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the business of Bio & Health Sciences

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"ORDI serves as a bridging platform to connect scientists with relevant patients to further basic and translational research"

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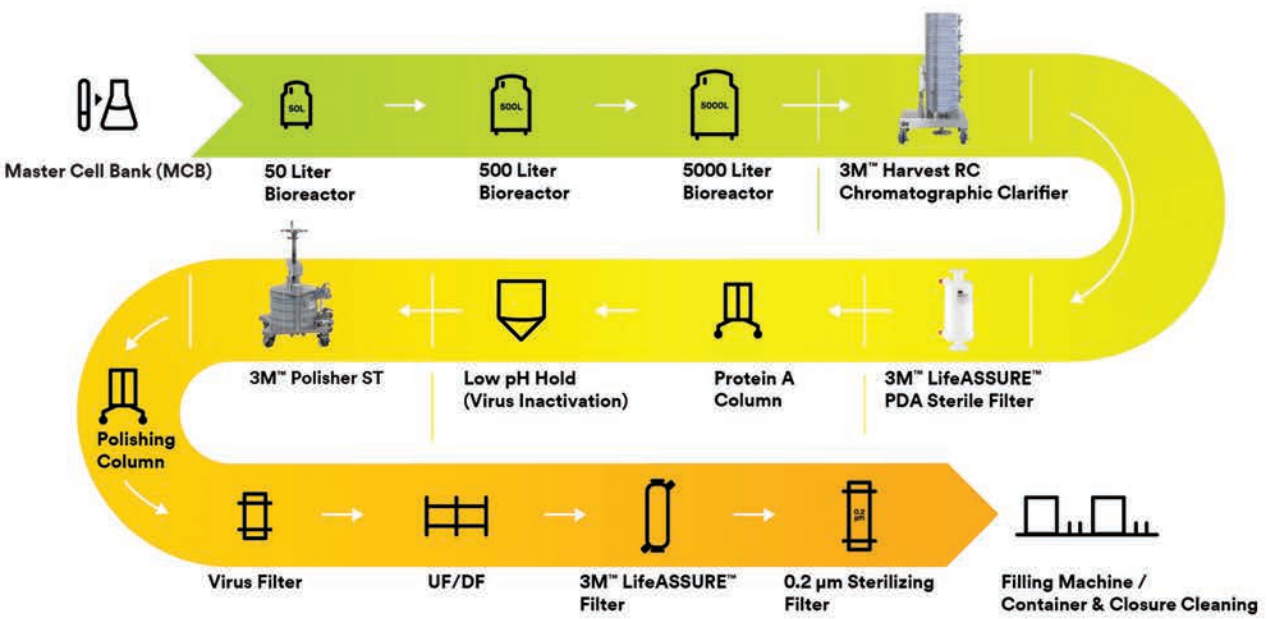

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Acknowledgement/ Feedback

Women can excel in any field, including science. Their crucial role in the development of COVID-19 vaccine is an example. Thank you for the wonderful feature on Women's Day.

- Dr Pragya Yadav, Pune

It is important to recognise the strides we have made towards gender equality yet acknowledge that we have miles to go. In the pharmaceutical industry, we are at a pivotal moment where the underrepresentation of women, especially in leadership roles, highlights a deeper systemic challenge.

- Priyanka Chigurupati, Hyderabad

India has made significant progress in scaling up molecular diagnostics, providing the most advanced medicines, and implementing the largest digital programme for TB surveillance and monitoring.

- Dr Sanjay K Mattoo, New Delhi

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Letter from Publisher

Ravindra Boratkar
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Dear Readers,

In the fast-changing global industrial arena, sustainability has become quite crucial. It is a critical issue across multiple industries; healthcare, pharmaceuticals, biotechnology and many other sectors are no exception. Sustainability, partially translates to ethical and green practices. The pharmaceutical and biotech industries are beginning to shift towards these practices to reduce environmental stress on the planet. Not unlike global leaders in pharma manufacturing, Indian pharmaceutical companies, too, have a responsibility to lead the way in environmental sustainability.

Leading pharma companies have already been investing in green chemistry. Dr. Reddy's Laboratories has been a pioneer in implementing sustainable practices in pharmaceutical manufacturing. Other leading companies such as Biocon, Sun Pharma, Cipla, and Aurobindo have adopted green chemistry principles to develop eco-friendly processes and products. While these companies are taking baby steps and leading the way in embedding environmental protection, some of the global entities like Bayer, AstraZeneca, Torrent Pharma, Glenmark, among others, are also demonstrating their commitment to sustainable development and responsible business practices. Integrating sustainable practices enables more innovative and practical solutions that minimise the environmental impact. Our team has covered the sustainability issue by incorporating views of industry captains on Sustainable Drug Discovery, New Drug Development and Pharma Manufacturing.

Healthcare 4.0 is revolutionising the medical industry. Industry 4.0 technologies are ushering in a new era of healthcare services with an emphasis on enhanced precision and accuracy, just as how automation revolutionised core manufacturing industries. Healthcare, on the other hand, offers very little opportunity for fully autonomous robotic operations, despite the fact that robots execute many automated, independent tasks in environments like auto shops and assembly lines. However, the production of medical devices has seen a notable increase in the usage of robots, and they can be used collaboratively, enhancing the operations of healthcare service providers through the use of collaborative robots, dubbed ‘cobots’. Our team has, therefore, written a piece on the topic, "Can Cobots Become Indispensable in Healthcare?"

Telangana, home to over 800 life sciences companies with 200 plus sites that are US FDA-approved, recently hosted its 21st edition of BioAsia 2024. The state boasts of a global vaccine manufacturing hub in India, producing and exporting 1/3 of global vaccines to countries worldwide. Telangana has witnessed a whopping 23 per cent growth rate compared to India’s 14 per cent, in the life sciences segment. As Telangana envisions becoming a state-of-the-art hub for life sciences in India by 2030, our team has put together an article on How Telangana is Targeting Innovation Beyond Generics in the coming years?

TheBioStartUps.com, a dedicated online platform from BioSpectrum supporting and empowering biotech startups with resources, funding opportunities, and industry connections, is hosting the CEO & Founder Conclave 2024, an exclusive, one day event that brings together the leaders, innovators, and stakeholders of the biotechnology startup ecosystem on the theme “Fuelling innovation and growth in Biotechnology” on April 12, at CIDCO Convention Hall, Mumbai.

Looking forward to your presence at the BioStartUps CEO & Founder Conclave 2024.

I am sure you will find this edition a great read.

Thanks & Regards,

Ravindra Boratkar,
Publisher & Managing Editor

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Adopting 'Green Approach' in Drug Discovery

In the fast-changing global industrial arena, sustainability has become quite crucial. It is a critical issue across multiple industries; the healthcare and clinical research sectors are no exception. Hospitals and clinical facilities produce tonnes of waste alongside carbon emissions. Medical research consumes non-renewable resources at a staggering rate, which can have a long-term impact on the environment. Sustainable drug discovery and development is positioned as a key initiative in the long-drawn fight against climate change and reducing the detrimental impact on the environment, linked with the health and clinical industry. Let's explore how India can nail this 'green target'.

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Partha S Dash, Managing Director-New Business and Growth, Moglix talks about the impact of smart packaging technologies on pharmaceutical safety.

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Again in Rough Waters?

Swiss multinational pharma giant Roche has raised the alarm over the clinical trials being conducted for a biosimilar of its widely used biologic drug for breast cancer, Perjeta in India. This comes close on the heels of the recent cough syrup-related controversy.

It has filed a complaint with the Drugs Controller General of India (DCGI) against Ahmedabad-based Zydus Lifesciences Ltd, which is conducting the trials. The nature of the complaint, filed in November 2023, pertains to the quality of the drug used for the trial. The drug used in the initial phase of trials has not been procured from the company as per Roche' claim.

Hence, it may be of questionable quality, compromised and spurious, it has been alleged. It had also sought the credibility of the source of the drug procured in September 2022 and the information on supply chain norms. Once again, in February 2024, Roche sought the regulator's intervention and probe on this issue in February 2024 since it is a matter of patient safety.

Zydus has denied the allegation as baseless, perceiving it as an attempt to malign its reputation and discredit it in making expensive drugs accessible at affordable prices in the domestic market. It said the company has been conducting trials and introducing novel biologics and biosimilars. All necessary regulations and processes are followed regarding ethics and safety and it was committed to share with the regulator all the relevant information.

Zydus was conducting trials to test a biosimilar to Perjeta labelled ZRC-3277. It is for treating patients suffering from malignant neoplasm of the breast of unspecified size, referring to a type of cancerous growth in the breast. Clinical trials have to be conducted in comparison to a reference drug. In this case, the reference drug is Perjeta invented by Roche.

The trials received regulatory clearance from DCGI in December 2021. The company procured 500 vials of the drug Perjeta from Germany in August and September 2022 for clinical trials in India. But Roche claimed it was not procured from the company's official supply chain. As per Roche's records, Zydus procured 480 vials from Roche in January 2023. Hence, Roche has raised questions about how and from where Zydus accessed the drug for the initial part of the trials since the trials started in September 2022 and it procured the drug from Roche only in January 2023.

Going by the details of the nature of the allegations, the issue appears to have assumed the form of one's claims against the other's. While Roche's concerns could be right, some Indian experts feel that one of the angles to the issue could be of MNC-domestic competition. Whatever may be the case, it should be addressed on a priority basis.

As experts perceive it, the issue is not very complicated. The regulator should resolve it expeditiously by seeking information from the Indian company on its procurement of drugs in September 2022 and matching it with Roche's dealers. Delay in such matters may snowball into a controversy. Expeditious resolution and subsequent actions are required in such cases since the reputation of the Indian companies is at stake.

Roche has tried to block biosimilars of its drugs earlier too. In 2016, it filed a suit in the Delhi High Court against DCGI to block approval of any biosimilar of its other cancer drug Avastin. Before that, it blocked the launch of a biosimilar of another of its breast cancer drugs Herceptin. If the biosimilar sector is to be protected in the interest of patients, so that they get costly drugs at a lesser cost, the government will have to find out a long-term policy solution to the problem, which may be in the form of separate legislation. BS

Dr Milind Kokje
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S&T Minister announces GenomeIndia flagship programme of 10,000 genome sequencing

The Union Minister of State (Independent Charge) Science & Technology (S&T), Dr Jitendra Singh recently announced the GenomeIndia Flagship Programme of 10,000 Genome Sequencing. Dr Singh described this as a watershed moment for India, as it will lead to genetic based remedies, besides giving a big boost to the public healthcare system in the country. In her address, Advisor, Department of Biotechnology, Dr Suchita Ninawe said that the "Reference Genome for Indian Population"

created under the project will lead to a better understanding of the nature of diseases and specific interventions essential for various ethnic groups. The GenomeIndia will place India on the world map of genome research and will collectively facilitate future large-scale human genetic studies for researchers across the globe. Joint Coordinators of the GenomeIndia, Prof. Y Narahari & Dr K Thangaraj said in their presentations that beyond the sheer scale of sequencing and establishing a Reference Genome, the creation of a biobank housing 20,000 blood samples at the Centre for Brain Research, coupled with data archiving at the Indian Biological Data Centre exemplify the project's commitment to transparency, collaboration, & future research endeavours.

ICMR inks MoU with CDSCO to fortify testing & validation ecosystem of in vitro diagnostics

A groundbreaking partnership has been announced between the Indian Council of Medical Research (ICMR) and the Central Drugs Standard Control Organization (CDSCO), aimed at fortifying the Testing and Validation Ecosystem for In Vitro Diagnostics (IVDs). Both organisations have formalised their collaboration through a signed Memorandum of Understanding (MoU). This partnership heralds a new era of synergy, innovation, and excellence in the realm of healthcare diagnostics. The focus of this collaboration is to enhance the quality, efficacy, and safety of IVDs through robust testing and validation mechanisms. By leveraging the collective expertise and resources of ICMR and CDSCO, MedTech Mitra is poised to revolutionise the landscape of diagnostic technologies in India.

MedTech Mitra was recently launched by the government as a strategic initiative to empower medtech innovators and advance healthcare solutions.

Dr Mandaviya launches AYUSH-ICMR Advanced Centres for Integrated Health Research in AIIMS

Dr Mansukh Mandaviya, Union Minister of Health and Family Welfare launched the AYUSH-ICMR Advanced Centre for Integrated Health Research in All India Institute of Medical Sciences, New Delhi. He also announced other mega joint initiatives between the Ministry of Health and Family Welfare and the Ministry of AYUSH which included Multicentre clinical trials on Anaemia and the launch of Indian Public Health Standards for AYUSH healthcare facilities. The objectives of the AYUSH-ICMR Advanced Centre for Integrative Research are to harness the mutual understanding and research environment between the different systems of medicine leading to Integrative Health Research; and to identify priority areas where the approach of integrative medicine may have potential and conduct integrative research in these priority areas to generate robust evidence. Four AIIMS which will host these advanced centres: AIIMS Delhi (Advanced Centre for Integrative Health Research in Gastro-intestinal Disorders; and Advanced Centre for Integrative Health Research in Women and Child Health); AIIMS Jodhpur (Advanced Centre for Integrative Health Research in Geriatric Health); AIIMS Nagpur (Advanced Centre for Integrative Health Research in Cancer Care); and AIIMS Rishikesh (Advanced Centre for Integrative Health Research in Geriatric Health).

Health Minister inaugurates greenfield projects under PLI Scheme for bulk drugs and medical devices

Dr Mansukh Mandaviya, Union Minister for Chemicals & Fertilizers and Health & Family Welfare virtually inaugurated 27 greenfield bulk drug park projects and 13 greenfield manufacturing plants for medical devices. The PLI scheme for bulk drugs will lead to reduced import dependence and better supply chain resilience.

Investment worth Rs 3,651 crore has already been grounded, till December 2023, by the scheme participants. PLI scheme envisages manufacturing of 41 bulk drugs with a total outlay of Rs 6,940 crore during the tenure of the scheme from 2020-21 to 2029-30. The inauguration of 13 Greenfield plants of companies such as Sahajanand Medical Technologies, Poly Medicure, Trivitron Healthcare, Wipro GE HealthCare, Siemens Healthcare, Panacea Medical Technologies etc. will be a big step towards achieving self-reliance in manufacturing of a wide range of medical devices. 26 Applicants for manufacturing of Medical Devices have been approved for 138 products under the PLI scheme with total financial outlay of Rs 3,420 crore for the period 2020-21 to 2027-28.

Cabinet approves Director position to spearhead National One Health Mission, Nagpur

The Union Cabinet chaired by Prime Minister Narendra Modi has approved the proposal of creation of a post at the level of Scientist H as Director of National Institute of One Health, Nagpur who will also serve as the Mission Director for the multi-Ministerial and multi-sectoral National One Health Mission for integrated disease control and pandemic preparedness, by bringing human, animal, plant and environmental sectors together.

The creation of the post of Director of National Institute of One Health at the level of Scientist 'H' in the pay level 15 (Rs 1,82,000 - Rs 2,24,100) will have the annual financial implications of approx. Rs 35.59 lakh. A programme for strengthening research and development towards integrated diseases central and pandemic preparedness for the National One Health Mission has already been approved on January 1, 2024. The National One Health Mission will help India to achieve integrated disease control and pandemic preparedness by institutionalising the One Health approach. It will also leverage the ongoing/planned programmes of different Ministries/Departments by fostering collaborations to address health of humans, animals, plants and environment holistically and in a sustainable manner.

Ministry of Ayush signs MoU with Research and Information System for Developing Countries

The Ministry of Ayush and Research and Information System for Developing Countries, (RIS) New Delhi have signed a Memorandum of Understanding (MoU). This MoU will bring forth the overview of the Ayush Service sector and will serve the continuation of academic cooperation and collaboration with RIS (a Policy Research autonomous institute of the Ministry of External Affairs). Vaidya Rajesh Kotecha, Secretary, signed the MoU on behalf of the Ministry of Ayush, whereas Prof. Sachin Chaturvedi, Director General was the signatory on behalf of RIS. This Knowledge Partnership, through this MoU, will not only serve to strengthen academic cooperation and collaboration to undertake research, policy dialogue, and publications for national, regional and international, and capacity building in the field of Indian Traditional Medicine, but will also bring out Ayush Service Sector overview in a time bound frame. Also, the academic cooperation between Ministry of Ayush and RIS includes continuance of Forum on Indian Traditional Medicine (FITM).

Rx Propellant locks largest life sciences real estate deal in India at Rs 162 Cr

In a deal that marks the tenancy of the single largest space within India's life sciences real estate sector, Rx Propellant, the country's leading Life sciences infrastructure platform, has leased a massive 1.3 lakh sq.ft. of state-of-the-art R&D facility - Nextopolis to GV Research Platform (GVRP), an integrated contract research organisation (CRO) in the biopharma industry. The deal, sealed by Rx Propellant for Rs 162 crore will allow NABL-accredited research organisation an occupancy for 10 years. Nextopolis, located in Hyderabad's Genome Valley, is developed by Modi Properties and will enable GVRP to expand its service portfolio and consolidate all complementary offerings under one roof. Nextopolis offers customised infrastructure solutions suitable for the pharmaceutical and biotech firms. The facility boasts of sustainable infrastructure and world-class facilities including EV charging stations, high side HVAC system (including chillers), effluent pre-treatment plant, sewage treatment plant, compressed gas & vacuum lines, fire alarm & suppression systems, among others.

TDB supports Alchem Synthon with Rs 8.6 Cr loan assistance to build manufacturing facility

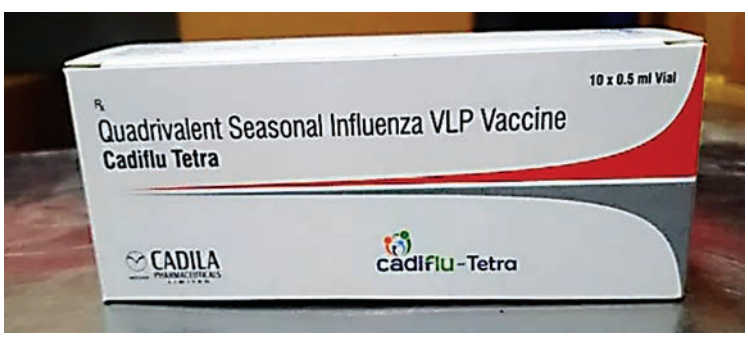
In a significant stride towards fortifying indigenous manufacturing capabilities and fostering innovation in the pharmaceutical sector, the Technology Development Board (TDB) has entered into an agreement with Alchem Synthon, Mumbai. The board will provide a loan assistance of Rs 8.6 crore out of the total project cost of Rs 19.01 crore for the development and commercialisation of advanced pharmaceutical intermediates, fine & specialty chemicals. The project aims to establish a state-of-the-art manufacturing facility dedicated to large-scale production of Key Starting Materials (KSMs) and Advanced Intermediates, pivotal for Active Pharmaceutical Ingredients (APIs) that comply with stringent quality standards. Additionally, the facility will manufacture Specialty and Fine Chemicals tailored to various applications across industries such as Polymer and Water Treatment facilities. Upon completion, the new manufacturing facility will increase production capacity, targeting an output of 12,000 kg per month compared to the existing capacity of 1,000 kg per month.

TechInvention Lifecare invests $15M into global collaborative centre for medical countermeasures

In a significant stride towards enhancing global health security and pandemic preparedness, TechInvention Lifecare has announced the ground breaking of its Global Collaborative Centre for Medical Countermeasures (GCMC) with an investment of approx. $15 million. The centre is strategically located close to the upcoming international airport in Navi Mumbai. GCMC has been acknowledged for its global significance at the 2nd World Local Production Forum in The Hague on November 6-8, 2023, organised by the WHO. The objective of GCMC is well aligned to WHO's call to action, CEPI's 100 days mission, India's National Biotechnology Development Strategy (2020-2025), and other global key initiatives. This facility will serve the needs of both public and private organisations, such as academic institutes, startups, MSMEs, and R&D organisations, to provide a comprehensive ecosystem, facilitating the transition from R&D to GMP-scale production for pre-clinical/clinical batches with required regulatory approvals.

Orchid Pharma's Exblifep receives US FDA approval

Orchid Pharma, based in Chennai, has received approval by the United States Food and Drug Administration (USFDA) for its novel invention, 'Enmetazobactam' (marketed as Exblifep). This development comes in close succession to the recent recommendation for approval by the European Medicines Agency (EMA). Enmetazobactam is the first completely invented-in-India Beta Lactamase Inhibitor. Orchid is the first company from India, ever to have invented a product which has received a New Drug Approval (NDA) from USFDA. It is a significant development in addressing the global need for affordable and efficacious drugs to combat Anti-Microbial Resistance (AMR). This USFDA approval paves the way for the introduction of Enmetazobactam in the United States. The product is expected to be launched within the next couple of quarters in the US market. Enmetazobactam was invented in India by Orchid and then out-licensed to Allecra Therapeutics for further development.



Cadila Pharmaceuticals introduces quadrivalent influenza vaccine

Ahmedabad-based Cadila Pharmaceuticals has announced the launch of Cadiflu Tetra Vaccine, an advanced Quadrivalent Influenza Vaccine to prevent influenza, a recurrent, widespread and debilitating viral infection. The vaccine is approved by the Drugs Controller General of India (DCGI) for use in adults and children. Cadiflu Tetra Vaccine targets four strains of the Influenza virus subtype–A and B, responsible for seasonal epidemics. Developed using cutting-edge proprietary technology employing nano-sized particles, the vaccine mimics the external structure of the virus without containing intact genetic material. The vaccine carries hemagglutinin (HA), neuraminidase (NA) and matrix 1 (M1) proteins from the respective strains aggregated together in a single formulation. The virus-like particle (VLP) vaccine replicates the external structure of the viruses but does not contain any live genetic substance, which can cause viral replication and infection. Therefore, this vaccine is qualitatively superior and has a better safety profile.

Suven announces merger of Cohance Lifesciences, forging integrated pharma CDMO leadership

Hyderabad-based firms Suven Pharmaceuticals and Cohance Lifesciences have announced a proposed scheme of amalgamation for the merger of Cohance with Suven. This marks a pivotal moment in Suven's journey, underscoring its commitment to scaling, ensuring consistent earnings, fortifying financial standing, and advancing towards forging leadership in the integrated contract development and manufacturing organisation (CDMO) space. Cohance is a leading CDMO and Merchant API platform with global leadership in select low-mid volume molecules as well as unique capabilities in the form of its antibody drug conjugates (ADC) platform. Merger shall establish Suven's position as a diversified CDMO and API leader in India, transcending its current revenue base. The merged entity is expected to be amongst leading integrated CDMO players in India. With an expanded capacity to ~2,650 kL and a significantly broadened customer base, scale and synergy benefits are substantial.

HMD develops revolutionary Dispojekt to help reduce needle stick injuries

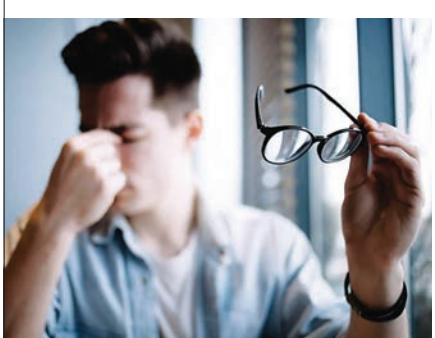
Hindustan Syringes and Medical Devices (HMD) has launched first-of-its kind Dispojekt single use syringes with safety needle, which further strengthens India's position in becoming a global powerhouse in medical devices. With the revolutionary Dispojekt safety syringes, HMD aims to reduce prevalence of accidental Needle Stick Injuries (NSIs) among health workers, reduction of infection control cost and that of disposal and training, offering a long term positive financial impact on the healthcare sector. Domestic manufactured, technologically advanced products will provide India a global edge in the realm of R&D and leapfrog indigenous players to meet the highly demanding global market for sharp injury prevention syringes. The use of safety needles in healthcare settings offer numerous cost benefits. They reduce healthcare worker injuries, lowering costs from potential disease treatment and potential long-term health issues. By minimising needle stick injuries, they also decrease expenses for post-exposure prophylaxis and associated healthcare costs.

Stryker expands prototype and testing facility in India

Stryker, a global leader in medical technologies, has officially expanded its prototype and testing facility in India, marking significant growth of its R&D footprint in the country. This advanced 55,600-square-foot facility integrates cutting-edge infrastructure, enhanced microbiology capabilities, and a talented team to drive innovation and ensure product quality across its medical technology portfolio. Stryker's new facility is dedicated to the rigorous life cycle testing of medical devices. The new lab boasts several key features. Equipped with state-of-the-art infrastructure for plastic 3D printing, metal machining, and a diverse range of testing capabilities, the lab supports prototyping and product assurance across Stryker's entire product portfolio. The lab strengthens Stryker's ability to conduct comprehensive microbiological testing, ensuring the safety and efficacy of its medical technologies. Highly skilled engineers and microbiologists will use the advanced equipment and expertise to develop innovative solutions that positively impact patients around the world.

Roche unveils Vabysmo drug in India to treat two leading causes of vision loss

Roche Pharma India has marked its foray into the ophthalmology space by launching Vabysmo (faricimab) for the treatment of neovascular or 'wet' age-related macular degeneration (nAMD) and diabetic macular edema (DME). Neovascular AMD and DME are two leading causes of vision loss worldwide. Vabysmo is the first and only dual-pathway-inhibitor that uniquely targets and inhibits two disease pathways linked to a number of vision threatening retinal conditions. It neutralises both angiopoietin-2 (Ang-2) and vascular endothelial growth factor-A (VEGF-A) which are key proteins involved in the development and progression of retinal conditions, contributing to vision loss by destabilising blood vessels in the eye. As the world's first bispecific monoclonal antibody (mAb), Vabysmo is a single molecule designed to target and inhibit the effects of two targets, providing the benefits of two medicines in one. Current treatment options target VEGF alone, and therefore only partially address the biology of the disease. By blocking both pathways involving Ang-2 and VEGF-A, Vabysmo offers people the first new MoA (mechanism of action) in more than 15 years for nAMD and close to a decade for DME, stabilising blood vessels in the retina and improving vision outcomes.



Venture Center and Blockchain For Impact to accelerate biomedical innovation

Pune-based Venture Center and Blockchain For Impact (BFI) have announced a strategic partnership under the BFI-Biome Virtual Network Programme, to expand initiatives aimed at nurturing innovation & driving advancements in healthcare. Venture Center is the first incubator across India to partner with BFI for this pioneering initiative. BFI-Biome Virtual Network Programme is a pioneering initiative bringing together incubators & research institutes under one umbrella to foster collaborations amongst the various stakeholders in the translational pipeline. Under this programme, BFI will allocate more than $200,000 over three years and leverage Venture Center's expertise to create necessary programmes for healthcare startups. The announcement of the partnership between Venture Center and BFI lays the foundation for a series of collaborations under the BFI-Biome Network Programme that will add to the advancement of biomedical research & innovation in India.

Pfizer joins hands with NIPER Ahmedabad to support healthcare innovation

To encourage and support startups in India and help early-stage innovators advance on their journey, American pharmaceutical firm Pfizer has announced collaboration with the National Institute of Pharmaceutical Education & Research (NIPER), Ahmedabad. This collaboration will endeavour to support healthcare startups in turning their innovative ideas into market-ready solutions. The initiative is being supported by the Department of Pharmaceuticals and Niti Aayog and is being anchored by Social Alpha. This partnership expands on the successful Pfizer INDovation initiative, through which 34 startups in India have already been supported through funding and incubation to bring their breakthroughs to market. Through this partnership with NIPER Ahmedabad, this initiative will follow a cohort-based approach with the aim of selecting 6 innovators pan-India, that will be incubated at NIPER Ahmedabad. Startups with a proof-of-concept that matches the set mandate will be selected for a one-year accelerator programme. Each of these startups will receive incubation support in areas of product development, regulatory pathway, pre-clinical testing, tech transfer support through NIPER ecosystem and real-world clinical fitment check. They will also receive funding support of up to Rs 25 lakh each.

Mumbai Angels invests in Mestastop Solutions

Mumbai Angels, a premium platform for private investments, has invested in Mestastop Solutions, a cancer metastasis drug discovery and predictive diagnostics-focused biotech based out of Bengaluru. Mestastop Solutions has secured investment from Mumbai Angels for the second time since its initial backing in 2020. The recent funding round witnessed participation from 92 angel investors and Malpani Ventures. The company plans to leverage the funds to generate a PoC (proof of concept) around the novel target and position two approved drugs for clinical trials to explore delaying metastasis for primary tumour patients in an adjuvant setting. Mestastop is a deep-tech startup that focuses on the functional properties of patient primary tumour samples to identify distinct phenotypes that can act as markers of metastatic cells. Over the past five years, it has integrated wet lab biology and machine learning algorithms to develop three proprietary platforms to unravel metastasis biology.

C-CAMP launches unique Life Science Entrepreneurship Development Programme

Bengaluru-based Centre for Cellular and Molecular Platforms (C-CAMP) takes a turn at education and upskilling through a new initiative, Life Science Entrepreneurship Development Programme or Life-ED aimed at promoting life sciences research, innovation, and entrepreneurship in the Indian academic community, beginning with Bengaluru as the first region of interest. It is well established across the globe that the key to societal progress is by creating breakthrough technologies. The

way to accelerate this creation is by equipping the country's scientific community with expertise and access to Modern Research Tools and inculcating a strong Innovation-driven Mindset to transform bench discoveries into solutions that address societal challenges. These coupled with entrepreneurial knowhow can be vital skill sets in promoting indigenous innovation and science-led entrepreneurships in a country like India. Current academic structure lacks this three-pronged approach. The Life-ED aims to address this gap through a structured programme that will engage with academic institutions having a scholarly community of students, teachers, researchers, & academic innovators.

Dozee unveils fall prevention alert feature

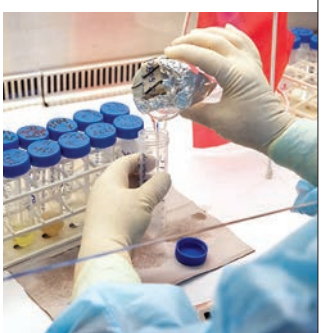
Bengaluru-based startup Dozee, an artificial intelligence (AI)-based contactless remote patient monitoring (RPM) & early warning system (EWS), has announced the launch of its innovative Fall Prevention Alert (FPA) feature aimed at revolutionising patient safety in hospitals. As per World Health Organization (WHO), patient falls are the most frequent adverse event in hospitals. Falls are the second leading cause of deaths due to unintentional injuries, and represent one of the most prevalent patient safety incidents in healthcare facilities worldwide. The Fall Prevention Alert (FPA) feature by Dozee revolutionises patient safety with its real-time monitoring capabilities and proactive alerts. Leveraging advanced technology, including the Dozee Sensor Sheet's bed exit logging, FPA offers customisable alerts for high-risk patients, ensuring prompt intervention.

Sanskritech unveils world's first ultra-portable health monitoring bag

Backed by Pune-based startup Mylab Discovery Solutions, health tech brand Sanskritech has announced the launch of Swandook, the world's first ultra-portable, ultra-smart Anytime Health Monitoring Bag. Approved by the Central Drugs Standard Control Organisation (CDSCO), Swandook represents a pioneering leap in healthcare technology, offering users convenience and accessibility in monitoring their health. Swandook's versatility extends across multiple sectors, including military/ defence, public health coverage extension, CSR-driven social health initiatives, health check-up camps, corporate wellness programmes, and rural health initiatives. Swandook's cutting-edge technology ensures instant and accurate reports, facilitating prompt analysis and action based on the screening results. Moreover, the platform includes an integrated telemedicine feature complete with a webcam, dermascope, otoscope, and stethoscope. This enables users to engage in remote consultations and follow-ups with healthcare professionals, further enhancing the accessibility of healthcare services.

WHO announces catalytic grant fund for pathogen genomics

The World Health Organisation (WHO) has announced $4 million in funding from donors to create a catalytic grant fund for organisations working in pathogen genomic surveillance. The fund will support projects across the world, particularly in low- and middle-income countries (LMICs), to pilot projects and in doing so, create an evidence base for how to quickly scale-up pathogen genomic surveillance.



The results of this kind of surveillance help countries and the world to respond more quickly and effectively to prevent outbreaks and to respond to them. The initial grants for the catalytic fund have been provided by the Bill & Melinda Gates Foundation, The Rockefeller Foundation and Wellcome, to support the International Pathogen Surveillance Network (IPSN). IPSN is a new global network of pathogen surveillance actors convened by WHO through a Secretariat at the WHO Hub for Pandemic and Epidemic Intelligence in Berlin. The fund is hosted by the UN Foundation on behalf of the IPSN.

WHO issues guidance to improve access to hearing care in low-and middle-income settings

The World Health Organization (WHO) has released new technical guidance on hearing aid service delivery approaches for low- and middle-income settings. This document is designed to provide practical guidance to countries in developing hearing aid services in areas that lack human resources for assessing hearing, as well as fitting and maintaining hearing aids. The guidance, developed with support from the ATScale Global Partnership for Assistive Technology, is based on the principle of task sharing among specialists and trained non-specialists. It includes two approaches, one targeting adults and the other for children 5 years and over, and is accompanied by resources with tips for healthy ear care practices, use of hearing aids and how to support people living with hearing loss. A key challenge in ear and hearing care is the lack of health system capacity for the provision of integrated ear and hearing care throughout people's lives, as evidenced by a lack of policies, human resources and dedicated finances. The service delivery approaches detailed by WHO aim to overcome this challenge by better utilising non-specialists in providing hearing care to increase capacity.

WHO launches a mobile app for biosafety risk assessment

The World Health Organization (WHO) has launched the Risk Assessment Tool (RAST) for Biosafety and Laboratory Biosecurity, developed to help with laboratory risk assessment. Laboratory workers are reported to be up to 1000 times more vulnerable to infections compared to the general population. RAST is designed to complement the WHO Laboratory biosafety manual's (LBM4) risk- and evidence-based approach. It reflects the first two steps of the risk assessment framework outlined in the LBM4: gather information and evaluate the risks. The app aims to increase understanding of hazards and risks, and to promote thorough assessment and adherence to biological safety practices for laboratory staff. While many biosafety/biorisk assessment apps tend to be informational, the app developed by WHO is logic-based and capable of performing complex risk calculations. It allows the user to gather information about the hazards associated with their intended work in either a research laboratory, diagnostics laboratory or field work settings.

In the fast-changing global industrial arena, sustainability has become quite crucial. It is a critical issue across multiple industries; the healthcare and clinical research sectors are no exception. Hospitals and clinical facilities produce tonnes of waste alongside carbon emissions. Medical research consumes non-renewable resources at a staggering rate, which can have a long-term impact on the environment. Sustainable drug discovery and development is positioned as a key initiative in the long-drawn fight against climate change and reducing the detrimental impact on the environment, linked with the health and clinical industry. Let's explore how India can nail this 'green target'.

Adopting 'Green Approach' in Drug Discovery

Integrating sustainable drug discovery practices enables more innovative and practical solutions that minimise the environmental impact. The demand for new medications and treatments will not decrease, which makes it crucial that the development process is responsible and eco-friendly. This will allow scientists to research and innovate treatments while also reducing the detriment to the environment which could lead to better health consequences in the long run.

Looking back at the past century, various industrial revolutions and developments have completely overlooked human health and environmental protection. Today, the environment

is destroyed beyond repair and if proper corrective steps are not taken today we will for sure face the consequences of extreme climate change and struggle for survival in the future.

Prominent Environmentalist Sunderlal Bahuguna rightly said, “Development that destroys the environment is not development. True progress lies in preserving nature while meeting the needs of society.” Therefore it is now or never, not just for India but for the entire global community to come together and frame sustainable new drug discovery goals, prioritising environmental protection.

Healthcare and Environmental Impact

Undoubtedly, medical services are necessary for sustaining and saving human lives, However, the reality is that the healthcare industry has an impact on nature that can lead to eco-threats. In the US alone, the health sector is responsible for 8.5 per cent of national carbon emissions, both from regular operations and from energy, heating, cooling, and supply chain. Globally, hospitals use as much energy to cool their facilities as 110 coal power plants.

Moreover, billions of dollars worth of drugs are discarded due to improper packaging. Hospitals produce over 5 million tonnes of waste every year, of which, 25 per cent is some form of plastic. Plastics can be found in syringes, drug packages, surgical equipment, personal protective equipment, and more.

Strict Implementation of Sustainable Healthcare

Globally, the healthcare sector is responsible for 4.4 per cent of greenhouse gases. Besides reducing the direct effects of climate change on humans and the environment, mitigating the healthcare sector’s negative impact could reduce the costs of care. As per the World Health Organization, the direct damage costs to health could reach about $2 to 4 billion a year by 2030. Hospitals and clinical production facilities being able to reduce their carbon footprints could drastically bring down costs associated with global health, according to Vial, a next-generation CRO from San Francisco, USA that delivers faster and radically cheaper trials through an end-to-end technology platform

Additionally, climate change has the potential to impact health in a variety of ways. For example, increasingly frequent and severe weather events lead to more food and water scarcity, vector-borne diseases, mental health issues, and medical emergencies. A decrease in air quality and food security could cause further health risks.

Environmental degradation could have a significant impact on the healthcare industry’s ability to deliver safe and effective care worldwide. Issues such as hospital evacuations and power outages, medical supply shortages, and other disruptions, in turn, worsen the quality of care provided.

Reducing the carbon footprint of the medical industry could lead to dramatic improvements in overall human health, alongside notable social and economic benefits. “Greenifying” single-use plastics would also mean less plastic produced and discarded and could pave the way for more affordable alternatives.

Lastly, a shift in drug development to more sustainable and eco-friendly processes in both discovery and testing could minimise the environmental impact. Dr Renu Swarup, former Secretary, the Department of Biotechnology, Government of India, said, "As we advance in drug discovery, it is imperative to adopt green chemistry principles and sustainable manufacturing practices. By minimising waste, reducing energy consumption, and using eco-friendly solvents, we can ensure that the development of life-saving drugs does not come at the cost of environmental degradation."

Sustainable Drug Discovery

"Sustainability", partially translates to ethical and "green" practices. The pharmaceutical and biotech industries are beginning to shift towards these practices to reduce environmental stress on the planet. Dr Satish Reddy, Chairman, Dr. Reddy's Laboratories, said "Incorporating environmental stewardship into drug discovery requires a shift in mindset and investment in sustainable innovation. By prioritising green chemistry practices, optimising resource utilisation, and adopting renewable energy sources, we can minimise the environmental impact of pharmaceutical manufacturing and ensure a more sustainable future."

According to S&P Global ESG Scores calculated from the Corporate Sustainability Assessment (CSA) for the year 2024, out of 10,000 identified companies globally only less than 1000 companies have been selected for rankings to adhere to sustainability targets, among them around 10 companies have featured from India, while companies from smaller countries like Taiwan, Thailand, Japan, Republic of Korea, Italy, Spain, Germany, France and USA have fared far better.

New Drug Development

Now, turning the context of sustainability for India and its pharma, biotech, medtech and other aspects of allied healthcare sectors, the country stands at the dawn of a new era. Placed uniquely, with its skilled and well-educated professionals in Information Technology, Pharmaceuticals, Chemical Technology, Healthcare, Biopharmaceuticals, Biotechnology, and Engineering and with the advent of new age automation technologies like Artificial Intelligence (AI), Machine Learning (ML) and Big Data Analytics, India could excel on par with the global leaders like Japan, China, USA and other leading European countries, in the arena of sustainable new drug discovery and provide solutions to complex healthcare challenges facing the global population.

Mastering the art of manufacturing quality branded generics; India has achieved the tag of 'Pharmacy of the world' by providing high-quality generic medicine to over 200 countries and with Indian pharmaceutical exports likely to touch $28 billion in 2023-24, registering 10.2 per cent growth, as per the Pharmaceuticals Export Promotion Council of India (Pharmexcil).

"As global leaders in drug discovery, Indian pharmaceutical companies have a responsibility to lead the way in environmental sustainability. By investing in green technologies, promoting recycling and waste reduction, and collaborating with stakeholders to develop eco-friendly solutions, we can mitigate the environmental footprint of drug development and contribute to a greener world," observed Dr Deepak Parekh, Chairman, Indian Pharmaceutical Alliance.

Due to a strong infrastructural base, India has the highest number of US FDA-compliant pharma plants outside of the USA. It is home to more than 3,000 pharma and biotech companies with a strong network of over 10,500 manufacturing facilities and a highly skilled resource pool.

Leading players in the Indian pharmaceutical, biotechnology and healthcare industry must look beyond their traditional mindset. From doing reverse engineering for manufacturing generics to copying the off-patented branded drugs, it is time to grasp the opportunity of new age technologies, venturing into sustainable new drug discovery regime by adopting Green Chemistry approaches, assessing ecological environment impact, and medical needs, utilise the modern age technology like AI and Big Data Analytics, and conduct clinical research works addressing the root cause of illness.

Healthcare expert Sangeeta Reddy, Joint Managing Director, Apollo Hospitals Group said, "Environmental protection must be integrated into the DNA of drug discovery processes. From green chemistry principles to sustainable packaging solutions, every aspect of pharmaceutical manufacturing should be designed with environmental sustainability in mind. By prioritising eco-friendly practices, the pharmaceutical industry can safeguard both human health and the planet."

Targeting R&D Prowess

Stressing the importance of collaborations to take on the challenges faced by the industry to bring sustainability aspect in the new drug discovery Dr Sharvil Patel, Managing Director, Zydus Lifesciences Ltd said, "I think the importance of collaboration between outstanding physicians and scientists within a conducive ecosystem is key for accelerating continuous progress in Research and Development that will pave way for new drug development era in India,"

Acknowledging the unfortunate reality that many companies face the need to reduce R&D efforts due to

performance and market pressure, Dr Ajit Shetty, Chairman, the Flemish Institute of Biotechnology and former Chairman, Janssen Pharmaceuticals, noted that the situation is gradually changing and expressed confidence in India's potential to create a conducive sustainable ecosystem for innovation, with support from the government, regulatory bodies, risk funding, and other essential elements.

Expressing concerns as to how funding plays a vital role in devising a comprehensive sustainable R&D ecosystem, G V Prasad, Managing Director and Co-Chairman of Dr. Reddy's Laboratories, shared insights into research and development in new drug discovery. "Funding remains a major hurdle, not only for us but also for academia. While there are incubators in places like IEP, they're currently quite limited. Public health institutions must be strengthened. Unlike the National Institutes of Health (NIH) in the United States, there's no equivalent institution in India investing substantial capital in innovation. India can learn from countries like China, which have rapidly embraced innovation. Implementing programmes similar to China's Thousand Talents Programme could accelerate our efforts," said Prasad.

Appreciating the advanced R&D infrastructure facilities established in Genome Valley in Hyderabad, Professor Alan Rowan, Director, the Australian Institute of Bioengineering and Nanotechnology (AIBN) at the University of Queensland, emphasised that such facilities could be used for the rapid progress in cell biology and the remarkable advancements in genomics. "I'm particularly excited about the rapid progress in cell biology. Technologies like machine learning and spatial transomics are revolutionising our understanding of cellular kinetics. The mRNA revolution has enabled the development of protein vaccines, while AI is revolutionising radiotherapeutics. We have an incredible opportunity to leverage these technologies to create an end-to-end therapeutics pipeline," said Rowan.

While the integration of AI with R&D could open newer opportunities, AI's unparalleled data-harnessing abilities could allow it to be an invaluable tool for sustainable development. So the key might

Global pharma companies featured in Sustainability Yearbook-2024 Rankings

Out of over 9400 companies assessed in the 2023 S&P Global Sustainability Yearbook for the 2024 Corporate Sustainability Assessment (CSA) under the pharmaceutical category, only 5 Indian pharmaceutical players out of 62 global companies have made it to the list of CSA score rankings. The table below displays the positions of the top 22 global companies in the S&P Global sustainability list.

Company	Country	CSA Score Ranking
GSK plc	United Kingdom	Top 1%
Chugai Pharmaceutical Co., Ltd.	Japan	Top 5%
Roche Holding AG	Switzerland	Top 10%
Sanofi	France	Top 10%
Ono Pharmaceutical Co., Ltd.	Japan	Top 10%
Dr. Reddy's Laboratories Limited	India	Top 10%
Takeda Pharmaceutical Company Limited	Japan	Top 10%
Livzon Pharmaceutical Group Inc.	China	Industry Mover
Santen Pharmaceutical Co., Ltd.	Japan	Sustainability Yearbook Member
Daiichi Sankyo Company, Limited	Japan	Sustainability Yearbook Member
Oneness Biotech Co., Ltd.	Taiwan	Sustainability Yearbook Member
AstraZeneca PLC	United Kingdom	Sustainability Yearbook Member
Hansoh Pharmaceutical Group Company Limited	China	Sustainability Yearbook Member
Sun Pharmaceutical Industries Limited	India	Sustainability Yearbook Member
Eisai Co., Ltd.	Japan	Sustainability Yearbook Member
Cipla Limited	India	Sustainability Yearbook Member
Shionogi & Co., Ltd.	Japan	Sustainability Yearbook Member
Lupin Limited	India	Sustainability Yearbook Member
Novartis AG	Switzerland	Sustainability Yearbook Member
Neuland Laboratories Limited	India	Sustainability Yearbook Member
Hypera S.A.	Brazil	Sustainability Yearbook Member
Genomma Lab Internacional, S.A.B. de C.V.	Mexico	Sustainability Yearbook Member

Source: S&P Global

Ten principles of sustainability applicable in drug discovery

1 Ecological-environmental impact (benign-by-design)
2 Medical needs
3 Green chemistry
4 Artificial intelligence and big data
5 Root cause of illness
6 Risk and decision-taking models
7 Biomarkers and bioinformatics to support precision medicine
8 Cost-effective
9 Lean discovery process
10 Responsible research and innovation

Source: www.sciencedirect.com

Indian pharma/biotech companies featured in Sustainability Yearbook - 2024 Rankings

1. Dr. Reddy's Laboratories
2. Sun Pharmaceutical Industries
3. Cipla
4. Lupin
5. Neuland Laboratories
6. Biocon

Source: S&P Global

lie in the hands of the pharma companies on how to implement AI for drug development in the most sustainable manner.

Notable Entities Working Towards Sustainability

Dr. Reddy's Laboratories has been a pioneer in implementing sustainable practices in pharmaceutical manufacturing. They have invested in green technologies, such as solvent recovery systems and energy-efficient processes, to minimise their environmental footprint. The company also focuses on waste reduction and recycling initiatives to ensure responsible stewardship of resources. Recently, they were awarded 'Gold Medal' status by EcoVadis, the global sustainability ratings agency, for its score of 70 out of 100 in its scorecard for 2023.

Other leading Indian companies such as Biocon, Sun Pharma, Cipla, and Aurobindo have adopted green chemistry principles to develop eco-friendly processes and products. while Biocon emphasises the use of renewable energy sources and has implemented water conservation measures to reduce its environmental impact. Sun Pharma has invested

in research and development of green technologies to minimise waste generation, and energy consumption and even promotes eco-friendly packaging solutions and implements recycling initiatives to reduce environmental pollution.

While these are some of the pharmaceutical companies in India taking baby steps and leading the way in embedding environmental protection in the process of making new drug discoveries, some of the global entities like Bayer, AstraZeneca, Torrent Pharma, Glenmark, etc, are also demonstrating their commitment to sustainable development and responsible business practices.

For instance, AstraZeneca leads the industry in sustainability with its Product Sustainability Index (PSI), evaluating environmental impacts and setting improvement plans. Siva Padmanabhan, Managing Director & Head, Global Innovation and Technology Centre, AstraZeneca highlights the company's focus on Pharmaceuticals in the Environment (PIE) and responsible product stewardship. Sustainable practices are integrated throughout the product life cycle, with targets for API manufacturing emissions and environmental research. AstraZeneca's life cycle assessment (LCA) programme aligns with ISO standards. They've launched an Ecopharmacovigilance (EPV) dashboard and led the IMI PREMIER project, aiming to identify environmental risks earlier in drug development.

Meanwhile, Torrent Pharma's focus on reducing plastic usage and reusing hazardous waste aligns with its goal of minimising environmental impact. By recycling and reusing hazardous waste, the company

significantly reduces waste and utilises it as an alternative fuel to conserve energy. Over 55 per cent of high-calorific value hazardous waste is diverted from incineration and processed in the cement industry. Additionally, Torrent Pharma explores the utilisation of canteen and biological waste for biogas generation, aiming to reduce landfill waste disposal by 20 per cent. These initiatives underscore the company's dedication to environmental responsibility and contribute to India's green agenda.

In parallel to Torrent Pharma's endeavours, Glenmark Pharma is actively adopting sustainable practices to safeguard crucial natural resources and mitigate environmental impact. Emphasising water management, Glenmark implements the 3R principle—Reduce, Reuse, Recycle—to curtail freshwater consumption by employing best practices and recycling treated wastewater for various purposes. Rain Water Harvesting (RWH) structures across multiple facilities further amplify water conservation efforts, replenishing 10 per cent of annual freshwater demand. Glenmark also employs wastewater treatment and recycling initiatives, such as the Zero Liquid Discharge (ZLD) approach in specific plants, retrieving high-quality water for reuse. These combined measures meet 38 per cent of the company's annual freshwater needs, underscoring its commitment to sustainability.

Furthermore, in Telangana, Re Sustainability Limited (ReSL) recently inaugurated its Zero Liquid Discharge (ZLD) Common Effluent Treatment Plant (CETP) in the TSIIC Pashamylaram industrial park in Hyderabad. The plant, developed on a DCO model with a total investment of Rs 55 crore, addresses critical environmental concerns by providing wastewater treatment services to pharmaceutical, bulk drug, and chemical manufacturing plants. Operating on a zero-liquid discharge model, the plant efficiently recycled wastewater for industrial reuse while managing solid waste sustainably. Supported by natural gas and solar power, the plant ensures zero emissions, exemplifying ReSL's commitment to responsible waste management and environmental stewardship.

List of Biotechnology global companies featured in Sustainability Yearbook - 2024 Rankings

- Biogen Inc, United States- Top 1% S&P Global CSA Score
- AbbVie Inc., United States - Top 1% S&P Global CSA Score
- Gilead Sciences, Inc., United States - Top 10% S&P Global CSA Score
- Grifols, S.A., Spain - Top 10% S&P Global CSA Score
- Ultragenyx Pharmaceutical Inc., United States - Sustainability Yearbook Member, Industry Mover
- Celltrion, Inc., Republic of Korea - Sustainability Yearbook Member
- Biocon Limited, India - Sustainability Yearbook Member
- Regeneron Pharmaceuticals, Inc, United States - Sustainability Yearbook Member
- PharmaEssentia Corporation, Taiwan - Sustainability Yearbook Member
- Swedish Orphan Biovitrum AB (publ), Sweden - Sustainability Yearbook Member

Source: S&P Global

Leading by Example

India must take on a pivotal role in preserving its precious natural resources. It is high time that industry leaders and government policymakers re-evaluate and optimise current practices while exploring new technologies. The pharma, biotech and healthcare companies must embed sustainable practices into R&D drug discovery programmes. Unless the pharmaceutical sector in India adopts a holistic approach to devising a comprehensive, sustainable, and innovative drug discovery regime, its efforts to address the broader healthcare needs of the global population will remain incomplete. BS

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How Pharma & Biotech can Achieve Sustainability

« **Supriya Lal Kundu,** Industry Analyst, Healthcare & Lifesciences, Frost & Sullivan

The global pharmaceutical industry is growing rapidly, but it also carries a substantial environmental footprint. This article explores the critical issue of sustainability within the global pharmaceutical industry, examining key sustainability challenges, strategies for reducing environmental footprints, & highlights the key opportunities for a sustainable pharmaceutical industry.

The World Health Organization pointed to climate change as humanity's biggest threat. The European Green Deal and the Paris Agreement have triggered several regulations in the pharma industry. Additionally, the recently concluded COP28 stresses building partnerships such as the Alliance for Transformative Action on Climate and Health to establish green health systems globally and collaboration with community and healthcare providers to mitigate health impacts because of climate change. These regulations require pharma companies to become more environmentally sustainable.

Pharma and biotech companies are recognised as a significant contributor of greenhouse gas (GHG) emissions due to their supply chain and manufacturing processes, as well as on-site emission. It is imperative that pharmaceutical companies take necessary steps to minimise their carbon footprint.

Set Goals and Decarbonise

According to a report by My Green Lab, released during COP28 in December 2023, there has been a rise in the number of pharma and biotech companies joining the UN-backed Race-to-Zero initiative, that mobilises a coalition of leading net-zero initiatives across sectors to achieve net-zero carbon emissions by 2050. Till December 2023, 53 per cent of the sector by revenue (35 companies) had joined the initiative. Almost 63 per cent of companies actively involved in the campaign have implemented a My Green Lab Certification programme, with half of these programmes being implemented on a global scale.

Decarbonisation can be supported by an energy transition of replacing fossil fuel-based energy supply, increasing share of renewable energy, and reducing supply chain related emissions. Solar energy is recognised as a cost-effective alternative with multiple implementation models, such as a low-cost operational expenditure model, on-site deployment of solar panels, or collective purchase in collaboration with other companies such as partnering with Energy-as-a-Service (EasS) vendors.

Collaboration with energy companies for power purchase agreements (PPA) will allow players to bring additional renewable energy into the grid (in countries of operation) while buying energy for operations. Eli Lilly collaborated with Enerpower to pioneer Ireland's largest and first solar farm back in 2021, which powers Lilly's operations. Partnering with value-based energy monitoring service providers can help identify areas of energy savings (e.g., Carbon Lighthouse's offering).

Pharma and biotech companies can shift toward electrical vehicle (EV) fleets to save energy. Amgen kicked off its EV pilot programme in 2022, increasing electrification of its field fleet by 30 per cent to significantly reduce carbon emissions in the United States, and plans to launch 1,800 EVs on the road by 2027. According to Frost & Sullivan analysis, developing a target-based roadmap for decarbonisation will include assessing carbon reduction costs assessment (ROI analysis) to inform a carbon trade-off strategy for Scope 1 and 2 emissions, maximising renewable energy use and implementing energy-efficient solutions.

Developing Pipelines of Green Products

Implementing green chemistry principles is becoming a lab best practice. It is driving scientists to use ecofriendly products like software-enabled synthetic pathway designs for predicting drug solubility, toxicity, pharmacodynamics, and pharmacokinetics. Notably, Sanofi's solvent selection guide helps scientists choose sustainable solvents

in early drug development in sites based on a classification that enables safe solvent use.

Collaboration with government programmes and associations, such as the National Cancer Institute's Program for Natural Product Discovery, for drug screening, provides access to an extensive library of product samples (organic and aqueous extracts and organisms), offers tools to aid intra- and extramural research, and addresses natural product-based drug discovery challenges. Usage of sustainable feedstocks lower hazardous waste generation and help to develop a pipeline of green products. For example, Spain-based PharmaMar has developed a pipeline of anticancer drugs based on marine bioproducts such as Zepzelca (for small cell lung cancer), Aplidin (multiple mylenoma), and Yondelis (soft tissue sarcoma).

Sustainable Manufacturing

Manufacturing automation is emerging as a vital process transformation. Companies are deploying AI to analyse temperature set points, test flow rates, and assess cooling equipment. Pharma manufacturers should leverage real-time data to discover energy inefficiencies points and optimise energy use.

Environmental, social, and governance (ESG) Audits have emerged as a primary focus area to create a responsible supply chain. Companies now conduct supplier audits and assess the ESG metrics of new suppliers before hiring them for raw material sourcing. For example, Piramal Pharma Solutions deployed a supplier assessment questionnaire to evaluate vital new suppliers on ESG criteria before hiring them. These initiatives are likely to bolster sustainability across the supplier value chain for Scope 3-related emission reduction.

Waste and Water Advocacy

An upcoming theme in the pharmaceutical industry is around the water advocacy process that mandates treatment of wastewater generated by the pharmaceutical industry. Implementing closed-loop systems to recycle solvents, recover APIs, and reuse will be a key focus area. Market participants will engage with waste management and water solutions partners that devise ways to generate value from waste and conduct joint research to provide novel water reuse solutions. Glenmark Pharmaceuticals adopted a zero-liquid discharge approach to reclaim water from wastewater, meeting 38 per cent of its freshwater needs.

Partnering with vendors of engineered clean water solutions, such as vapour compression, is enabling less energy consumption in drug fill/finish manufacturing. For example, shifting to more energy-efficient vapour compression distillation (VCD) from traditional multi-effect distillation (MED) that water-for-injection uses. Biogas recovery is another novel process implementation. It serves a dual purpose – waste treatment and energy generation. Water with solvent or chemical contamination (API production) and wastewater effluent can undergo treatment to produce biogas for industrial use and generate electricity on-site for pharma companies.

Roadmap to Sustainability Implementation

In a growing trend, the use of eco-friendly packing material is driving partnerships between pharma and drug packaging specialists on materials such as polyethylene (PE) or PE terephthalate from plant-based sources such as sugarcane, polylactic acid, and polyolefin laminate. To achieve circular economy goals, valorisation (recycling, reusing, or converting waste into resources) is a significant strategy. Notably, Saur Industries supports pharma companies in separating Polyvinyl chloride (PVC) from aluminium in blister packaging (two different material types for valorisation) to ensure reuse in other industries.

Implementation of transportation and cold chain logistics solutions that utilise renewable energy is a key focus. Biotech companies are partnering with vendors offering energy-efficient cold chain solutions for drug storage and distribution while minimising environmental impact. More than 45 biopharma companies leveraged AeroSafe Global's cold chain enhancement solutions by preventing lost drug inventory, reducing carbon usage by 65 per cent, and landfill by 90 per cent.

Besides supply chain partnerships, the pharma and biotech industry should collaborate with external stakeholders, consultants, and platform providers (e.g., GreenPlaces) for ESG audits, risk assessment, and carbon budgeting. Teaming up with advocacy groups can help to design internal policies on sustainability strategy. For example, Aptar Pharma partners with CE100 and agreed on the New Plastics Economy Global Commitment to limit plastic waste at its source. Inter-industry collaborations are viable strategies for industry-level transformation. AstraZeneca, GSK, Merck KGaA, Novo Nordisk, Roche, Samsung Biologics, and Sanofi collaborated with UNICEF and WHO to meet the near-term emissions reduction targets and delivery of net-zero health systems via a public-private partnership.

By utilising an ideology of shared ownership, companies have an opportunity to impact emissions by consistent scrutiny, providing the needed resources, and collaborating on net-zero initiatives and implementing sustainability as part of their growth strategy. BS

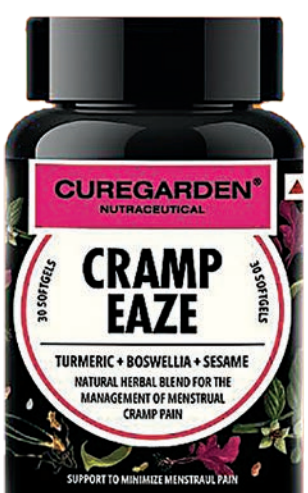
“We’re working on some unique extracts beneficial for improving memory and cognition”

Dr Benny Antony,
Joint Managing Director,
Arjuna Natural Pvt Ltd

World's leading manufacturer and innovator of standardised botanical extracts since 1989, Arjuna Natural firmly believes that technological innovation is the only way to success. The company has patented numerous innovative products and invested heavily in research. Arjuna was the first private company in Kerala to receive approval for an in-house research by the Government of India. As a commitment, the company invests about 10 per cent of its profit towards conducting innovative studies for new products in various universities in India and abroad. In an interaction, Dr Benny Antony, Joint Managing Director, Arjuna Natural shared more details about the company’s plans for the nutraceutical and healthcare market in India.

How was FY 2023-24 for Arjuna Natural globally, particularly India? How much revenue was generated, and how much growth is expected in FY 2024-25?

I feel elated with our performance FY 2023-24, where we could venture into new and unexplored markets and have seen an incremental growth in our existing products and launch of new products for the consumers worldwide. We have seen an increase of 12 per cent globally, while the Indian market has grown by 5 per cent. Arjuna group global annual turnover is above Rs 500 crore, and in FY 24–25, we hope to hit the Rs 600 crore milestone.



Is the company planning new collaborations or investments in India this year?

India boasts one of the fastest-growing economies globally, with a large and diverse consumer base. The country's GDP growth rate consistently outpaces many other major economies, presenting ample opportunities for businesses to expand and thrive. We have partnered exclusively with certain companies worldwide for our top-selling products and also working in collaboration with certain MNC’s in India. Additionally, in India we are also venturing into B2C space with the launch of Curegarden®. We are also expanding in the field of animal nutrition. Currently, to increase our production capacity, we are in the process of expanding to a 60,000 sq ft facility in Erode.

What are the latest offerings at Arjuna Natural for the Nutra industry? Any major plans in store for 2024 for the Indian Nutra market?

Women’s health is one of the verticals we are working on now. As you are aware that the burden of menstrual pain is the single most prevalent gynaecological condition that affects over half of women in their reproductive age regardless of age or socioeconomic status. We have created a novel botanical formula Cramp Eaze® (Curegarden) which offers a natural holistic solution to manage menstrual discomfort, allowing women to enjoy their daily activities without interruption.

Furthermore, we are also working to integrate our clinically proven products into the food market. We are in discussions with a number of food sector companies that could use our clinically approved ingredients to fortify their food ingredients.

How is Arjuna Natural currently addressing the mental healthcare market with its products?

When we consider that 57.8 million persons globally are now dealing with mental health condition, we can leverage

the potential benefits of dietary supplements and functional foods to promote mental well-being, support cognitive function, and reduce the risk of mental health condition. In our product portfolio we have innovative solutions to promote mental well-being. Our ashwagandha extract in 'Shoden®', with the highest purity of 35 per cent withanolide glycosides, is hailed as the most potent and most bioavailable ashwagandha extract globally and has been clinically studied for stress management. It has been clinically proven to help the body adapt to stress and modulate the stress response system, promote emotional well-being and improve sleep quality. We also manufacture Omega-3 fatty acids with high levels of DHA which promotes brain function and mental health. Furthermore, BCM-95®, the world's most researched and bioavailable turmeric extract, has been proven in clinical trials for its neuroprotective activities that can aid in preventing oxidative stress and inflammation, both of which are linked to the aetiology of mental health condition. It has also been studied to reduce anxiety and depression. Currently we are working on some unique extracts beneficial for improving memory and cognition.

What are your views on the concept of healthy ageing? How is the company exploring this space? Are you launching new products in this regard for the Indian healthcare market?

In my opinion by adopting healthy lifestyle behaviours and staying proactive about health, individuals can age gracefully and maintain a high quality of life throughout their later years. Research has always been woven into our DNA and our clinically validated products help in healthy ageing through supporting joint health, improving mental health and cognition, providing better sleep, improving immunity and endurance, and supporting optimal health.

For the Indian market, Arjuna has introduced Curegarden®, which offers well researched, clinically proven formulas fortified with active botanicals that not only improve general health, but targets specific conditions associated with healthy ageing.

With Ayush Ministry strengthening the focus on traditional medicines as a mode of healthcare in India, what are your views on partnering with the government for developing new healthcare products? What are your expectations from the government in terms of supporting R&D, developing policy guidelines, etc.?

Partnering with the government to develop new healthcare products, including traditional medicines, has the potential to yield significant benefits for public health, research and cultural preservation. Collaboration between governments, research institutions, industry stakeholders, and local communities can help harness the potential of traditional medicines while ensuring safety, efficacy, and accessibility for all. Additionally, I would like to inform you that we have a long history of working with government organisations. We were the first company in Kerala to establish a DSIR approved research centre in 2001. We have contributed to developing Pharmacopoeias standards and SOP's of manufacturing of five medicinal plants under Ayush in 2008-10. Our numerous projects have involved collaboration with several government departments and institutes, with which we continue to engage. Recently, with the funding from the Department of Biotechnology, Govt. of India we have co-developed a stable gingerol product from the ginger variety "Karthika" with Kerala Agricultural University. We have recently been granted an Indian patent too and we are in line to commercialise it soon. This ingredient has high market potential in India and abroad. Once the product is commercialised, there will be a sustainable income for farmers /SHGs/FPOs through cultivation and this will help to foster further academia-industry collaboration.

We look to the government for support in research to develop innovative products from traditional Indian plants and their clinical validations. We also request the government to exclude cultivated and value-added plant extracts from the purview of the National Biodiversity Act.

Click the link below for more details
www.arjunanatural.com

Can Cobots Become Indispensable in Healthcare?

Healthcare 4.0, today, is transforming the medical field. Just like how automation revolutionised the core manufacturing industries, Industry 4.0 technologies are bringing about a new era of healthcare services with a focus on increased precision and accuracy. While robots perform a lot of automated, independent actions like in an automobile shop floor or assembly line, healthcare, on the other hand, offers very limited scope for completely autonomous robotic operations. However, robots have made significant inroads in medical device manufacturing and it's possible to use robots in a collaborative manner, where the healthcare service provider's operations can be augmented by the use of collaborative robots or cobots. Let's dig deeper.

In our fast-paced lives where evidence-based decision-making and quick turnaround times are needed, automation does a lot of good by streamlining workflows aided by good health data management, freeing up time for healthcare providers to concentrate on increasing patient care and experience. From surgical assistance to supply transport, robots offer innovative solutions.

The integration of robotics into healthcare settings marks a significant shift, fostering collaboration between humans and machines. Healthcare professionals are increasingly prepared to work alongside these machines, driven by the need for high-quality care, efficiency, and cost-effectiveness. Understanding their readiness is essential for evaluating the impact on patient outcomes.

In medical contexts, collaborative robots, or cobots, are being used to help doctors with rehabilitation, patients with mental health issues, and people with impairments. Cobots mainly are designed to add substantial benefits by reducing the physical workload on doctors and nurses by automating repetitive logistical tasks, enabling them to dedicate more time and energy to more empathetic patient care. Cobots are also used in rehabilitation settings to guide patients through physical therapy exercises, providing personalised feedback and customised workout routines.

Cobots can help address labour shortage challenges by automating routine tasks, allowing healthcare professionals to focus their time and expertise on patient care. There are specific applications within the medical field where cobots can make a significant impact, such as surgery, telemedicine, rehabilitation, and logistics. By targeting these areas, they can tailor their robotics solutions to meet the unique needs of healthcare providers.

Explaining further about the uses of cobots, ***Addverb Technologies' Co-Founder Bir Singh*** says, "Collaboration between robots and healthcare professionals is essential for successful integration into medical settings. The importance of designing cobots that can effectively work alongside human caregivers is paramount for ensuring seamless integration into healthcare workflows, maintaining trust between patients and healthcare providers, and ultimately improving overall healthcare outcomes while preserving the human element in caregiving."

In February this year, at LogiMAT India 2024, Addverb unveiled India's first-ever assistive dog robot, an advanced medical cobot for rehabilitation and imaging, and a collaborative robot (cobot) to enhance operational efficiency and safety. These robots are being manufactured at Addverb's recently opened facility in Greater Noida. Notably, Addverb, known as India's foremost robotic and automation solutions provider, entered the healthcare robotics sector with the introduction of Heal, a medical cobot.

Modernising operation theatres and surgical procedures

Cobots have given conventional surgical theatres or operating rooms (ORs) a complete facelift. As conventional forms rely on the skill and experience of the surgical team, with the use of various medical instruments, automated surgical theatres, on the other hand, represent the future of surgeries.

Cobots are also deployed for more purposes. In the Indian healthcare scenario, the increasing population needs more support from technology to be able to get timely access to quality healthcare. Medical professionals rely on advanced technologies to deliver better results for their patients. For

instance, Siemens Healthineers solutions for cardiovascular interventions with robotic assistance is an example of technological intervention in surgical operating rooms.

Hariharan Subramanian, Managing Director of Siemens Healthcare Private Limited says, "The robotic cardiovascular interventions can aid significantly by contributing to cardiovascular medical conditions like heart diseases, where the ideal treatment includes complex procedures in the coronary arteries by specialised medical professionals. The smart procedural automation can enable performing complex interventional cases in a shorter time, with precision, and with better clinical outcomes."

From a surgeon's point of view ***Dr Sreedhara V Shetty, HOD - Surgical Gastroenterology, Robotic and General Surgery, Kauvery Hospitals, Electronic City, Bengaluru,*** says, "Surgical robots offer advantages over traditional laparoscopic surgical procedures. Aided by cutting-edge hardware, immersive 3D vision, safety features in instruments and AI integration (at present with intestinal staplers), these systems are growing in popularity as they assist in increasingly complex procedures and drive improved patient outcomes (reduced pain, early discharges & early return to work)."

According to Dr Shetty, high upfront costs have been a barrier to broader surgical robot adoption, but robotics has advantages for patients (early return to work in companies) & for companies (reduced sick leaves) which are expected to boost demand.

Expressing further, Dr Shetty, said, "Kauvery Hospital prides itself as the front runner in surgical excellence, precision, and affordability. Its state-of-the-art facilities and technological advancements support every robotic surgeon in delivering the best possible care to patients. Our recent achievement (fastest first 100 procedures in 97 days) is a testament to the trust our patients and their families place in our clinical skills and in the cutting-edge technology we employ."

Platform for cobot developments

To propel India's technological stand on the global premise, an academic platform focused on R&D in robotics and cobotics becomes very essential. The need was duly fulfilled in September 2023 when India got its dedicated first-of-its-kind Medical Cobotics Centre (MCC) in New Delhi to foster innovation in healthcare. This is a joint facility of the Technology Innovation Hubs of IIT Delhi (IHFC) and IIIT Delhi (iHub Anubhuti).

MCC is aimed at being India's first state-of-the-art technology-enabled medical simulation and training facility for doctors, paramedics, technicians, engineers, biomedical researchers, and entrepreneurs. IHFC is funding various R&D projects in the area of rehabilitation robotics and prosthetic devices at premium institutes across the country to deliver low-cost healthcare solutions for India's physically challenged population.

Dr Rashmi Tripathi, Manager, Operations at IHFC, Technology Innovation Hub of IIT Delhi, says that this facility is envisaged as a one-of-its-kind Centre of Excellence (COE) in the field of healthcare, medical cobotics and AI in India.

"The centre has been set up to create an ecosystem for skill development, R&D and startups in the field of medtech devices and equipment and aims at bridging the gap between the medical and engineering fields by providing a common platform for collaboration on training, research, new product development and commercialisation," informs Dr Rashmi.

While sharing more about the cobotics CoE, Dr Rashmi said that collaborative surgical robots are set to enhance precision and minimise invasiveness in medical procedures. These could see increased deployment in India allowing surgeons to perform intricate procedures with improved accuracy.

She also indicated that with a growing ageing population and increased demand for elderly care solutions in India, medical cobots could be designed as assistive devices to help the elderly with daily tasks, monitor health parameters and provide companionship.

Dr Seema Singh, Consultant with IHFC, Technology Innovation Hub of IIT Delhi, says that medical cobots could be designed to assist healthcare professionals remotely to increase the footprint of high-quality healthcare in backward regions of India. "IHFC has developed Tele Observance Tele Operation Robot under their READY program for telemedicine and remote assistance for ICU in healthcare as well. There is a rising demand for rehabilitation services, and medical cobots could be a game changer in India for rapid diagnostic processes, such as sample collection, analysis, and reporting to improve efficiency and reduce errors of medical testing."

Use of Cobots in Healthcare

- **Surgery and Medical Procedures:** Assist surgeons by holding instruments, providing steady camera positioning, or performing repetitive tasks.
- **Rehabilitation:** Help patients with physical therapy exercises, providing guided movement and support.
- **Pharmaceuticals and Laboratories:** Perform repetitive tasks like pipetting liquids, handling samples, and sorting medications.
- **Patient Care and Assistance:** Deliver medications and supplies, help patients with mobility issues transfer or move around.
- **Telemedicine:** Equipped with cameras and screens, cobots can be used for remote consultations, allowing healthcare professionals to interact with patients virtually.
- **Disinfection and Sanitation:** Cobots can be programmed for autonomous disinfection tasks, reducing human contact with potentially contaminated areas.

Evolution of AI-assisted surgical navigation

Surgical navigation systems and cobots are two emerging technologies in medicine and their integration is slowly being explored. Although there isn't widespread use of surgical navigation systems directly in cobots themselves for surgical procedures just yet, both technologies can be complementary in the operating room, working together to improve surgical outcomes.

The greatest advantage of surgical navigation systems is their ability to provide real-time guidance to surgeons during minimally invasive procedures. Use of cameras or trackers to pinpoint the surgical instruments' location within the patient's body offers precision surgical procedures to seamlessly take place.

Nikhil Chandwadkar, Co-founder & CEO, Cartosense, opines that, "Navigation technologies are the backbone of digital surgery because the tracking system component generates information that is complementary to radiological imaging, and the software component is a hub for integrating that information along with radiological images with a variety of tools such as imaging equipment, robotic solutions and advanced visualisation displays. Together these technologies enhance the surgeon's awareness and increase the accuracy of specific actions."

Chandwadkar founded Cartosense to develop technology and products for making surgical interventions more targeted and precise using data. Cartosense is soon launching the C75 Surgical Navigation System, considered to be a breakthrough in single-camera optical navigation.

According to Chandwadkar, in the Indian market, the adoption of navigation-based technologies by surgeons and hospitals has been on an increasing trend in the last 5 years and will continue to rise faster soon. He says that early adopters might receive great bundling deals from multinational multi-product companies, and their purchases can often be marketing expenses. However, he says, only products that are truly beneficial and practical can succeed over a longer period of time.

Emerging opportunities for R&D and higher education

In this digital era, we are seeing the convergence or blending of many streams of education. The multidiscipline approach to product development holds true for medical cobots too. Foresighters predict that there is going to be a burgeoning need for cobot kind of products featuring advanced technologies to save time and most importantly save lives.

Most leading universities are exploring at designing specialised programmes in curriculums related to medical robotics, combining engineering, healthcare, and computer science. Also, researchers are looking to explore how cobots can assist with tasks like: a) drug discovery and handling hazardous materials; b) rehabilitation and physical therapy; c) patient care, such as medication dispensing and mobility assistance; minimally invasive surgery; and for building trust and ensuring safe human-cobot interaction in sensitive medical environments is viewed as necessary.

R&D in human-cobot interface design for a more intuitive and safe collaboration will be a huge area that will demand talent and workforce. Ideally, advancements in sensor technology for better environmental awareness and patient monitoring; machine learning for cobots to learn and adapt to specific tasks and user preferences; and enhanced dexterity and manipulation capabilities for delicate medical procedures will be the areas that will open up for young talent to uptake niche higher education courses.

By capitalising on these emerging opportunities, R&D and higher education can play a pivotal role in shaping the future of medical cobots and their positive impact on healthcare. The future of healthcare, therefore, will likely see humans and cobots working as a well-oiled team, leveraging each other's strengths for better patient outcomes. BS

Anusha Ashwin

“We intend to establish excellence centres across India, catering to diverse needs of different regions”

German firm Miltenyi Biotec is launching operations in India with its first office and investing to set up Miltenyi Innovation and Technology Center as Cell and Gene Therapy (CGT) Centre of Excellence (CoE) at Hyderabad. The company is well poised to enable local development and manufacturing in India to drive affordable and accessible CGT therapies by academia and industry for Indian as well as global patients. BioSpectrum India interacted with Dr Boris Stoffel, CEO and Managing Director of Miltenyi Biotec, at length about the company's growth plans in the Indian market. ***Edited excerpts:***

« **Dr Boris Stoffel,** CEO and Managing Director, Miltenyi Biotec

How does Miltenyi Biotech plan to accelerate the adoption of cell and gene therapy technology within the research and translational community in India and what strategies are being employed to foster innovation and support local initiatives?

Our aim is to swiftly introduce this technology to the research and translational community in India to spur new approaches. We are actively seeking additional innovation here and are committed to supporting it. In the realm of cell and gene therapy (CGT) today, much revolves around the MACS Prodigy platform. This instrument, though appearing conventional, serves as a cornerstone in autologous cell therapy. It facilitates end-to-end processing of patient cells, starting from sample collection to final cell product delivery.

The Prodigy platform serves as the foundation for many established procedures, with over 250 different cell types and protocols developed in collaboration with physicians, researchers, biotech companies, and the pharmaceutical industry.

Our platform accommodates a wide range of cell types beyond CAR T's and Chimeric antigen receptor-NK (CAR-NK), including stem cells. We assist individuals and small biotechs in adapting their ideas and protocols to the platform, facilitating faster entry into the market by leveraging our extensive experience. To expedite market penetration, we have established a team of experts locally. Additionally, we collaborate with physicians who are keen on introducing established therapies and new findings to patients swiftly. We are also open to collaborating with large pharmaceutical companies to develop more closed systems, if desired.

What's your strategy to foster collaborations and partnerships with research institutions and biotech companies? Have you collaborated with any pharmaceutical research institutions in India?

Globally, we have partnered with leading biotech & pharma companies like Novartis, J&J and BMS for delivering cell based products in the market. In India we do not have any notable alliance with any company but we are open to form partnerships & collaborations with biopharmaceutical companies, hospitals and other institutions for sharing our expertise and experience in providing cell and gene therapy. Each year, more than 10,000 patients are treated with cell products using Miltenyi Biotec's technologies. More than 950 investigational new drug (IND) applications as well as investigational device exemptions (IDE) with the US Food and Drug Administration (FDA) are using our technologies and platforms. In doing so, the company is well poised to enable local development & manufacturing in India to drive affordable & accessible CGT therapies by academia & industry for Indian as well as global patients.

Although we have engaged with renowned institutions and organisations like Biotechnology Industry Research Assistance Council (BIRAC) in India, it is still in the initial stage. We realised the importance of daily presence to foster deeper collaborations. Hence, last year, we established

Cell and gene therapies are cutting-edge medical treatment technologies designed to address complex diseases such as cancer and immunodeficiency disorders. Cell therapy involves the injection, grafting, or implantation of viable cells into patients to produce a medicinal effect. On the other hand, gene therapy aims to generate therapeutic effects by manipulating gene expression or altering the biological properties of living cells, addressing genetic problems at their source. These therapies primarily target diseases like immunodeficiency, haemophilia, thalassaemia, and cystic fibrosis, which are often single-gene disorders suitable for somatic cell therapy.

a team in India, to strengthen our presence and engagement in the region. Despite being operational for only a short period, we've witnessed significant interest from pharmaceuticals and biotech companies in India. Moreover, hospitals and oncologists have also shown keen interest, given the urgent need for effective treatments.

How do you plan to deliver your product to patients in India and monitor effectiveness of treatment?

Cell and gene therapy are cutting-edge medical treatment technologies designed to address complex diseases such as cancer and immunodeficiency disorders. Cell therapy involves the injection, grafting, or implantation of viable cells into patients to produce a medicinal effect, such as transplanting T-cells to combat cancer cells or grafting stem cells for tissue regeneration. On the other hand, gene therapy aims to generate therapeutic effects by manipulating gene expression or altering the biological properties of living cells, addressing genetic problems at their source.

These therapies primarily target diseases like immunodeficiency, haemophilia, thalassaemia, and cystic fibrosis, which are often single-gene disorders suitable for somatic cell therapy. The treatment process involves apheresis, where the patient's blood is collected, processed using necessary reagents and the final product is administered to the patient after quality control checks.

However, the logistical challenge lies in coordinating the treatment process within hospitals due to its precise timing and organisation requirements. To address these challenges and advance therapy development, we collaborate with various stakeholders, including physicians, researchers, and biotech startups. Through workshops, training modules and alliances with academia, we aim to foster innovation and streamline the transition from preclinical to clinical stages. Our collaboration extends beyond providing technological solutions; we aim to support partners throughout their journey, including education and technical training. We are prepared to meet this need by offering a spectrum of support beyond technical assistance, including medical discussions and integration into clinical workflows.

Could you share details of your plan to establish a Centre of Excellence in India?

Hopefully, within a 4-month timeframe, we aim to establish our initial lab infrastructure in Hyderabad to begin training personnel. However, to establish such a setup it requires meticulous planning. We intend to commence this process immediately.
In the next phase, as our team has already forged relationships with hospitals and biotech companies possessing GMP facilities, we will take our business forward. We're ready to provide support where needed, including potential facility upgrades. Many of these facilities are poised for operation, and some are already functional. Our focus is on rapid dissemination of knowledge rather than constructing a centralised manufacturing facility.

We intend to establish excellence centres across India to cater to the diverse needs of different regions. Hyderabad has been identified as an initial location, with plans for further expansion in key cities like Bengaluru, Delhi, and Mumbai.

Will you be enhancing your workforce in India in next 12 months?

Currently, our presence in India is relatively small, with 11 employees. However, as we progress, we aim to expand our team, emphasising the importance of talent acquisition to drive our operations forward. Additionally, we leverage strong partnerships to serve customers efficiently, with plans to further expand our workforce as needed to meet growing demand. However, we don't quantify our growth solely in terms of employees; rather, we focus on business development. As we're in the initial stages, we're witnessing significant interest. Currently, our priority is assembling a team capable of swiftly integrating various elements. This process may be influenced by our partnerships and regulatory factors, as everyone involved is continually learning and adapting. BS

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"We're building capabilities in product security; carrying out penetration testing and Threat Modelling to ensure cyber security"

Ireland-headquartered medtech company Medtronic, which completes 75 years of its inception this year, recently inaugurated its newly expanded state-of-the-art Medtronic Engineering and Innovation Center (MEIC) in Hyderabad, in the presence of D Sridhar Babu, Minister of IT, Industries & Commerce, Government of Telangana, along with Geoff Martha, Chairman and Chief Executive Officer, Medtronic, and Jennifer Larson, US Consul General. This expansion is part of the investment of approximately Rs 3000 crore announced by Medtronic over five years to scale up and expand the R&D facility and to employ 1500 people in future. BioSpectrum spoke to Divya Prakash Joshi, Vice President & MEIC Site Leader, Medtronic to learn more about the company's growth plans and offerings in India in 2024. ***Edited excerpts:***

« **Divya Prakash Joshi,** Vice President & MEIC Site Leader, Medtronic

What prompted Medtronic to invest such a significant amount in expanding the Medtronic Engineering & Innovation Center (MEIC) in Hyderabad? What are the key highlights of the expanded site?

Medtronic's decision to strategically invest in the Medtronic Engineering & Innovation Center (MEIC) in Hyderabad is driven by several key factors. Firstly, India's healthcare technology sector offers immense growth potential, and Medtronic recognises the country's importance as a global hub for innovation and talent. Hyderabad, in particular, has emerged as a thriving ecosystem for healthcare technology research and development, with a pool of skilled professionals and strong government support. By expanding MEIC in Hyderabad, Medtronic aims to leverage these opportunities and foster collaboration with the local ecosystem and stakeholders to drive innovation and advance patient care. The investment reflects Medtronic's commitment to investing in India's healthcare ecosystem and delivering innovative solutions that address the evolving needs of patients and healthcare providers. MEIC is Medtronic's largest R&D centre outside the US. At 250,000 sq. ft. of total space, MEIC will focus on collaborative innovation, training and education, and immersive experiences from the expanded space, aimed towards shaping the future of healthcare technology.

The new space will house a Digital Therapy & Innovation Lab, Connected Care Lab, Platform & Tech Lab, Systems Engineering Lab, and Software Lab, as well as new workstations and wellness amenities for employees. MEIC is building capabilities in product security and we have teams engaged in penetration testing, and Threat Modelling to ensure cyber security in our products.

What are the major hiring plans in India in the coming times, and under what skill or expertise, especially with new emerging technologies? Are you looking at partnering with academic institutes for more hiring?

Healthcare technology has primarily focused on engineering skills like electrical engineering or mechanical engineering, but we are expanding to areas like digital and other aspects of software as the newer trends evolve. With 900+ engineers, MEIC is home to some of the best STEM talent bringing in diverse perspectives, and ambition to engineer the extraordinary.

With this expansion, MEIC aims to leverage the sizeable pool of diverse and skilled talent in India involving engineering, mobile apps, application and desktop software, cloud/web apps, data engineering, embedded software, product security, and cyber-product security. The investment will support key healthcare technology areas like robotics, imaging and navigation, surgical technologies, and implantable technologies. It will create significant job opportunities across various niche skill sets like software, data engineering, product security, robotics, kinematics, etc.

The team would continue to collaborate with global R&D units in surgical technologies, imaging

R&D is part of Medtronic's overall global strategy. Medtronic invested $2.7 billion in R&D globally in FY22. As Medtronic's largest innovation centre outside of the USA, MEIC serves as a critical hub for innovation and collaboration working with many business units. The teams at MEIC are working on R&D mainly related to software and engineering to drive product development initiatives, leverage cutting edge technologies, and enhance existing product portfolios. An investment of Rs 3000 crore will be spent over the next five years on physical infrastructure as well as human and scientific capital.

and navigation, and implantables in Cardiovascular and Neuroscience with a focus on connected care, and mobile applications, among others.

We have relationships with various academic institutes across Telangana and other states in India for talent hiring. We also have partnerships with the startup ecosystem to foster digital upskilling of the workforce. The company invests in getting talent from premier institutes and we facilitate the upskilling of these engineers in MedTech and therapy domain knowledge.

Apart from strategic partnerships with leaders in academia, MEIC has infrastructure in place to ensure digital training of the workforce. With a clear onboarding plan, MEIC not only hires talent from the health-tech sector but also from other industrial sectors and freshly-hired graduates have a facilitated mentoring plan. MEIC is building a digital innovation lab at the new site to enable the workforce to understand methodologies like device building, surgeries, etc.

With emerging technologies gaining momentum, how does MEIC envision incorporating these advancements into its operations and offerings in India? Are there any new product launches lined up for 2024?

Our collaborative approach with a focus on research excellence, and close alignment with Medtronic's global strategy ensures the delivery of innovative solutions that address critical healthcare challenges, improve patient outcomes, and drive Medtronic's growth in the global market.

We recognise the growing importance of emerging technologies such as robotic surgeries in advancing patient care. Our team of 100+ engineers played an important role in the launch of the Medtronic Hugo RAS system, a robotic-assisted surgery platform. The centre contributed to a wide range of areas, including software, hardware, systems engineering and quality.

MEIC envisions incorporating these advancements by actively investing in research and development activities, collaborations with healthcare professionals in partnership with the commercial Medtronic India team, and partnerships with academic institutions and technology providers. Our goal for the upcoming years, in line with MEIC's expansion plans, includes contributing to the areas of ENT, next-gen robotics, acute care monitoring, etc.

What role does MEIC play in Medtronic's overall strategy for product development and global market expansion?

R&D is part of Medtronic's overall global strategy. Medtronic invested $2.7 billion in R&D globally in FY22. As Medtronic's largest innovation centre outside of the United States, in R&D and Quality & Regulatory, MEIC serves as a critical hub for innovation and collaboration working with many business units, across technologies and across multiple global R&D units.

The teams at MEIC are working on R&D mainly related to software and engineering to drive product development initiatives, leverage cutting-edge technologies, and enhance existing product portfolios. As announced earlier, an investment of approximately Rs 3000 crore will be spent over the next five years on physical infrastructure as well as human and scientific capital.

The centre's expertise and capabilities contribute to the development of new healthcare technologies that meet the evolving needs of patients and healthcare providers worldwide. MEIC's collaborative approach, focus on research excellence, and close alignment with Medtronic's global strategy ensures the delivery of innovative solutions that address critical healthcare challenges, improve patient outcomes, and drive Medtronic's growth in the global market.

Telangana government has expressed plans to scale up the medical devices park in the state. What are your thoughts on being a part of this initiative?

MEIC started with 50,000 square feet in 2011 during its inception, and it is now at around 250,000 square feet. We have strong collaborations with the Government of Telangana and support their vision to build a robust medtech ecosystem. For now, we are only going to operate from the current site. BS

Dr Manbeena Chawla
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"ORDI serves as a bridging platform to connect scientists with relevant patients to further basic and translational research"

The Founder of the Organisation for Rare Diseases in India (ORDI), Prasanna Kumar Shirole, at the announcement of the 9th Edition of "Racefor7", a 7-kilometre marathon, intends to raise awareness about 7000 rare diseases known or reported worldwide. He's keen to provide patients and their families access to medical treatment and resources. Coinciding with World Rare Diseases Day celebrated on the last day of February, an annual marathon held across 15 cities, Shirole shared with BioSpectrum, the measures and initiatives ORDI has undertaken in addressing rare disease management in India and the goals of ORDI. ***Edited excerpts:***

« **Prasanna Kumar Shirole,** Founder, Organisation for Rare Diseases in India (ORDI)

Why do you hold this annual marathon event?

An annual local event, such as this 'Racefor7' marathon, happening in fifteen different cities across India this year, is important for ORDI's initiative & will contribute to spreading awareness. The annual event is also the means for us to raise funds for ORDI. It also conveys a message that patients suffering from rare diseases and their families are not alone in their fight, showcasing community support through such a local public event and also tackling stigma. Through our local & nationwide public events, ORDI also aims to be a platform for sending the message to the Government as well as to national & global pharmaceutical companies to look towards the Indian market as having potential for investment in rare disease therapies.

What infrastructure is in place at ORDI to increase awareness about rare diseases among medical practitioners?

When ORDI was first started, a considerable challenge was increasing awareness about the existence and diagnosis of rare genetic disorders and diseases among doctors in the first place. Presently, ORDI works with more than 500 hospitals and doctors in India. ORDI serves as the focal point for arranging and conducting webinars and conferences by partnering with institutions like the Indian Academy of Paediatrics (IAP) and the National Neonatal Forum (NNF), to facilitate not only knowledge exchange but also convey the message about real-time issues to these medical experts. ORDI has also set up a helpline for doctors so that doctors across the country can connect with information about possible case(s) or rare diseases and seek further assistance needed in correct diagnosis and/or treatment options. ORDI serves as the platform to connect them to required services depending upon their location in the country. ORDI volunteers visit different locations, conduct clinical specialities and start associating with the local doctors so that patients do not have to travel too much to visit the relevant medical facility. The doctors in such areas can then network with specialists in other areas, like urban hubs, without the patient having to go there.

What are your goals in the next few years?

One of the future targets for ORDI will be to work towards getting the state governments on board with its initiatives and for implementation of various policies, as public health and hospitals are primarily state subjects. ORDI works on a 360-degree approach for rare diseases: One aim is increased advocacy to policymakers, hospitals, researchers, and genetic counsellors. We also work with different funding agencies and clinical trial agencies/companies across India to draw their attention to the rare diseases niche. We also aim to approach and work with pharmaceutical companies to bring overseas drugs for rare diseases to bring those drugs into the Indian market. ORDI serves as a bridging platform to connect scientists to relevant patients to further basic and translational research. In that capacity, ORDI has a connection with ICMR.

Also, in the next two years, another important aim for ORDI is to establish a "Who After Me" facility for rare disease patients and their families. BS

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How Telangana is Targeting Innovation Beyond Generics

In the ever-evolving landscape of life sciences, experts in Telangana are emphasising the need for a shift from merely replicating past successes to fostering groundbreaking discoveries and inventions in drugs and medical technologies. The state has earned recognition for its robust foundation in life sciences, marked by a dominant presence led by research institutions like Centre for Cellular and Molecular Biology (CCMB), Indian Institute of Chemical Technology (IICT), National Institute of Nutrition (NIN), and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) In addition to a strong base for generic pharmaceuticals and vaccine manufacturing industries like Bharat Biotech, Biological-E and Indian immunological Limited, industry leaders stress the importance of transitioning towards a future centred on innovative drug development.

As per the Telangana State Industrial Infrastructure Development Corporation (TSIIDC) report, Telangana is home to over 800 life sciences companies with a combined value of $ 50 billion spread across multiple segments.. Among them, more than 200 plus sites are US FDA-approved, which is the highest number of such firms located in a region anywhere in the world. As per the Industries department report, in the past 9 years, Telangana has attracted more than Rs 29,000 crore in investment in the life sciences segment and created direct and indirect jobs for more than 4.5 lakh people in the state. Overall, Telangana has witnessed a whopping 23 per cent growth rate compared to India's 14 per cent growth rate in the life sciences segment.

Currently, Telangana boasts of a global vaccine manufacturing hub in India, producing 1/3 of the global vaccine supplied from the state to the world countries. Owing to high demand during the COVID-19 period, the vaccine manufacturing capacity of biotech companies from Hyderabad has been enhanced from 9 billion doses in 2014 to 14 billion doses in 2024.

In addition to this, Hyderabad has more than 20 Life Sciences and Medtech incubation centres which is the highest for any city in India. In the year 2022-23, Telangana achieved the distinction of having direct centres of four among the top global life sciences companies which include Novartis, BMS, Roche, and Sanofi.

According to ***Ajay Kallam, Principal Secretary of Industries Department, Government of Telangana,*** the state has the best ecosystem for establishing the life sciences companies. "There's a need to attract investors in the innovator and new product development segment, which will pave the way for attracting more small and big research-based institutions aligning with the needs of big players", says Kallam.

Despite these achievements, the one big thing that is missing in the life sciences sector in the state is companies investing in discoveries and inventions of innovative drug molecules to treat complex diseases threatening global healthcare.

Dr S V Krishna Prasad, CEO of Cito Healthcare, says, "Although Telangana currently leads the nation in generic pharmaceuticals and contributes significantly to India's pharmaceutical exports, the real growth lies in cultivating a robust base for manufacturing and marketing innovative drugs globally". Dr Prasad urges a departure from the prevalent practice of copying off-patented drugs and emphasises the critical need for continuous research and development to discover new molecules that can effectively address a variety of global health challenges. "Except for Dr. Reddy Laboratories, not a single entity from Telangana has dared to carry out clinical trials for the new molecule. Even for Dr. Reddy's, the molecule which it was working on had to face failure in the phase-3 trials, ever since then, there is no major entity that has taken any notable steps towards finding out new drugs," adds Dr Krishna Prasad.

Expressing similar sentiments, ***Laxmi Prasanna, Executive Director of Regulatory Affairs at Pharmaceutical Export Promotion Council of India (Pharmexcil),*** points out that

despite the financial strength of many pharmaceutical firms in Telangana, there is a reluctance to invest in the discovery or invention of new drug molecules. While the state boasts over 400 US FDA-approved manufacturing units producing generic medicines and vaccines worth $4.5 billion, Laxmi Prasanna notes a lack of confidence to innovate, positioning the life sciences sector behind its Western counterparts. "No doubt India has emerged as the Pharmacy of the World in producing and supplying affordable and good quality medicines to the world, but real recognition comes only from the original work that we can deliver. Our life sciences industry must move beyond our conventional practices and take advantage of technology and try to develop new medicines to treat diseases that have no cure to date," observed Laxmi Prasanna.

Over the past four decades, the Telangana life sciences sector has indeed achieved notable milestones, with more than 800 large Indian and global pharma companies setting their bases in and around Hyderabad, Telangana state has set its target of enhancing its drug manufacturing capacity from the current $4.8 billion to $19.1 billion by the end of 2030.

Genome Valley: The Global Hub for Life Sciences

Telangana holds the distinction of being the pioneering state in India to establish the country's first systematically developed life sciences Research and Development (R&D) cluster, known as Genome Valley. It stands as India's premier organised cluster dedicated to Life Sciences R&D and Clean Manufacturing endeavours. The cluster is equipped with state-of-the-art infrastructure, including Industrial/Knowledge Parks, Special Economic Zones (SEZs), Multi-tenanted dry and wet laboratories, and incubation facilities.

With over 200 companies calling it home, Genome Valley has cultivated a scientific workforce exceeding 15,000 professionals. Its occupants include renowned global entities such as Novartis, GlaxoSmithKline, Ferring Pharma, Chemo, DuPont, Ashland, United States Pharmacopeia, Lonza, and numerous others. The cluster's success lies in its commitment to fostering innovation and collaboration in the field of life sciences.

In FY 2017-18, Genome Valley was accorded with Industrial Area Local Authority (IALA) status. The IALA status enables single-point administration of the cluster, which will allow companies in Genome Valley a single-point contact for all Government approvals and further facilitate infrastructure development.

Encompassing an expansive area of 120 acres, Genome Valley hosts numerous prominent global companies spanning 18 countries worldwide. Notably, it accommodates three of India's largest vaccine manufacturers: Bharat Biotech, Biological E, and Indian Immunologicals.

Distinguished as the European hub of India, Genome Valley serves as the operational base for major European corporations, including Novartis, Sandoz, Lonza, Ferring, Chemo, GSK, and others. The cluster features over 2.5 million square feet of multi-tenanted laboratory facilities, with a 500,000-square-foot facility available for lease by March 2021 and

Facts about Genome Valley

Genome Valley is India's first organised cluster for Life Sciences R&D and Clean Manufacturing activities, with world-class infrastructure facilities in the form of Industrial / Knowledge Parks, Special Economic Zones (SEZs), Multi-tenanted dry and wet laboratories and incubation facilities. It is home to more than 200 companies with a scientific workforce of about 15,000 professionals including presence of the marquee global names like Novartis, GlaxoSmithKline, Ferring Pharma, Chemo, DuPont, Ashland, United States Pharmacopeia, Lonza amongst many others.

In FY 2017-18, Genome Valley was accorded with Industrial Area Local Authority (IALA) status. The IALA status enables single point administration of the cluster, which will allow companies in Genome Valley a single point of contact for all Government related approvals and further facilitate infrastructure development in the cluster.

- Home to companies from about 18 countries across the globe
- Home to three of India's largest vaccine manufacturers, namely Bharat Biotech, Biological E and Indian Immunologicals
- Recognized as the European hub of India, housing major European companies like Novartis, Sandoz, Lonza, Ferring, Chemo, GSK, among others
- Houses more than 2.5 Mn Sq. Ft. of multi-tenanted laboratory facilities- About 500,000 Sq. Ft. multi-tenanted facility will be available for lease by March 2021 with another 15,00,000 Sq. Ft under development
- Ranked #1 among the core clusters established in India as per the report – "Life Sciences Real Estate – Opportunities & Hotspots in India", Edition 1, by JB & Cerestra (2019)
- Around 120 acres of land is available for industries as part of Genome Valley Phase 3

Source: lifesciences.telangana.gov.in

Indian & Global Majors in Genome Valley

- DuPont Knowledge Center, one of DuPont's seven global research centres, is in Genome Valley. The centre has approximately 350 scientists conducting research in agriculture and industrial biotechnology.
- AMRI's Hyderabad Research Center in Genome Valley is one of its few centres where AMRI conducts advanced research and development activities outside the USA.
- Mylan is one of the world's leading generics and specialty pharmaceutical companies, providing products to customers in approximately 140 countries. The company established its first Biologics R&D laboratory in Genome Valley and has also expanded its operations further in India.
- Ferring Pharma is a Swiss multinational, biopharmaceutical company developing products in the fields of reproductive health, urology, gastroenterology, endocrinology and orthopaedics. It has planned development activity in reproductive healthcare in Genome Valley, where land has been acquired and facility development is being planned
- Biological E Limited is India's first private sector biological products company and the first pharmaceuticals company in south India. The company leased pivot plants and other laboratory suites in Genome Valley for the development of pneumococcal conjugate vaccine (PCV) and typhoid conjugate vaccine (TCV) using CRM197 as the carrier protein
- Nektar started its operation in Genome Valley in 2005 and it is their only R&D facility outside the US. Some of its operations within GV include research, chemistry, manufacturing and control activities to support the company's novel therapeutics development
- GSK Consumer Health carries out R&D activities for new product development as well as method development, stability studies and analytical development
- Novartis has started its operations in Genome Valley in 2010 and this facility is the company's major R&D centre in India

Source: lifesciences.telangana.gov.in

an additional 1.5 million square feet currently under development.

Acknowledged as the premier cluster in India, Genome Valley secured the top rank in the 'Life Sciences Real Estate – Opportunities & Hotspots in India'. Furthermore, an additional 120 acres of land is earmarked for industries as part of Genome Valley Phase 3 in Siddipet of Medak district.

Dr SP Vasireddi, Non-Executive Chairman and founder of Vimta Labs noted that despite pharma and life sciences players having deep pockets it is sheer reluctance and fear of loss that is acting as a big hindrance for life sciences players to invest in new drug molecule discovery. He stressed that the state and central governments must support funding in this direction and bring in innovative policy decisions to encourage more and more players to venture into new drug development projects.

Vinay Kumar Nandicoori, Director of the Centre for Cellular and Molecular Biology (CCMB) also highlighted that the private pharma players who are keen on new drug discovery can foster partnerships with CCMB and utilise the vast research data available and use the services of lead scientists at the same time they could use and take advantage of new and emerging technologies like data analysis and Artificial Intelligence.

Highlighting the historical struggles to lay the foundation for the life sciences ecosystem,

R K Agarwal, National President, the Bulk Drug Manufacturers of India (BDM) acknowledges the challenges faced by associations in the early 1990s. The concerted efforts of various pharma and life sciences associations, despite hurdles such as tough environmental regulations and financial burdens, have resulted in the creation of a strong life sciences ecosystem in both Telangana & AP.

As Telangana envisions becoming a state-of-the-art hub for life sciences in India by 2030, industry experts assert that the true measure of success will be the state's ability to transition from a focus on generic drugs to pioneering innovative solutions. The future of life sciences in Telangana lies not in replication but in the pursuit of groundbreaking discoveries and inventions that will shape the landscape of global healthcare. BS

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Chief Minister of Telangana, A Revanth Reddy, along with Western Australia's Minister for Health and Mental Health Amber-Jade Sanderson, industry leaders and dignitaries unveiling EY Parthenon's report entitled "From volume to value: Indian pharma's transformation with data and AI" at the 21st edition of BioAsia 2024 held in Hyderabad.

BioAsia 2024

Ushering Fourth Industrial Revolution in Telangana

Taking advantage of the 21st edition of BioAsia 2024 at the Hyderabad International Convention Centre (HICC) in Madhapur, the Government of Telangana leveraged the confluence of the global platform to spearhead initiatives aimed at propelling the state into the forefront of the Fourth Industrial Revolution (C4IR).

Termed as Asia's largest life sciences event, BioAsia 2024 showcased the convergence of pharma, biotech, healthcare and other allied companies adopting new cutting-edge technologies such as Artificial Intelligence (AI) and Big Data Analysis, catalysed fostering partnerships, collaborations, and new investments in the industries.

The three-day global bio event starting from February 26, was marked by the presence of more than 200 leading delegates from across 50 countries including, the USA, UK, France, Germany, Canada, Switzerland, and Australia, among others. The event also witnessed a footfall of over 10,500 participants from across various pharma, biotech, healthcare and other allied sectors.

Telangana Chief Minister Revanth Reddy, who inaugurated the BioAsia event made a significant announcement about the unveiling of the Genome Valley Phase-II expansion on February 27, the second day of the event. The Genome Valley project which is proposed to come up over an extent of 300 acres is expected to attract Rs 2000 crore investment. The facility is set to span across Greenfield pharma clusters located in Vikarabad, Medak, and Nalgonda districts. Highlighting the project's significance, CM Reddy accentuated its strategic placement near the Hyderabad International Airport, highlighting the convenience it provides for global entrepreneurs.

This ambitious venture apart from attracting thousands of crore rupees of investment is also expected to generate employment opportunities to 500,000 individuals in the state.

The second day of the event witnessed leading international speakers Amber Jade Sanderson, Minister of Health, Government of Western Australia, Dr Christopher Boerner, CEO of Bristol Myers Squibb (BMS), Professor Greggg Semenza, Nobel Laureate from Johns Hopkins School of Medicine and Dr Rod Hochman, President and CEO of Providence delivering the keynote address.

The Genome Valley Excellence 2024 Award, presented to Nobel Laureate Professor Gregg L Semenza, further underscores the Government of Telangana's commitment to encouraging the

Indian Pharma's Evolution with Data and AI

EY Parthenon (EY-P), a premier strategy consulting firm, joined hands with BioAsia to unveil a groundbreaking report entitled "From volume to value: Indian pharma's transformation with data and AI". This report heralds the profound impact of Gen AI on revolutionising drug discovery, R&D, and pharmaceutical operations.

Signifying a pivotal shift in India's pharmaceutical landscape, the report underscores the convergence of data and Artificial Intelligence (AI) as a catalyst for unprecedented advancements. By embracing these transformative technologies, India is poised to lead global pharmaceutical innovation, fostering a resilient ecosystem for industry growth.

Suresh Subramanian, Partner & National Life Sciences Leader at EY Parthenon India, emphasised the seismic impact of Gen AI, citing projections that it will contribute $4-5 billion to the Gross Value Added (GVA) of the Indian pharma sector by 2030.

Gen AI's transformative potential extends beyond patient care, impacting various facets of healthcare such as R&D, manufacturing, and supply chain management. However, amidst these gains, ensuring robust data governance and regulatory compliance remains paramount.

Shakthi Nagappan, Director of Life Sciences, Government of Telangana, and CEO of BioAsia, lauded the transformative era of Data and AI in healthcare. This technological fusion is revolutionising drug discovery, clinical trials, precision medicine, and healthcare delivery mechanisms.

The report outlines key imperatives for Indian pharma's transformation with data and Gen AI, including leveraging AI in drug discovery, shifting to value-centric R&D, building resilient supply chains, and embracing digital upgrades in manufacturing, quality, and compliance.

By harnessing Gen AI's capabilities in reshaping R&D through Machine Learning (ML) and Natural Language Processing (NLP), Indian companies are accelerating drug development for various diseases, including cancer, Alzheimer's, and rare diseases.

Furthermore, Gen AI offers opportunities for early-stage development cost savings, target identification, pharmacology analysis, and safety monitoring, positioning India as a frontrunner in pharmaceutical innovation.

To bolster India's pharmaceutical sector by 2030, the report emphasises the need for large-scale plant setups, reduced human intervention, and embracing Industry 4.0 technologies to ensure high-quality standards and manufacturing efficiency.

In conclusion, the report paints a picture of a transformative future where data and AI converge to unlock unprecedented possibilities, positioning India at the forefront of global pharmaceutical advancements.

scientific community striving to advance healthcare and life sciences.

The event witnessed the highlights of the ground-breaking research work of Prof. Gregg Semenza. His discovery of hypoxia-inducible factor 1 or HIF-1 protein that controls gene expression in response to the fluctuations in oxygen availability attracted the attention of industry leaders and the scientific community present at the event. The pioneering research of Prof. Semenza is said to help understand the molecular mechanism of oxygen regulation and the pivotal role of the HIF proteins in treating diseases such as cancer, anaemia, blinding eye disease and cardiovascular diseases.

Outlining the state government industrial policies and initiatives taken up by the government to further encourage industries to set up their bases in Telangana, the Industries and IT Minister, D. Sridhar Babu, highlighted that the government is planning to create over 10,000 new job opportunities in health-tech, alongside nurturing emerging companies and startups in the sector. As part of this, the state government is moving with a plan to provide technical and professional skill training programmes to nearly 50,000 graduates over the next few years, equipping them with industry-ready capabilities to drive research, development, and manufacturing in the life sciences domain.

The BioAsia community also recognised the immense contribution of the startups which are coming up with innovative and new ideas to resolve the complex healthcare and other problems facing society. Of the noted more than 75 new startups floated across the country, BioAsia 2024 recognised five startups for their groundbreaking innovative contributions to healthcare.

Startups such as Plebc Innovations, ZedBlox ActiPod, UR Advanced Therapeutics, Descign, and Lamark Biotech were honoured for their incredible work in revolutionising healthcare access, technology, and patient care. These startups exemplify the transformative potential of technology in shaping the future of medicine and healthcare delivery.

Telangana as Investment Hub

BioAsia, which was launched way back in 2003, in the past 20 years had been an attractive platform for the Pharma, Biotech, Healthcare and Medical Tech companies not just from India, but also from across the globe. Ever since then, the forum has constantly increased its pitch and today has become a global conglomeration platform. Addressing the audience at the event, B P Acharya, former Secretary, Industries and Commerce, who was behind the creation of BioAsia said,"The event had now reached a stage where it has become a more mature global forum, attracting thought leaders and delving into the contemporary issues and new advancement by lead scientists, industry leaders, policymakers, regulators and partnering International players to bring out solutions not just to problems of Indian industry but also to the entire global community".

Overall, BioAsia has attracted a large number of international players to invest in Telangana over the past 20 years. Acknowledging this, Jayesh Ranjan, the Industries & Commerce Department, Principal Secretary, said, "BioAsia has played a vital role in showcasing the Telangana state's solid industrial infrastructure to the global community which in turn had helped attract a large chunk of global investment to the state in the past two decades".

Highlighting Telangana state's emergence as a prime investment hub, Chief Minister Revanth Reddy, urged investors to explore opportunities beyond Hyderabad, particularly in Tier-2 cities. With initiatives like the Regional Ring Road project (RRR) and the development of transport infrastructure, the state government is committed to facilitating seamless operations for domestic and international organisations.

In a testament to Hyderabad's appeal as a destination for investment, the Chief Minister of Telangana also highlighted the substantial investments garnered during the recent World Economic Forum at Davos, amounting to Rs 40,232 crore.

Notably, he welcomed the collaboration between Japanese multinational pharmaceutical company Takeda and Indian vaccine maker Biological-E to produce five crore Dengue vaccine doses annually, further enhancing Hyderabad's reputation as a leading vaccine production hub of the world.

In a strategic move, Queensland-based Southern RNA forged a partnership with DKSH to expand into the Indian biotech market, showcasing the growing relationship between the Australian and Indian biotechnology sectors. This collaboration announced at BioAsia 2024, reflects the global significance of the event as a platform for driving innovation, collaboration, and investment in the life sciences industry.

During a meeting held at BioAsia with Jeremy Jurgens, Managing Director, World Economic Forum & Head of the Forum's Centre for the Fourth Industrial Revolution, Chief Minister Revanth Reddy advocated for investments in not just pharma, biotech and healthcare sectors, but also encouraged investment in the agriculture sector in the state. Additionally, the Chief Minister unveiled the state government's initiative to develop digital health profiles for all residents, further underlining Telangana's commitment to leveraging technology for comprehensive healthcare solutions.

Furthermore, CM Reddy urged Didier Vanderhasselt, Ambassador of Belgium to India, to explore investment prospects in the green hydrogen sector. This initiative aligns with Telangana's vision for sustainable development and renewable energy solutions. Moreover, expressions of interest were received from industrialists keen on investing in the semiconductor sector. The Chief Minister provided assurances regarding the provision of requisite infrastructure, including land at affordable prices, to facilitate seamless operations and encourage investments in this burgeoning sector.

Overall, Telangana's initiatives at BioAsia 2024 have set the stage for the state to emerge as a leader in the Fourth Industrial Revolution, harnessing the power of technology and innovation to propel growth, create employment opportunities, and drive advancements in healthcare and life sciences. BS

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Top 5 Startup Awardees

1. **Plebc Innovations Pvt Ltd:** Revolutionising healthcare access in rural areas with their teleoperated robotic ultrasound system.
2. **ZedBlox ActiPod:** Leading the way in unbreakable cold chain solutions for healthcare.
3. **UR Advanced Therapeutics Pvt Ltd:** Innovating biomaterials for tissue engineering, focusing on endoregenerative cornea.
4. **Descign:** Powering life sciences and healthcare with their AI-enabled digitalisation platform.
5. **Lamark Biotech:** Bringing life-saving medicines within reach globally.

Prime Minister Narendra Modi is seen greeting hundreds of entrepreneurs at the first ever Startup Mahakumbh held at Bharat Mandapam, Pragati Maidan, New Delhi on March 20, 2024.

India celebrates first-ever Startup Mahakumbh

Startup Mahakumbh, India's biggest celebration of startups, kicked off on March 18, 2024 at Bharat Mandapam, Pragati Maidan, New Delhi. Rajesh Kumar Singh, Secretary, Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry (MOC&I), Government of India (GoI), delivered the inaugural address in the presence of key government and private officials including Amitabh Kant, G20 Sherpa & Former CEO, NITI Aayog, GoI, and members of the organising committee.

Rajesh Kumar Singh said, "Startup Mahakumbh is a 'coming out' party of the Indian startup ecosystem. It epitomises the Prime Minister's vision that the whole society should accept the goal of becoming a developed nation and work towards it. It also encapsulates the idea of public-private partnership, given the event is backed by DPIIT and organised by industry stakeholders."

Amitabh Kant highlighted the pace of growth of the Indian startup ecosystem, and said, "From 4 to 400+ incubators, 150+ unicorn, $350 billion+ valuation, 20X increase in funding, 12X increase in investors, 8X increase in incubators, India's startup story is a truly remarkable one. Today, the sector has created close to a million jobs, 10 million indirect jobs, and more than 4 million jobs in the gig economy."

On Day 3, Prime Minister (PM) Narendra Modi visited the Startup Mahakumbh, and took a walkthrough of the exhibition showcased on the occasion. Addressing the gathering, the Prime Minister highlighted the importance of Startup Mahakumbh and emphasised the country's roadmap of working to become a Viksit Bharat by 2047.

"This is indeed a Mahakumbh in its truest form creating an unprecedented energy and vibe. Any Indian visiting the Startup Mahakumbh will witness the unicorns and decacorns of the future. Startups have become a social culture and no one can stop a social culture. India is the third largest startup ecosystem with 1.25 lakh startups involving 12 lakh youth who are directly linked with them", said the PM.

During three days March 18-20, the event witnessed a diverse range of activities and sessions across 10 pavilions including AI + SaaS, D2C/ Consumer brands, Agritech, Fintech, Deep Tech, Biotech & Pharma, Incubators, Climate Tech, E-sports, and B2B Manufacturing.

Biotech Pavilion Sets Stage for Innovation and Global Growth

The Biotech pavilion on Day 1 featured a keynote address focusing on the importance of moving from innovation to the creation of intellectual property. Prof. Vijay Chandru, Co-founder, Strand Life Sciences highlighted that the pandemic has caused a paradigm shift, emphasising the need for a blend of knowledge and utility to navigate the way forward. Key technologies such as synthetic biology were identified as drivers of the ongoing revolution, pointing towards a future dominated by 'Techbio.'

A panel discussion on 'Startups Go Global: Conquering New Markets' applauded the government for providing a fantastic stepping stone for startups looking to expand globally. The panel emphasised the direct application of engineering to biology (Techbio) as a transformative approach.

Dr Jitendra Kumar, Managing Director, Biotechnology Industry Research Assistance Council (BIRAC) spoke on how the government is strengthening the growth of biotech startups at a global scale by establishing a global bioincubators network in the country.

Further, Dr Taslimarif Saiyed, Director and Chief Executive Officer, Centre for Cellular and Molecular Platforms (C-CAMP) said, "The concept of Techbio, bridging engineering and biology, is revolutionising the biotechnology industry. Biotechnology startups are not just entering global markets; they're shaping them and it's crucial to unlock the right global collaborations to propel our startups towards greater success."

The Startup Mahakumbh 2024 event witnessed the grand launch of the 7th edition of the National Bio Entrepreneurship Competition (NBEC 2024) on Day 2. The event was inaugurated by Dr Rajesh Gokhale, Secretary of the Department of Biotechnology (DBT). NBEC 2024, a flagship initiative, serves as a platform for aspiring entrepreneurs in the biotech sector, with C-CAMP playing a pivotal role in nurturing and supporting their ventures. The competition offers lucrative opportunities, including cash prizes, investment opportunities of up to Rs 15 crore, and mentorship access to industry leaders, making it an invaluable launchpad for bio-ventures.

Dr Rajesh Gokhale commented on the launch, saying, "The National Bio Entrepreneurship Competition has been instrumental in fostering innovation and entrepreneurship in the biotech sector. NBEC 2024 will provide a platform for budding entrepreneurs to showcase their ideas and contribute to the growth of the bio-economy in India."

The Biotech Pavilion also witnessed a plenary session on Day 2, that delved into 'Charting Healthcare's Future: Innovations, Opportunities, and On-Ground Impact'. The panelists explored India's competitive edge in the global healthcare market, the significance of innovation, and the role of technology and data in wellness.

Additionally, Krishna Mohan Puvvada, Senior Vice President, Planetary Health and Regional President, MEIA, Novonesis delivered a keynote on "Building a Customer-Centric Culture", and Guhesh Ramanathan, CEO, Indian Institute of Management (IIM) Visakhapatnam FIELD, conducted a masterclass on "Dealing with a VUCA (volatility, uncertainty, complexity, and ambiguity) Environment: Lessons from Healthtech Companies". The day commenced with a reverse pitching session led by Shilpy Kochhar, Chief Manager and Head-Business Development and Communications, BIRAC; and Aditi Kumar, AVP-BioAngels, Indian Angel Network (IAN) shedding light on critical aspects of funding for startups.

Incubators highlight the importance of capacity building

The Incubator Pavilion hosted a first-of-its-kind roundtable witnessing over a dozen departments in the government around innovation with the vision of integrating with startups & angel investors all over the country, and highlighting the future of accelerating the tier II & III cities.

Sanjiv, Joint Secretary, DPIIT stated, "Manufacturing is going to be the next push sector by the government as there are currently 50 active incubators in the making. India unlike the US does not actively promote incubators however, we aim to change that. DPIIT has already started to include incubators in their premiere institutions and similar steps will be undertaken for other sectors as well. Startup Mahakumbh is a big example of one such step and its success will be a collaboration of government and private sector's equal participation."

With the purpose of enabling handshakes and connecting startups with a spectrum of inventors such as venture capitals (VCs), angel investors, family offices, and HNIs, as well as potential corporate partners, the event hosted 2,000+ startups, 100+ unicorns, 10+ thematic pavilions, 1,000+ investors, 300+ incubators & accelerators, 3,000+ conference delegates, 10+ country delegations, and 50,000+ business visitors over the span of three days. BS

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United We Care appoints ex-Google executive Prabeer Nair as Global CHRO

United We Care (UWC), a leading deep tech Generative AI startup focused on transforming mental health and well-being, has announced the appointment of Prabeer Nair as its Global Chief Human Resources Officer (CHRO). Nair brings extensive experience across the entire employee lifecycle, from hiring and training to development, benefits, and research. He possesses a deep understanding of global workforces and cultures, having lived and worked in over 12 countries throughout his career. His career highlights include leadership positions at Google, where he focused on employee motivation and team dynamics, as well as experience with companies like PetroChina, Oracle, and disruptive companies like Google X, Sprinklr, and Speechify. This diverse background equips him with the expertise to navigate the complex landscape of global talent acquisition and cultural integration.

MediBuddy onboards Kuldeep Singh as Senior Vice President & Head of Engineering

MediBuddy, Bengaluru-based digital healthcare platform, has announced the appointment of Kuldeep Singh as Senior Vice President and Head of Engineering. With over 18 years of experience leading distributed teams across the globe, Singh brings a wealth of technical leadership from his notable roles in high-value startups and global financial institutions. In his new role, he will spearhead the engineering efforts at MediBuddy, focusing on designing and implementing innovative solutions that align with the company's vision of making high-quality healthcare accessible to a billion people. In his previous role at Gojek, Singh was leading Engineering for Business platforms (Marketplace, Cartography, Customer, and Communication platform). This formed the core engine of Gojek powered by machine learning systems for real-time, high throughput use cases, in pricing, allocations, routing, and incentives. Prior to Gojek, Singh served as a Distinguished Engineer at Deutsche Bank and Royal Bank of Scotland and as Director of Engineering at Indian e-commerce unicorn Snapdeal.

Dr Pradeep Mahajan receives Maharashtra Bhushan Award

Dr Pradeep Mahajan, the Founder, Chairman and Managing Director of StemRx Hospital and Research Centre, and StemRx Bioscience Solutions, has received the Maharashtra Bhushan Award 2024. This recognition celebrates his pioneering work in regenerative medicine, highlighting his significant contributions to the field. Dr Mahajan's dedication, leadership, and innovative spirit have truly made a difference in the lives of many. Known for his remarkable achievements, Dr Mahajan is highly respected in the field of regenerative medicine. His groundbreaking clinical successes and scholarly contributions have earned him a well-deserved reputation. Through his work, he has not only improved individual lives but has also pushed the boundaries of medical science itself. His associations with prestigious institutions like Maharashtra University of Health Sciences (MUHS), Institute of Technology & Management (ITM), and Amity University reflect his commitment to education and research. Additionally, his certification from the American Board of Regenerative Medicine speaks volumes about his expertise and proficiency.

Lubrizol names Bhavana Bindra as MD, India, Middle East and Africa

The Lubrizol Corporation, producer of multiple grades of high molecular weight polymers for the pharmaceutical market, has announced the appointment of Bhavana Bindra as Managing Director, India (MD), Middle East & Africa (IMEA). The newly created role will support Lubrizol's aggressive growth goals and ongoing commitment to the region. With over two decades of experience in the manufacturing industry and working with renowned companies in this space like REHAU and Cummins

India, Bhavana will apply her leadership and industry expertise to drive Lubrizol's growth in the region. As Lubrizol IMEA Managing Director, Bhavana will be responsible for leading the company's IMEA team to deliver regional growth for Lubrizol and its customers, based on a local-for-local approach. Bhavana will work closely with Lubrizol leaders across the company to support localised market opportunities and strengthen relationships with in-region customers, suppliers and stakeholders. She also will provide oversight of a new Global Capability Center in Pune, which will serve as a regional hub that enhances Lubrizol's capabilities for regional growth.

CARE Hospitals Group appoints Shalabh Dang as Chief Sales and Marketing Officer

CARE Hospitals, a leading healthcare group in India, has announced the appointment of Shalabh Dang as its Chief Sales and Marketing Officer. With a distinguished career spanning over two and a half decades, Dang brings a wealth of cross-domain experience to his new role. Before joining CARE Hospitals, he served as the Group Head - Domestic, International Sales and Collections for Fortis Healthcare. His last assignment was with Red.Health as the Chief Revenue Officer. His impressive career also includes notable stints at renowned companies such as Philips, Vodafone, and TATA Teleservices. Dang's contributions to the healthcare industry were recognised with the prestigious Top 100 Global Healthcare Leader Award in Dubai in 2019, presented by the International Forum on Advancements in Healthcare (IFAH).

Veeda Clinical Research appoints Dr Mahesh Bhalgat as Group CEO

Veeda Clinical Research has announced the appointment of Dr Mahesh Bhalgat as the Group Chief Executive Officer (CEO). Dr Bhalgat is an accomplished leader and professional with more than three decades of a successful career in developing business strategies, driving growth, spearheading multiple initiatives across several verticals, and managing operations in diverse businesses including Biopharmaceuticals, Vaccines, Contract Research Organization (CRO), Contract Development and Manufacturing Organization (CDMO), Agricultural Biotechnology, and Research reagents and services space. Dr Bhalgat has vast experience of being in senior leadership roles. Prior to joining Veeda, he was the Chief Operating Officer (COO) for Syngene International (Biocon Group Company). Prior to that, he was the COO and Executive Director for Sanofi in Hyderabad, where he was responsible for initiating the first-ever Indian manufacturing operation for injectable polio vaccine. Dr Bhalgat started his India career with Biological E, which he joined after 20 years in North America pursuing his study and working with multi-national drug development companies, which include Amgen and Monsanto and Thermo Fisher.

India conducts first human clinical trial of gene therapy for haemophilia A at CMC Vellore

India has conducted the first human clinical trial of gene therapy for haemophilia A (FVIII deficiency) at Christian Medical College (CMC) Vellore. This was disclosed by the Union Minister of Science & Technology Dr Jitendra Singh while addressing the "National Science Day 2024" programme at Vigyan Bhavan in New Delhi, on February 28, 2024. Dr Jitendra Singh further informed that the programme is supported by the Department of Biotechnology, the Centre for Stem Cell Research - a unit of InStem Bengaluru, in collaboration with Emory University, USA at CMC, Vellore. The trials involved deploying a novel technology of using a lentiviral vector to express a FVIII transgene in the patient's own haematopoietic stem cell which will then express FVIII from specific differentiated blood cells. The Minister expressed the hope that manufacturing of this vector will commence soon in India and proceed with further clinical trials.

IISc discovers mechanisms vital for developing therapies for disorders like ADHD

Two new studies from the Centre for Neuroscience (CNS), Indian Institute of Science (IISc), Bengaluru explore how closely attention and eye movements are linked, and unveil how the brain coordinates the two processes. Scientists have long suspected that attention is tightly coupled to rapid eye movements, called saccades. In fact, even before our eyes move towards an object, our attention focuses on it, allowing us to perceive it more clearly – a well-known phenomenon called pre-saccadic attention. However, in the new study, the researchers at CNS show that this perceptual advantage is lost when the object changes suddenly, a split second before our gaze falls upon it, making it harder for us to process what changed. Using a special kind of electrode called a "U-probe", researchers recorded signals from hundreds of neurons across different layers of a specific region in a monkey's brain called the visual cortex area V4. What they found was that neurons in the more superficial layers of the cortex generated attention signals, while neurons in deeper layers produced eye movement signals.

IIT Mandi uncovers critical insights into Parkinson's Disease

Researchers from the Indian Institute of Technology (IIT) Mandi, with international collaborators, have investigated a crucial protein involved in the progression of Parkinson's disease. The work has offered the key insight that a protein modification seen in Parkinson's also has a normal role in regular brain function. The team of experts from various Universities, including IIT Mandi, medical schools, and pharmaceutical companies, has used a comprehensive array of techniques to understand the nature of one particular protein that has been associated with Parkinson's disease. The protein, called Alpha-synuclein, is abundantly found in the brain. In patients with Parkinson's disease and related conditions, this protein is highly phosphorylated i.e., phosphate groups attached to one amino acid (serine-129) of this protein. The research findings have three practical implications- First, drugs or gene therapies can be designed to ensure that the levels of SER129 are maintained correctly in specific areas of the brain; Secondly, molecules can be designed to either imitate or disrupt the connections between proteins that involve Ser129P to treat diseases like Parkinson's; and lastly, using this understanding of phosphorylated Ser129, models to study diseases like Parkinson's, can be improved.

IIT-K licenses innovative bone regeneration technology to Canada-based Conlis Global

The Indian Institute of Technology Kanpur (IIT-K) has signed a Memorandum of Understanding (MoU) with Conlis Global Inc. for licensing of an innovative new technology that promotes bone healing and regeneration. Conlis Global Inc. is a biotechnology company based in Canada that helps to bring products from R&D to the market. The novel Nano Hydroxyapatite based Porous Composite Scaffolds technology is biodegradable and has osteoinductive (bone healing process) and osteopromotive (material for new bone growth) properties for bone regeneration. They are highly biocompatible resulting in good cell material interaction with osteoblast cells (cells responsible for mineralisation of bone during bone formation and bone remodelling), exhibiting a high mechanical strength and interaction between the polymer network and the solvent. These functionalised scaffolds can be used as fillers in large size bone defects, without compromising the connectivity and structural defects, oxygen and blood circulation thereby enhancing tissue formation, mineralisation, and rapid defect healing. It can also be used as a bone substitute, overcoming autograft limitations.

PGIMER develops new prototype to generate neurovascular organoids from autologous

Researchers of Post Graduate Institute of Medical Education & Research (PGIMER), Chandigarh have come up with a prototype for establishment and characterisation of novel self-organising neurovascular organoids/ embryoids (NVOEs) entirely from autologous blood without any genetic maneuvering or morphogen supplementation. This new model for generating mass of neurovascular tissues or neurovascular organoids/embryoids (NVOEs) from autologous blood can help in the investigation of impaired brain functioning and development by analysing in neuroimaging (preclinical) scans, correlating with altered blood supply. The field of neural organoids is rapidly progressing and has fuelled the hope (and hype) for improved understanding of brain development and functions, modelling of neural diseases, discovery of new drugs, and supply of surrogate sources of transplantation.

IIT Jodhpur brings first 'Make in India' sensor for alcohol detection through breath monitoring

The Indian Institute of Technology (IIT) Jodhpur researchers have developed the first 'Make in India' human breath sensor based on metal oxides and nano silicon operating at room temperature. The device's primary function is to measure alcohol content in the breath in drunk and driving cases. However, with some changes in sensing layers and the use of an array of sensors (for Electronic Nose or Artificial Nose), and data analytics, it can also be very useful for characterisation of diseases, such as asthma, diabetic ketoacidosis, chronic obstructive pulmonary disease, sleep apnea, and cardiac arrest, where the person's breath volatile organic compounds (VOC) are monitored. There was a greater need for the development of a quick, affordable, non-invasive health monitoring device, given the growing concerns about the adverse impact of air pollution on human health and the environment. The existing sensors are based on fuel cell-based technology or metal oxide technology. Hence, it motivated the researchers to take up the work and develop a breath VOC sensor whose cost will be less than the existing fuel cell technology-based device. In similar lines, the team has developed a breath monitoring sensor based on partially reduced graphene oxide.

Qiagen launches AI-derived biomedical knowledge base to accelerate data-driven drug discovery

US-based Qiagen has announced the launch of Qiagen Biomedical KB-AI, a new generative AI-driven knowledge base designed to propel drug discovery in the pharma and biotech industries. This new offering is designed for data scientists and bioinformaticians who are looking for the most comprehensive knowledge graphs to fuel data-driven drug discovery. Qiagen Biomedical KB-AI is built on a massive dataset of biomedical literature and other scientific sources. It identifies and extracts causal relationships between genes, diseases, drugs and other biological entities with artificial intelligence (AI), generating over 600 million more biomedical relationships than its complement, Qiagen Biomedical KB-HD. This expansive knowledge base helps data scientists understand disease mechanisms, identify drug targets or biomarkers and explore strategies for repurposing existing drugs. Qiagen Biomedical KB-AI provides the most complete picture of biomedical relationships, including edge cases and novel relationships. While Qiagen Biomedical KB-HD is manually curated and known for its high quality and accuracy, Qiagen Biomedical KB-AI contains over 25x more relationships, allowing data scientists to generate new insights.

US FDA clears Beckman Coulter Life Sciences' DxFLEX Flow Cytometer

Beckman Coulter Life Sciences, a global leader in laboratory automation and innovation, has received 510(k) clearance from the US Food and Drug Administration (FDA) to distribute its DxFLEX Clinical Flow Cytometer in the United States (US). Launched regionally in 2020, this advancement brings the popular benchtop IVD flow cytometry system to American labs while expanding testing capabilities. Offering up to 13-colours, additional detectors can be activated as labouratory needs evolve without the need to purchase additional hardware. Praised for its superior sensitivity and resolution, the compact DxFLEX Flow Cytometer makes multicolour flow cytometry less complex by using avalanche photodiode (APD) detector technology instead of traditional photomultiplier tube (PMT) technology. The use of APD technology simplifies compensation procedures and delivers richer content analysis with higher sensitivity to find dim populations. By comparison, running compensation on a conventional PMT flow cytometer involves significant hands-on time, even when features like auto-compensation setup are available in the software.

Waters launches HPLC CONNECT software

Waters Corporation has announced the launch of HPLC CONNECT software, an all-in-one software platform that enables full digital synchronisation between Waters high- and ultra-performance liquid chromatography (HPLC/UPLC) systems and multi-angle light-scattering instruments (MALS) from its Wyatt Technology portfolio. The software delivers ease-of-use, greater efficiency, and higher confidence for scientists performing size exclusion chromatography and MALS (SEC-MALS) analyses for complex and critical biopharmaceutical innovations, including antibody drug conjugates, other complex protein conjugates, & gene therapies. HPLC CONNECT software supports select Waters LC systems including the ACQUITY Premier, Arc Premier, and Arc Systems. The software enables users to control and monitor HPLC modules including pumps, column ovens, UV detectors, and autosamplers from a single dashboard view. Waters offers a full line of SEC columns optimised for separation of biomolecules by size, ideal for monoclonal antibodies, proteins, peptides, and other biologics. Waters HPLC CONNECT software is now available globally.

Byonoy partners with Eppendorf to provide automate workflow

German firm Byonoy has announced collaboration with Eppendorf to open new opportunities for researchers. The integration of a plate reader into Eppendorf's epMotion liquid handling system facilitates researchers to use the system in a variety of new applications. The current focus is on absorption-based measurements and analysis. Initial findings are centered around protein quantification, cell assays, and bacterial assay. As with all other automation applications, the main emphasis of these efforts is on the efficiency, accuracy,

and versatility of automated laboratory processes. The objective is to provide a first-class user experience with maximum precision during automated workflow. This was made possible by integrating a new class of on-deck absorbance plate readers featuring a compact footprint and fast readout, manufactured by Byonoy, an innovative biotech company specialising in modern measurement instrumentation. The integration of the pioneering on-deck plate reader, Absorbance 96 Automate into the range of powerful and proven liquid handling systems of Eppendorf's epMotion series is easy and simple. This integration enables researchers to effortlessly conduct plate readings and analysis during any automated laboratory processes.

NEB introduces new kit for enzyme-based 5hmC detection at single-base resolution

New England Biolabs (NEB) has announced the launch of the NEBNext Enzymatic 5hmC-seq Kit (E5hmC-seq), a novel enzyme-based method for the specific detection of 5hmC sites. The gentle, enzyme-based approach enables high yields and high-quality data, with an input range of 100 pg to 200 ng. While the biological importance of 5hmC modification is less clear than that of 5mC, the abundance of 5hmC varies significantly between tissues, suggesting that it may play a critical role in gene regulation and other biological processes. The kit includes the reagents required for E5hmC-seq conversion and library preparation compatible with Illumina sequencing; index primers for multiplexing are available separately. A conversion module is also available, for applications beyond library prep.

Thermo Fisher Scientific launches new ion chromatography instrument

To support a wider range of ion chromatography analysis with one instrument, American firm Thermo Fisher Scientific Inc. has launched the Thermo Scientific Dionex Inuvion Ion Chromatography (IC) system, helping to make ion analysis simpler and more intuitive for labs of all sizes. The new analytical instrument is designed to be easily reconfigurable, providing those who require determination of ionic and small polar compounds with a one stop shop for consistent, reliable ion analysis. Aligned with Thermo Fisher's mission to enable customers to make the world healthier, cleaner and safer, the Dionex Inuvion IC system equips environmental, industrial, municipal water, and food and beverage labs with the necessary equipment to determine ionic contaminants in water. The technology also helps identify corrosive contaminants in oil and gas, as well as provide quality assurance and quality control of small ionic compounds in food, beverage, and pharmaceuticals.

Can Gene Therapy Treat 'The Royal Disease'

Last year, the US Food and Drug Administration approved Roctavian, an adeno-associated virus (AAV) vector-based gene therapy for the treatment of adults with severe haemophilia A which is a potentially serious bleeding disorder. This stands as the first gene therapy for adults with severe haemophilia A, also recommended by the European Medicines Agency. With World Haemophilia Day celebrated on April 17, we pause and reflect on whether gene therapy can be regarded as the most effective form of treatment for this condition or not.

Studies have revealed that gene therapy for haemophilia (referred to as "the royal disease") in its current form is not qualified as a cure for haemophilia, though it can certainly relieve the burden of treatment from patients for several years at least. There is another less common form of haemophilia called haemophilia B. However, haemophilia A is 5 times more prevalent than haemophilia B and also has a 5 times greater need for gene therapy.

According to the World Federation of Haemophilia (WFH), there are an estimated 815,100 cases of haemophilia worldwide, of which only 347,026 are diagnosed, with 276,900 cases being severe haemophilia.

People with haemophilia have always been considered good candidates for gene therapy because their clinical manifestations are due to a lack of a single protein that circulates in minute amounts in the bloodstream. For instance, severe haemophilia A cases account for less than 1 per cent of FVIII in the blood, and thus the patients experience bleeding following an injury and may have frequent spontaneous bleeding episodes. On the other hand, people with mild haemophilia carry 6 to 49 per cent of FVIII in the blood and normal levels of FVIII range from 50 to 150 per cent.

The effectiveness of gene therapy can be considered from two perspectives: first, the expression level of the desired gene must be high enough to cure or at least alleviate the disease; and second, the expression should be sustained for a long period, ideally, for a lifetime.

The genetic defect causing haemophilia is very simple in comparison with some genetic diseases that may be caused by multiple gene mutations or one of many possible mutations. Further, the effect of gene therapy for haemophilia can be easily measured by a simple blood test of factor VIII level, which is already clinically available.

According to research, a major obstacle to gene therapy of haemophilia A is that the cDNA of FVIII is about 7 kb which is much longer than the capacity of an AAV vector, commonly used for gene therapy applications. The AAV-based approach also provides challenges such as pre-existing neutralising antibodies (NAb) due to natural AAV infections as well as immune reactions toward gene-transferred cells.

As alternatives, lentiviral vectors or genetic editing are already successful in the treatment of other genetic diseases or animal models of haemophilia but none has been tested for haemophilia with clinical trials.

In the Indian context, a major development was recently announced by Dr Jitendra Singh, the Science and Technology Minister, that researchers at Christian Medical College (CMC) Vellore have conducted the first human clinical trial of gene therapy for haemophilia A, also called the factor (F) VIII deficiency, or the classic haemophilia.

The trials involved deploying a novel technology of using a lentiviral vector to express an FVIII transgene in the patient's haematopoietic stem cell which will then express FVIII from specific differentiated blood cells. While the team is hopeful that manufacturing of this vector will commence soon in India to proceed with further clinical trials, the necessary infrastructure and capacity will pose real challenges to its successful implementation in the country. Nonetheless, gene therapy will continue to evolve and improve to drive the hope of a haemophilia-free world in the future. BS

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