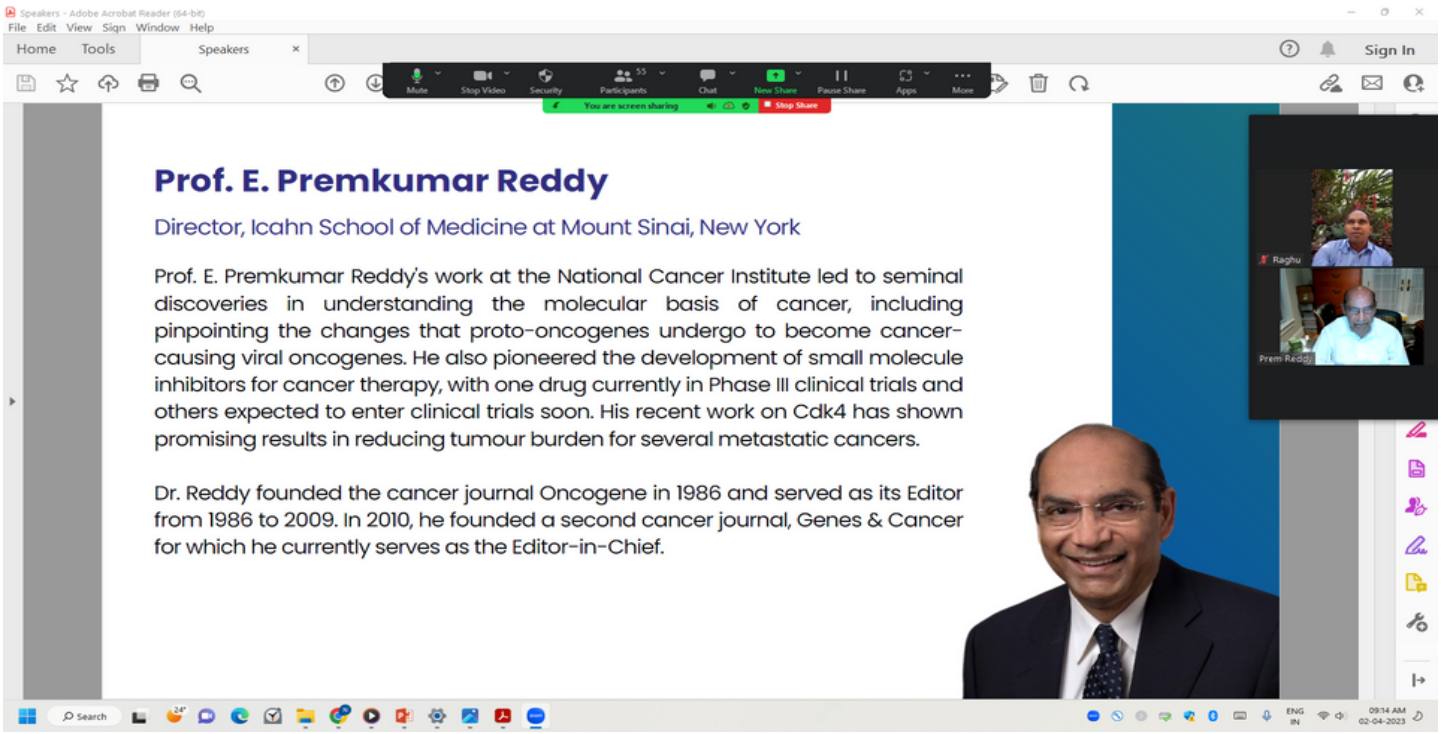
During the valedictory, Prof. Prem Kumar Reddy, Director, Ichan School of Medicine, Mount Sinai, New York, gave an indepthoverview of drug discovery from preclinical to clinical trials. His talk summarized in a practical way what participants learned in their three-week lectures.

Summary of Prof. Prem Kumar Reddy's talk:

Prof. Reddy focused on the "Fundamentals of targeted Drug Discovery and Development" explaining how to advance a therapeutic candidate from bench to bedside and preclinical proof of concept by establishing activity, bioavailability, and associated effects in cancerrelevant models. He further discussed the lack of potential drug molecules and FDA rules & regulations and the flow of the percentage of drugs entering into clinical trials.

He highlighted the costs involved and the validation process involved in drug development. He explained Human kinome and its significance in cancer research. Prof. Reddy further elaborated on target selection, validation lead discovery and lead optimization followed by preclinical and clinical evaluation- phase 1, 2, and 3. He further provided details on how the ki-

Group of attendees at the valedictory function at NIAB



nase target based drugs for BCR-ABL, FLT3, and Src in Cancer Research. He emphasized non-clinical toxicology, the development of biological products, and their regulatory consideration for clinical translation.

He highlighted the benefits of orally administered drugs over injectables as in case of protein based drugs.He then explained on the significance of Artificial Intelligence and Machine learning , preclinical evaluation by efficacious dose, Xenograft Models, and others involved in the process.

Prof. Reddy also suggested filling the gap between Aademia and industry in order to drive innovative product development by Indian Pharma and Biotech industries.

A strong collaboration between academia and the pharmaceutical industry is a win-win situation because each can combine their strengths to develop cost-effective drugs.

Finally, he concluded his address by presenting the current progress in cancer drug development and suggesting key tips for starting a biotech company.

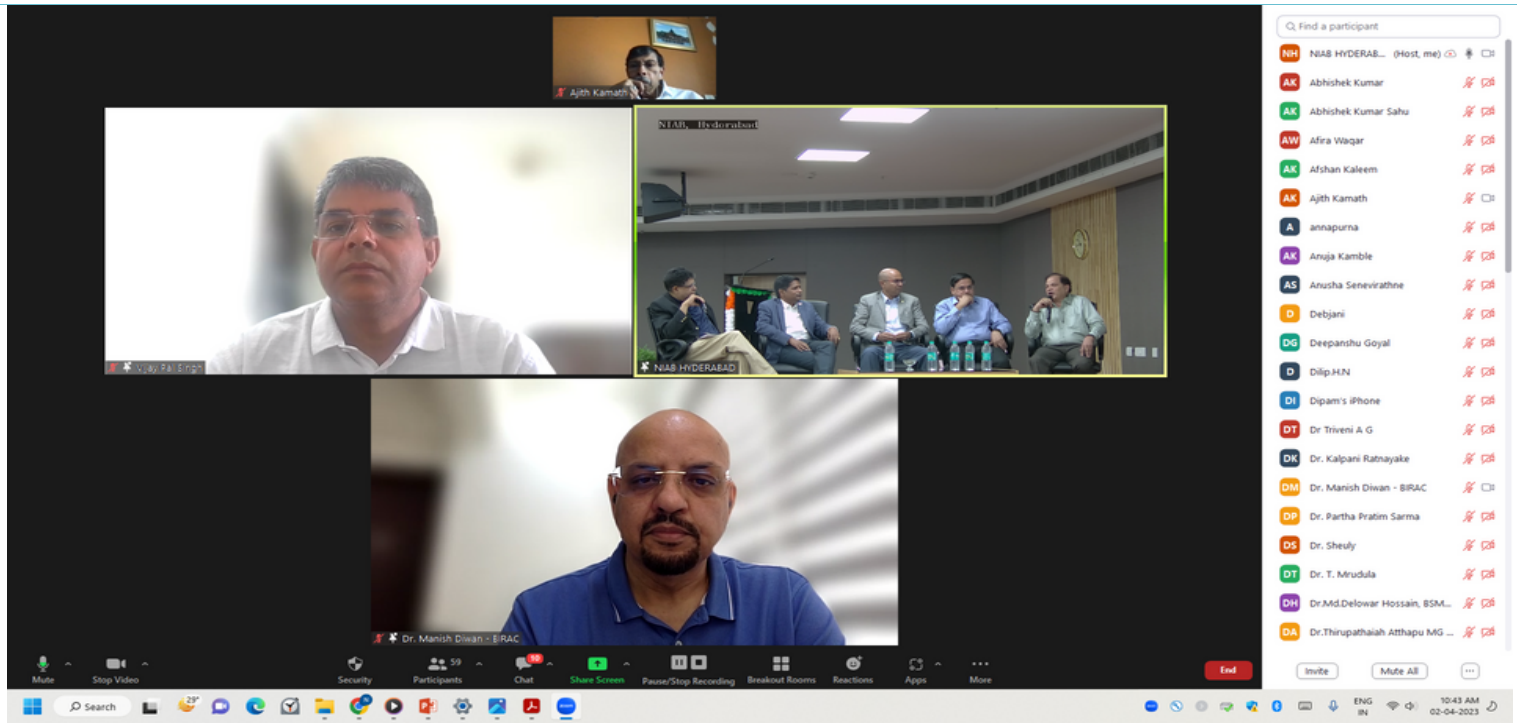
Panel Discussion: Future of Drug Discovery in India

A panel discussion on the future of drug discovery in India followed, featuring esteemed panelists including Dr. Vijay Pal Singh, Dr. Manish Diwan, Dr. C.S.N Murthy, Dr. Suresh Poosala, Dr. Ratnakar Palakodeti, and Mr. Prasant Bhavar discussing regulatory guidelines, challenges faced by Indian biotech startups, and the importance of academia-industry collaboration.

The discussion centered around the changes in regulatory guidelines for the Food Safety and Standards Authority of India (FSSAI) and the Central Drugs Standard Control Organisation (CDSCO), and the challenges faced by Indian biotech startups.

The panelists also discussed the importance of transgenic models, alternative models like spheroids, organoids, 3D bioprinting, and the role of Artificial Intelligence in silico medicine.

They also highlighted the need for Academia and Industry collaboration and the importance of developing a mature business mindset and new skills in India. Finally, the panelists emphasized the need for fund-



Panelists sharing a panel (hybrid mode) at NIAB

ing and commercial approaches to mitigate the risks involved in high-reward businesses. Dr. Uday Saxena concluded the discussion by stressing the importance of Pharma support for startups financially and an understanding of what the industry requires.

To conclude, this workshop in addition to providing knowledge, also provided

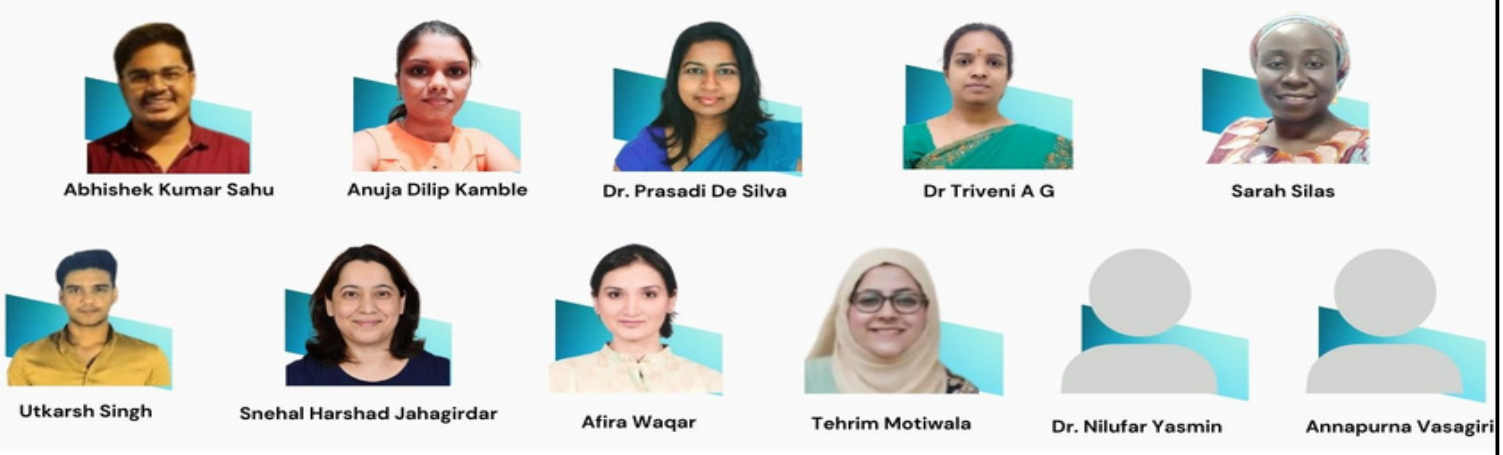
Networking Opportunities:
Professionals from the pharmaceutical sector had the chance to meet and exchange ideas at the workshop about the most recent advances in drug discovery. Attendees had the opportunity to learn from experts in the field, share their own experiences, and connect with like-minded professionals from around the world.

Hands-on training:
The highlight of the whole workshop is not only the lectures but also the hands-on training on drug discovery using computational tools provided by Schrodinger Inc. Participants greatly benefitted by understanding the theoretical concept along with the practical training.
Getting mentored by Industry experts: Since many of the participants were early-stage students their career-related queries were addressed by the top-quality speakers and mentors who were present during the whole workshop.

Honing presentation skills:
All the participants who attended the workshop were given an opportunity to present their area of work or topic of interest related to human diseases. They were given 10 minutes time slot to present and 5 minutes for feedback.

Inspiration:
To inspire the participants, successful cases of Indian start-ups were showcased with the speakers from the space of Pharma and Biologics, viz., Ms Kavita Iyer Rodrigues, Founder & CEO, Zumutor Biologics and Dr. Markandeya Gorantla, Chairman & MD, ATGC Biotech.

Funding:
Further, Ms. Padmaja Rupparel from BioAngels has



Winners of the
Drug Discovery & Development Workshop 2023

Award winners for student presentations

FABA has selected 11 participants for cash awards of Rs. 5000 based on their outstanding performance in the workshop. Here is the list of people who were selected for the presentation of awards.

1. Abhishek Kumar Sahu, M.Sc in Bioinformatics, Odisha University of Agriculture and Technology, India
2. Anuja Dilip Kamble, Doctoral Student at Savitribai Phule Pune University, India
3. Dr. Prasadi De Silva, Senior Lecturer, Uva Wellassa University, Sri Lanka
4. Dr. Triveni AG, Assistant Professor, Gulbarga University, India
5. Sarah Silas, Medical Laboratory Scientist, Gombe State Molecular Diagnostic Laboratory, Nigeria
6. Utkarsh Singh, Graduate, SGTB Khalsa College, India
7. Snehal Harshad Jahagirdar, BSc., MBA - Healthcare, Symbiosis Skills & Professional University, India
8. Afira Waqar, PhD fellow, Institute of Industrial Biotechnology, Government College University Lahore, Pakistan
9. Tehrim Motiwala, Ph.D. Candidate, University of KwaZulu-Natal, South Africa
10. Dr. Nilufar Yasmin, MD Resident, Bangabandhu Sheikh Mujib Medical University, Bangladesh
11. Annapurna Vasagiri, MSc Medicinal Chemistry, Sri Venkateshwara University, India

given a brilliant overview of the funding landscape for drug discovery in India.

Overall, the Drug Discovery and Development Workshop 2023 was an outstanding learning opportunity to exchange innovative ideas and enhance their knowledge and skills. Attendees obtained valuable knowledge on the latest advancements in drug discovery and development through captivating lectures and innovative research by industry experts. Undoubtedly, this workshop has made a significant impact in the field and will continue to do so in the future.

Chiesi Farmaceutici Completes Acquisition of Amryt Pharma Plc

Chiesi Farmaceutici S.p.A. ("Chiesi"), an international, research-focused biopharmaceuticals and healthcare group, today announced the completion of the acquisition of Amryt Pharma Plc ("Amryt") (Nasdaq: AMYT), a global, commercial-stage biopharmaceutical company dedicated to acquiring, developing, and commercializing novel treatments for rare diseases.

"We are excited to add the Amryt family to our company in this acquisition that demonstrates our commitment to rare diseases and aligns with our growth strategy through partnerships beyond internal research and development," said Giacomo

Chiesi, head of Chiesi Global Rare Diseases. "Amryt has unique and clinically differentiated products and additional promising drugs in its pipeline, and, as a benefit corporation certified B Corp, Chiesi has a patient-centric and sustainable model in place to make these treatments available to even more patients who need them. As of today, we are officially joining our forces to bring hope to people in need and look forward to this new chapter in our collective journey."

"This acquisition reflects Chiesi Group's commitment towards patients. Chiesi strives to create a world where it is common to have a therapy for all diseases and acts as a force for good for society and the planet," said Giuseppe Accogli, CEO of Chiesi Group "Amryt Pharma's team has delivered innovative treatments to rare disease patients with high unmet medical needs. By joining forces and expertise we will be able to grow our capabilities and further strengthen our position to provide a positive impact on patients living with rare diseases."

About Chiesi Global Rare Diseases

Chiesi Global Rare Diseases is a business unit of the Chiesi Group established to deliver innovative therapies and solutions for people affected by rare diseases. As a family business, Chiesi Group strives to create a world where it is common to have a therapy for all diseases and acts as a force for good, for society and the planet. The goal of the Global Rare Diseases unit is to ensure equal access so as many people as possible can experience their most fulfilling life. The unit collaborates with the rare disease community around the globe to bring voice to underserved people in the health care system. For more information visit www.chiesirarediseases.com.

About Chiesi Group

Chiesi is an international, research-focused biopharmaceuticals group that develops and markets innovative therapeutic solutions in respiratory health, rare diseases, and specialty care. The company's mission is to improve people's quality of life and act responsibly towards both the community and the environment. By changing its legal status to a Benefit Corporation in Italy, the US, and France, Chiesi's commitment to create shared value for society as a whole is legally binding and central to company-wide decision-making. As a certified B Corp since 2019, we're part of a global community of businesses that meet high standards of social and environmental impact. The company aims to reach Net-Zero greenhouse gases (GHG) emissions by 2035. With over 85 years of experience, Chiesi is headquartered in Parma (Italy), operates in 31 countries, and counts more than 6,500 employees. The Group's research and development centre in Parma works alongside 6 other important R&D hubs in France, the US, Canada, China, the UK, and Sweden. For further information please visit www.chiesi.com

About Amryt

Amryt is a global commercial-stage biopharmaceutical company focused on acquiring, developing and commercializing innovative treatments to help improve the lives of patients with rare and orphan diseases. Amryt comprises a strong and growing portfolio of commercial and development assets.
For more information on Amryt, including products, please visit www.amrytpharma.com.

Media Contact
Chiara Travagin
Rare Communication Manager
Mob. +39 348 8818985
c.travagin@chiesi.com

Featured Biotech News

India is emerging as the world's major Bio-economy with fast growing Biotech StartUps: MoS Jitendra Singh

April 7, 2023

Union Minister of State (Independent Charge) Science & Technology; Minister of State (Independent Charge) Earth Sciences; MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr Jitendra Singh said here today that under Prime Minister Narendra Modi, India is emerging as the world's major Bioeconomy with fast growing Biotech Start-Ups.

Delivering the inaugural address at the 20th Anniversary celebrations of Association of Biotechnology Led Enterprises (ABLE) today at India Habitat Centre here, Dr Jitendra Singh said that India has developed four indigenous Vaccines in just two years under "Mission COVID Suraksha" and augmented the manufacturing of Covaxin, and created necessary infrastructure for smooth development of future vaccines, so that our country is pandemic ready.

Dr Jitendra Singh called upon the Industry to help India achieve the target of $300 billion BioEconomy by 2030 and $1 trillion BioEconomy in the centenary celebration of India – India@100

The Minister said that in the Global Innovation Index 2022, India has moved to 40th rank from 81st position. We must now aspire to be in the top 25 in the near term and in the top five by India @ 100. Prime Minister Mr Narendra Modi has provided a huge impetus to innovation by adding Jai Anusandhan to the country's evergreen slogan of Jai Jawan, Jai Kisan, Jai Vigyan, he added.

Dr Jitendra Singh said that India has the third-largest StartUp ecosystem and is home to the fastest-growing unicorns. Startups are very important as they are a source of new ideas and technologies. India's Startups and R&D outcomes are setting global benchmarks and are at par with the world. Today the young talent of India, including women via startups or otherwise, are scripting the story of success for a thriving innovation led economy.

The Minister said that an enabling atmosphere for innovation was missing in the earlier policy initiatives and political dispensation but now that atmosphere is being provided by the political dispensation led by our Prime Minister Narendra Modi, India is leapfrogging.

Dr Jitendra Singh said, the Indian industry is the backbone of the fastest growing large economy of the world and has the potential to revolutionize and bring in a technology movement. Integration of Research, Startups, Academia and Industry is no longer an option but a dire necessity to attract young innovators in the country, he said.
The Minister said that ABLE in its 20th year of inception can make significant contribution to develop technologies, products, and providing solutions that help the global community at large.

He appreciated ABLE for bringing out a publication, "Enablers of Indian Biotech", on the occasion of its 20th Anniversary.

Bharat Biotech wins award at World Vaccine Congress 2023

At the World Vaccine Congress 2023 held in Washington, USA from April 3-6, Bharat Biotech was awarded the Best Production/Process Development award as a part of the Vaccine Industry Excellence (ViE) awards.

The World Vaccine Congress is a major international conference focused on vaccines, covering the entire vaccine value chain from basic research to commercial manufacturing.

It brings together experts from all over the world to share their knowledge and expertise in vaccine development.

The conference has been particularly important in addressing the COVID-19 pandemic and has been a platform for sharing groundbreaking discoveries and insights.

Bharat Biotech, headquartered in Hyderabad, was the sole Indian company among the nominees for the VIE awards in multiple categories such as the best clinical trial company, best clinical trial network, best central/specialty laboratory, best contract research organisation, and best production/process development, among others.

Bharat Biotech is known for developing the world's first intranasal Covid-19 vaccine, iNcovacc, and its intramuscular vaccine, Covaxin, which is used in India's public vaccination programme and has also been exported.

Tamil Nadu Government Invited to Swiss biotech showcase event on April 24 and 25

April 17, 2023

Tamil Nadu is gaining international exposure for its biotech sector due to its streamlined business environment, policy clarity, investor facilitation, human capital, and state-of-the-art infrastructure.

Foreign investors should note that Tamil Nadu is the only Indian state to be invited by the Swiss Business Hub in India to participate at the Swiss Biotech Day, a key conference for the industry in Europe. The Swiss Business Hub India is the Mumbai-based representative of the official international trade and investment promotion agency Switzerland Global Enterprise (S-GE).

India is among the top 12 biotechnology destinations worldwide and has the third largest production hub in the Asia-Pacific. Bio innovation and biomanufacturing in the country is categorized into biopharmaceuticals, bio agriculture, bio-IT, and BioServices. The Indian biotechnology industry has been forecasted to reach US$150 billion by 2025, at a compound annual growth rate (CAGR) of 16.4 percent.

Tamil Nadu has emerged as a test bed for companies innovating in the health tech space and investing in medical technology. The state boasts of a streamlined business environment, policy clarity, investor facilitation, human capital, and state-of-the-art infrastructure.

Tamil Nadu has a strong base in industry, manufacturing, and research, and the biotechnology sector is a thrust area for the state's policymakers.

On July 4, last year, the state launched the Tamil Nadu Life Science's Promotion Policy 2022 to support and incentivize research and development (R&D) programs, create industry fixed assets, and grow the medical, agricultural, marine, industrial, and environmental biotechnology production and service capabilities in the state.

Another key policy goal is to attract INR 200 billion (approx. US$2.43 billion) in investments for Tamil Nadu's life sciences sector and create 50,000 jobs.

Novo Nordisk Foundation to support crucial education of health professionals in India and East Africa with up to DKK 1bn (USD 140m)

The global shortage of qualified health professionals is an increasing challenge. According to the WHO, an additional 10 million health professionals will be needed by 2030. The demand is particularly acute in low- and middle-income countries, where health systems are already under immense pressure.

With the launch of the Partnership for Education of Health Professionals (PEP), the Novo Nordisk Foundation takes a step towards reducing inequity in health by initially targeting the education of health professionals in underserved regions in India and East Africa.

Lack of access to qualified health personnel combined with an alarming prevalence of noncommunicable diseases (NCDs) such as cardiometabolic diseases (CMDs), including diabetes and hypertension, constitute the perfect storm in low- and middle-income countries - a storm that demands action from a number of institutions, governments, organisations, and individuals to curb. As a response, the Novo Nordisk Foundation has launched PEP and will, together with various local partners, support the education of health professionals in improving the prevention and care of noncommunicable diseases, particularly cardiometabolic diseases such as diabetes and hypertension. The partners will include health authorities, universities and educational institutions. PEP is expected to run until 2030.

Professor Mads Krogsgaard Thomsen, CEO of the Novo Nordisk Foundation, said: "Our vision for PEP is that people living in vulnerable positions in rural India and East Africa should have equitable access to high-quality prevention and care for cardiometabolic diseases. These diseases are the primary cause of death globally, and in low- and middle-income countries the prevalence is increasing rapidly. I am confident that PEP can have a tremendous impact in both prevention and care. Through PEP, we will also promote gender equality by empowering women to flourish in their profession as health professionals and

researchers."

PEP will be implemented across multiple geographical locations across India and East Africa. In India, the need is especially urgent in the North-eastern Region, where access to quality health care is under particular pressure.

Atul Kotwal, Professor and Executive Director, National Health Systems Resource Centre, Ministry of Health and Family Welfare, Government of India, said: "The PEP vision and mission are fully aligned with the Indian Government's prioritisation of investing in human resources capacity building in healthcare in order to be on par with global top standards. Evidence shows that building capacity among the nurses, the largest cadre of healthcare providers, vastly improves the quality and acceptability of healthcare services. This is particularly pertinent today as we are preparing for a stronger response to the rising burden of e.g. noncommunicable diseases. Educating more and better qualified health professionals is a top priority for the Ministry of Health in India, so I am pleased with the prospects of PEP and the potential it holds to improve health outcomes for people in the region."

In East Africa, PEP will initially be launched in Kenya and Tanzania, where there is political commitment to prevent and manage cardiometabolic diseases.

Kaushik Ramaiya, Professor, Chairman of CDC Africa Advisory Panel and NCDs and President-elect of the NCD Alliance East Africa Initiative, says: "The burden of cardiometabolic diseases is increasing rapidly in East Africa where health systems already are over-burdened with communicable and non-communicable diseases. One of the challenges is access to adequate quality training at pre-service and post-service level. With the initiation of PEP, there is hope that healthcare providers will get adequate and up-to date-knowledge about non-communicable diseases. Thereby they will be better enabled to manage early diagnosis and complications - and ultimately reduce the overall burden and save lives."

Modes of intervention

PEP is a partnership with two intervention areas. The first area is institutional capacity building for the education of health professionals and the second is educational research and implementation research on health professionals serving people in vulnerable positions. Through PEP, a global partnership network will be established to ensure that innovation and new knowledge are shared between partners in India, East Africa, Denmark and more broadly globally.

Novo Nordisk Foundation to support crucial education of health professionals in India and East Africa with up to DKK 1bn (USD 140m).

Flemming Konradsen, Senior Vice President, Social and Humanitarian, Novo Nordisk Foundation, said: "Education of health professionals is a core component of reducing the burden of cardiometabolic diseases. With PEP, we will develop and disseminate evidence-based teaching and learning methods, such as online and blended learning. Activities across the areas of intervention will inform each other to ensure that all educational activities build on best practices and scientific knowledge, while enabling evidence from the field to feed into the teaching in the classrooms."

About PEP

- PEP will be developed and implemented with multiple partners at various geographical locations in India and East Africa with consideration to local health needs, partner priorities and alignment with government investments.

- Local commitment, ongoing health and health education interventions as well as anchoring and scaling potential will be crucial for selecting locations.

- To address gender-based inequalities in health education and the health workforce, PEP will apply gender mainstreaming across interventions and research activities, including gender analysis and targeted gender activities.

About the Novo Nordisk Foundation

Established in Denmark in 1924, the Novo Nordisk Foundation is an enterprise foundation with philanthropic objectives. The vision of the Foundation is to improve people's health and the sustainability of society and the planet. The Foundation's mission is to progress research and innovation in the prevention and treatment of cardiometabolic and infectious diseases as well as to advance knowledge and solutions to support a green transformation of society.

Pinarayi Vijayan_ Cm To Open Biotech Lab At Life Sciences Park _ Thiruvannthapuram

Thiruvananthapuram: Chief minister Pinarayi Vijayan will inaugurate the new administrative block and the biotech lab building at the Life Science Park at Thonnakkal on April 19. Industry minister P Rajeeve will be the chief guest.

The Kerala State Industrial Development Corporation (KSIDC) which carried out the construction has completed 80,000 sq feet for the new building. The building will house 16 labs for biosafety, of which eight have been completed. The remaining eight labs are expected to complete in 2023-24 financial year. With the completion of this project, the Life Science Park will house 22 labs for various disciplines. It will also have facilities to detect over 80 viral diseases.

In addition to this, it has also been decided to construct BSL 3 labs. This will help in studying the infectious agents or toxins that may be transmitted through air.

The park is being set up in two phases. For the first phase development 75 acres have been found for the project of which 70 acres have been acquired by KSIDC. For the second phase 1,123 acres of land will be acquired. Land will be given to entrepreneurs who are interested in setting up their units for medical research. The Sree Chitra Tirunal Institute of Medical Sciences will be setting up a medical devices park here.

About
Bio360 Life Sciences Park at Thiruvananthapuramis envisaged as a geographic cluster of Industries, R&D Institutions, and Centers for Higher Learning in the domain of Life Sciences/ Bio Technology Sector. The park once fully implemented will house units in Research & Development and Manufacturing in the Life Science sector encompassing Agri-biotechnology, Marine Biotechnology, Bioinformatics, Biosimilars, Biomedical Devices,Biopharmaceuticals etc.The park also houses a Medical Devices Park (MedSpark) a Joint initiative between KSIDC & SCTIMST conceived in 9 acres of land at the first phase

Contact Person
Shri. Biju B G
Deputy General Manager
9847936409
bijubg@ksidcmail.org

INDIAN NATIONAL SCIENCE ACADEMY (INSA)
Bahadur Shah Zafar Marg, New Delhi-110 002, INDIA

EPABX: 23221931 to 23221950
Fax: 91-11-23235648/23231095
E-mail: sciprom@insa.nic.in

INSA Visiting Scientist Programme FY-2023-24

(Last date: 01/05/2023)

Applications are invited for the following year from Indian citizens for the awards of INSA Visiting Fellowship for conducting advanced research or undergoing specialized training at Indian Research Institutes/Laboratories.

Details of Awards

These Fellowships will be awarded on a competitive basis to the **scientists/faculty** for furtherance of their research and/or research capabilities for carrying out collaborative research, undergoing training in specific techniques, or utilizing facilities not available in their own institutions. The Fellowship will be for a minimum period of one month to a maximum of 6 months in a laboratory or research institutions of his/her choice anywhere within India. Fellowships to be awarded each year will be a maximum of 120 man months per annum.

Value

During the fellowship period, awardees will be paid consolidated amount of Rs.30,000/- (maximum) per month to cover their expenses related to boarding, lodging, and incidental etc. The travel expenditure from parent to the visiting institute will be reimbursed on production of ticket as per the entitlement of the Visiting Scientist from FY 2023-24 as per central govt. TA rules.

Application Procedure

Applications will be invited once a year. The applicants would be required to provide a concise account of their plan of work/ study besides their bio-data highlighting their achievements. It would be desirable that the applicant should have approached the host institution and the scientist concerned to ascertain their concurrence to accept him/ her.

The applicant should be a **Scientist/Faculty** in any R&D organisation including Universities or Affiliated Colleges in India. Applicants should not have availed INSA Visiting Fellowship in **last one year**.

Candidates should apply online on prescribed application form available on Academy website. The decision of the Academy will be communicated during April / May in the following year.

Department of Science and Technology (DST)
Ministry of Science and Technology
Government of India
and
Ministry of Science, Technology and Innovation of the Argentine Republic (MINCyT)
Goverment of Argentina
Indian- Argentine Scientific Research Program

JOINT CALL FOR PROJECT PROPOSALS
2023

In the framework of the India-Argentine scientific and technological cooperation, the Department of Science and Technology (DST), Ministry of Science and Technology of the Republic of India and the Ministry of Science, Technology and Innovation of the Argentine Republic (MINCyT) are glad to invite researchers and scientists to submit joint proposals for research projects carried out by scientists from both countries until April 30, 2023.

The aim of this program is to support the development of scientific and technological cooperation between Indian and Argentine researchers and to strengthen the scientific partnership between research groups from both countries by establishing bilateral research networks, enhancing research cooperation and promoting the exchange of knowledge between Argentine and Indian scientists.

AREAS OF COOPERATION

The Department of Science and Technology (DST), Ministry of Science and Technology of the Republic of India and the Ministry of Science, Technology and Innovation of the Argentine Republic (MINCyT) provide financial support to joint research activities carried out by research groups in both countries. Indian-Argentine research groups are hereby invited to submit joint proposals for research projects in the following topics:

a) Biotechnology
b) Energy Transition

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National Directorate for the Promotion of Scientific Policy
https://www.argentina.gob.ar/ciencia/cooperacion-internacional
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E-mail: convocatoriasinternacionales@mincyt.gob.ar

India Coordination Office
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Contact Person
Dr. K. Jagajjanani Rao
Associate Dean R&D
8754484204

Co-ordinator
Mr. T. Nelson Ponnu Durai
9952012141

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Sepsis	Trauma and Burns	Neonatal sepsis
Meningitis/encephalitis	Chronic GE/Liver disease	Perinatal asphyxia
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For any queries related to the call, please contact - Dr. Lokesh Sharma, Email: po.epms@icmr.gov.in

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To continue the efforts and further strengthen South-South collaboration, ICMR and IAVI are now launching the Second Investigator Initiated Research (IIR) Call 2023 inviting applications from young investigators across India and Africa on HIV research under various priority areas towards enhancing indigenous scientific capacity of young investigators and promoting regional collaborations between India and Africa. Scientifically robust comprehensive proposals are invited in the field of HIV/AIDS prevention research. The proposals for 2023 may be in any of the disciplines of epidemiology, socio-behavioural research ,community engagement, immunology, virology and discovery research towards informing vaccine/product development in the field of HIV.

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ICMR-IAVI Joint Call for Proposal

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Contact Information

Dr. Reema Roshan,ICMR Email:reemaroshan.hq@icmr.gov.in Phone: 9910944549

Dr. Joyeeta Mukherjee, IAVI Email: jmukherjee@iavi.org Phone: 8588838927

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DE-Heidelberg | 5–10 March 2023 | M.D. Vivanco
Techniques for mammary gland research

DE-Heidelberg | 12–17 March 2023 | A. Hendrix
Extracellular vesicles: From biology to biomedical applications

IT-Procida | 13–19 March 2023 | V. Colonna
Population genomics: Background and tools

DE-Heidelberg | 26 March–1 April 2023 | J. Medenbach
Measuring translational dynamics by ribosome profiling

DE-Heidelberg | 17–24 April 2023 | J.E. González-Pastor
Microbial metagenomics: A 360° approach

GR-Heraklion | 7–18 May 2023 | A. Stamatakis
Computational molecular evolution

DE-Heidelberg | 11–16 June 2023 | C. Ludwig
Quantitative proteomics: Strategies and tools to probe biology

DK-Odense | 15–22 June 2023 | M.R. Larsen
Characterisation of post-translational modifications in cellular signalling

ES-Barcelona | 18–23 June 2023 | J. Sharpe
Computational modelling of multicellular systems

Hybrid | CZ-Prague | 18–23 June 2023 | I. Novotny
Super-resolution in light microscopy

IT-Monterotondo | 25–30 June 2023 | A. Crevenna
Imaging-based spatial-omics

Hybrid | DE-Heidelberg | 16–21 July 2023 | J. Crocker
Drosophila genetics and genomics

DE-Heidelberg | 24 July–4 August 2023 | A. Aulehla
Plasticity in developing systems: Time, space and environment

DE-Magdeburg | 4–15 September 2023 | S. Mikulovic
LINdoscope: Neuroimaging and data analysis

UK-London | 5–12 September 2023 | G. Zanetti
Image processing for cryo-electron microscopy

Hybrid | DE-Heidelberg | 10–15 September 2023 | C. Tischer
Advanced methods in bioimage analysis

TR-Izmir | 17–22 September 2023 | E. Karaca
Integrative modelling of protein interactions

Hybrid | DE-Heidelberg | 22–27 October 2023 | E. Perlas
FISHing for RNAs: Classical to single molecule approaches

ES-Barcelona | 12–17 November 2023 | E. Sabidó
Targeted proteomics: Experimental design and data analysis

FR-Illkirch | 19–25 November 2023 | A. Poterszman
Preparation and biophysical/MS characterization of multiprotein complexes for cryo-EM analysis

Workshops

IL-Rehovot | 8–12 January 2023 | M. Sharon
The 20S proteasome degradation pathway

IN-Goa | 6–10 February 2023 | A. Badrinarayanan
Bacterial morphogenesis, survival and virulence: Dynamic genomes & envelopes

Hybrid | DE-Heidelberg | 8–11 February 2023 | J. Mahamid
In-situ structural biology: From cryo-EM to multi-scale modelling

IL-Rehovot | 28 February–3 March 2023 | R. Sorek
Immune system of bacteria (SISB2023)

IL-Kibbuz Nahsholim | 11–14 March 2023 | M. Oren-Suissa
Mechanisms of neuronal remodelling

IL-Rehovot | 13–16 March 2023 | S. Wolf
Visualising the complex dynamics of biological membranes

Hybrid | CL-Valparaiso | 15–19 March 2023 | A. Calixto
Third Latin American C. elegans meeting

CL-Santa Cruz | 26–30 March 2023 | C. Leterrier
Emerging concepts of the neuronal cytoskeleton

Hybrid | DE-Heidelberg | 28–31 March 2023 | B. Kozlíková
Visualizing biological data (VIZBI 2023)

Hybrid | FR-Les Houches | 9–14 April 2023 | P.H. Puech
ImmunoBiophysics: From fundamental physics to understanding the immune response

Virtual | HU-Pecs | 17–19 April 2023 | S. Kapetanaki
Time-resolved spectroscopy meets time-resolved crystallography: The future of dynamic photobiology

DE-Seeon | 23–27 April 2023 | M. Conrad
Ferroptosis: When metabolism meets cell death

Hybrid | ES-Sant Feliu de Guíxols | 24–27 April 2023 | E. Martí
Hedgehog signalling: From molecular structure to developmental biology and diseases

GR-Heraklion | 8–11 May 2023 | G. Tavosanis
Cell biology of the nervous system: Long-term resilience and vulnerability

PL-Poznan | 15–18 May 2023 | B. Uszczynska-Ratajczak
Non-coding RNA medicine

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Cell polarity and membrane dynamics

HR-Srebreno | 21–26 May 2023 | E. Weber-Ban
Protein quality control: From molecular mechanisms to therapeutic intervention

HR-Cavtat | 23–26 May 2023 | O. Rissland
RNA meets protein decay

GR-Alexandroupoli | 25–28 May 2023 | F.G. Grosveld
Systems biology: Linking chromatin and epigenetics to disease and development

CH-Montreux | 18–22 June 2023 | S. Nef
European testis workshop 2023

Hybrid | AT-Pamhagen | 18–23 June 2023 | V. Jantsch
Meiosis

Hybrid | DE-Berlin | 19–22 June 2023 | E. Schulz
X-chromosome inactivation: New insights on its 60th anniversary

Hybrid | CZ-Brno | 20–23 June 2023 | Š. Vaňáčová
Eukaryotic RNA turnover and viral biology

HR-Split | 26–30 June 2023 | I. Stagljar
Systems approaches in cancer

ES-Girona | 27 June–1 July 2023 | S. Rooijakkers
Antibodies and complement: Effector functions, therapies and technologies

CH-Lugano | 28–30 June 2023 | S. Fernandez Gonzalez
Imaging the immune system (IIS)

DE-Dresden | 3–7 July 2023 | O. Campas
Physics of living systems: From physical principles to biological function

Hybrid | DE-Heidelberg | 11–14 July 2023 | J. Crocker
Predicting evolution

Hybrid | DK-Copenhagen | 6–10 August 2023 | J. Nilsson
Signal regulation by protein phosphatases: Mechanisms and pathways

CH-Les Diablerets | 3–7 September 2023 | J. Baxter
DNA topology and topoisomerases in genome dynamics

ES-Alicante | 7–10 September 2023 | V. Tiwari
Gene regulatory mechanisms in neural fate decisions

IT-Venice | 10–15 September 2023 | S. Sigismund
When biology of endocytosis meets physics: Emerging mechanisms and functions

Hybrid | DE-Heidelberg | 12–15 September 2023 | A. Aulehla
Developmental metabolism: Flows of energy, matter and information

ES-Sant Feliu de Guíxols | 17–22 September 2023 | B. Schrul
Lipid droplets: Metabolic hubs in health and disease

PT-Sintra | 18–20 September 2023 | I. Gomperts Boneca
The Great Wall symposium

Hybrid | DE-Munich | 18–21 September 2023 | C. Benakis
Stroke-Immunology conference

ES-Sevilla | 18–21 September 2023 | D. Lupiáñez
The evolution of animal genomes

DE-Göttingen | 18–22 September 2023 | R. Jahn
Mechanisms of membrane fusion

PT-Póvoa de Varzim | 25–28 September 2023 | A. Vertegaal
SUMOylation: From discovery to translation

Hybrid | TR-Istanbul | 26–29 September 2023 | E. Firat-Karalar
Centrosomes in development, disease and evolution

Hybrid | DE-Dresden | 27–29 September 2023 | S. Alberti
Epigenetics and condensates in lineage decisions

IT-Fiuggi | 1–6 October 2023 | A. Hamacher-Brady
Inter-organelle contacts biology

FR-Marseille | 17–20 October 2023 | S. Spicuglia
Enhanceropathies: Understanding enhancer function to understand human disease

ES-Seville | 7–10 November 2023 | V. Šikšnys
CRISPR-Cas: From biology to therapeutic applications

Hybrid | DE-Heidelberg | 8–11 November 2023 | D. Bourc'his
The mobile genome: Genetic and physiological impacts of transposable elements

PT-Ericeira | 17–21 November 2023 | S. Korenblit
Proteostasis: From translation to degradation

ES-Sant Feliu de Guíxols | 26 November–1 December 2023 | A. Montagud
Computational models of life: From molecular biology to digital twins

Hybrid | DE-Heidelberg | 28 November–1 December 2023 | S. Rompani
Subcortical sensory circuits: Visual, auditory, somatosensory, and beyond

Hybrid | DE-Heidelberg | 6–9 December 2023 | J. Kosinski
Computational structural biology

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'Trans-Scale Biology' using exotic non-model organisms

Workshop | Hybrid | CN-Kunming | 9–12 November 2023 | J. Hu
Membrane shaping and remodeling by proteins

EMBO | EMBL Symposia

Hybrid | DE-Heidelberg | 8–11 March 2023 | T. Kiers, J. McCutcheon, T. Richards
The cellular mechanics of symbiosis

Hybrid | DE-Heidelberg | 25–28 April 2023 | R. Bonasio, M. Boulard, M. Götz, K. Noh
Brain genome: Regulation, evolution, and function

Hybrid | DE-Heidelberg | 9–12 May 2023 | D. Arendt, E. Heard, M. Leptin, F. Watt, D. Weigel
The organism and its environment

Hybrid | DE-Heidelberg | 4–7 June 2023 | J. Jacobs, G. Legube, B. Luke, B. Schumacher
The ageing genome: From mechanisms to disease

Hybrid | DE-Heidelberg | 12–15 June 2023 | A. Muñoz, Z. Gitai, KC Huang, E. Paluch
Life at the periphery: Mechanobiology of the cell surface

Hybrid | DE-Heidelberg | 27–30 June 2023 | P. Cossart, S. Helaine, KC Huang, M. Laub, N. Typas
New approaches and concepts in microbiology

Hybrid | DE-Heidelberg | 18–21 July 2023 | A. Aulehla, J. Garcia-Ojalvo, R. Phillips, K. Wan
Theory and concepts in biology

Hybrid | DE-Heidelberg | 20–23 September 2023 | M. Arumugam, A. Bhatt, P. Bork, N. Segata
The human microbiome

Hybrid | DE-Heidelberg | 4–7 October 2023 | J. Ellenberg, J. Lippincott-Schwartz, S. Mayor, A. Miyawaki
Seeing is believing: Imaging the molecular processes of life

Hybrid | DE-Heidelberg | 11–14 October 2023 | M. Bühler, A. Eulálio, J. Mendell, G. Storz, I. Ulitsky
The non-coding genome

Hybrid | DE-Heidelberg | 18–21 October 2023 | M. Huch, K. Koehler, M. Lancaster, E. Schnapp
Organoids: Modelling organ development and disease in 3D culture

Lecture Courses

EMBO | FEBS Lecture Course

DE-Ingelheim am Rhein | 3–6 October 2023 | C. Muench
Susan Lindquist school on proteostasis

EMBO Lecture Course

IT-Venice | 21–25 August 2023 | J. Jaeger
Venice Summer School: The future of evolutionary-developmental systems biology

India | EMBO Lecture Courses

Hybrid | IN-Pune | 30 January–3 February 2023 | A. Sahu
Complement in kidney diseases

IN-Bangalore | 6–9 February 2023 | S. Tole
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Hybrid | IN-Noida | 28–31 March 2023 | V. Kumar
Tumour metabolism: Current understanding and opportunities for novel drug discovery

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