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the business of Bio & Health Sciences

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Total pages including cover 52

BioPharma's TRANSFORMATIVE & STRATEGIC OUTLOOK 2025

NuZar Lab Water Systems

Compact & Powerful

Plug-N-Play

Feed water: Tap	Feed water: Pure		Product water: Ultrapure	Product water: Pure
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●		E 10		● (EDI: 10 L/hr)
●		H 24		● (DI: 24 L/hr)
●		R 24		● (RO: 24 L/hr)
●		C 24		● (CLRW)
	●	C-DI		● (CLRW)
	●	Q	●	

NuZar Q
Type I water

NuZar U24
Type I + RO water

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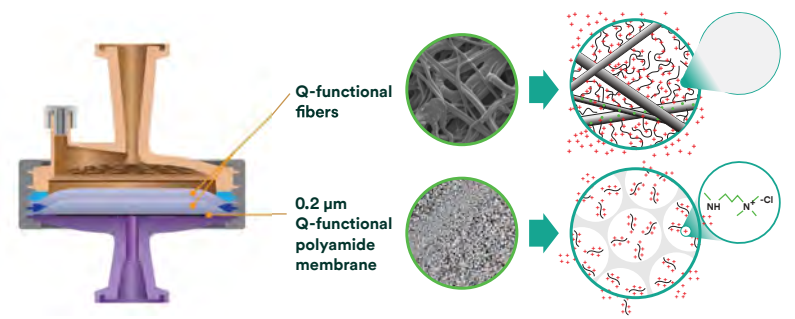
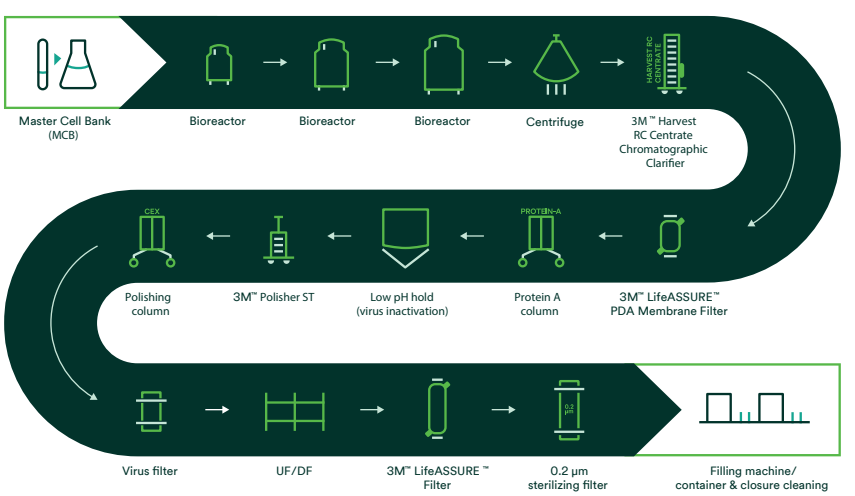


Centrate clarification simplified:



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Acknowledgement/ Feedback

The vision of a robust Biofoundry network is truly inspiring. It is exciting to see how it can catalyse innovation and enhance collaboration across various sectors. The potential for the NCR Biocluster, as mentioned in Dr Manish Diwan's interview in BioSpectrum's November 2024 edition, to drive impactful advancements in our bio-economy is boundless.

- Dr Dhatchana Moorthy, Chennai

Thank you BioSpectrum India for the coverage on 1Pharmacy and their thoughts on How Seed Funding is driving pharma startups in India.

- Sai Chaudhari, Mumbai

Establishment of biofoundry is an excellent initiative. It will create many opportunities. We at WeMR are already on a mission to mentor and upskill students in scientific fields towards human capacity building in scientific research.

- Dr Mamta Aggarwal, Mumbai

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Letter from Publisher

Ravindra Boratkar
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MD, MM Activ Sci-Tech
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Dear Readers,

Over the past year, India's biopharma industry has achieved important milestones, including improvements in precision medicine, biosimilars, and new biologics, as well as scaling up production to match global standards. Innovation and efficiency are being driven by industry's adoption of cutting-edge technologies like biofoundry automation, continuous production, and AI-driven medication discovery. The industry's dedication to quality and compliance is demonstrated by the expanding pipeline of biologics and biosimilars as well as the rising number of regulatory approvals in international markets. This development fits in perfectly with new trends that are expected to emerge in the upcoming year.

2025 looks to be a year of increased cooperation, scientific discoveries, and commercial expansion as India continues to capitalise on its advantages—such as a trained labour force, strong infrastructure, and government backing. Our cover story unearths how the Indian biopharma industry is not only well-positioned to maintain its current development trajectory but also to reinterpret its position as a worldwide centre for biopharma innovation and excellence through a forward-looking approach.

It is still unclear how to best strengthen the current programmes to further spur antibiotic innovation, despite the fact that there have been significant national and international efforts to provide financial incentives for antibiotic research and development. But according to an article by our correspondent, there doesn't seem to be enough worldwide coordination between all the programmes, which could result in funding gaps in the value chain, duplication of effort, and the omission of important antimicrobial resistance (AMR) objectives.

Supported by astute angel investors, medtech startups will remain essential in tackling the world's healthcare issues. These startups are in a strong position to create products that satisfy the needs of patients worldwide by utilising India's enormous talent pool, manufacturing capacity, and healthcare infrastructure. An angel investor, in an article, notes that strategic angel investors will be crucial in helping these businesses grow, improve their offerings, and enter foreign markets as they continue to innovate.

Geopolitical upheavals that led to a major legislative shift in September 2024 are expected to benefit Indian pharmaceutical Contract Development and Manufacturing Organizations (CDMOs) through the US Biosecure Act, which aims to reduce US dependence on Chinese pharmaceutical supply chains by restricting collaborations with certain Chinese biotech firms. To improve the resilience of their supply chains, Indian CDMOs can benefit from the increased demand for Indian CDMOs and CROs from US pharmaceutical companies in the upcoming year. This can be achieved by strengthening their regulatory processes and infrastructure and reducing their dependence on China. Besides, in an article, an expert talks about the growth that was primarily driven by advances in biotechnology, personalised medicine innovations, and an expanding market for biosimilars in 2024.

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

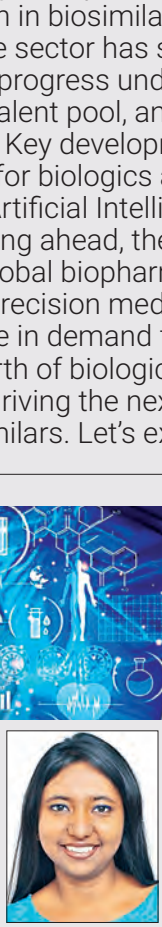
Thanks & Regards,

Ravindra Boratkar,
Publisher & Managing Editor

COVER 21

BioPharma's Transformative & Strategic OUTLOOK 2025

The Indian biopharma industry witnessed notable transformative developments and announcements, marked by innovation, regulatory advancements, and market expansion this year. From achieving global recognition in biosimilars to advancing biomanufacturing capabilities and precision therapeutics, the sector has solidified its role as a key player in the global pharmaceutical landscape. This progress underscores India's strategic focus on leveraging its robust infrastructure, skilled talent pool, and government support to meet the evolving demands of the healthcare industry. Key developments in 2024 include an increase in biosimilar approvals, enhanced collaborations for biologics and vaccines, and a focus on potential investments in cutting-edge technologies like Artificial Intelligence (AI), continuous manufacturing, and automation through biofoundries. Looking ahead, the industry is well-positioned to align with emerging trends that are shaping the global biopharma landscape for 2025 and beyond. These include the growing emphasis on precision medicine, a shift towards sustainable biomanufacturing practices, and an increase in demand for advanced therapies such as cell and gene therapies. With over $200 billion worth of biologic patents set to expire by 2030, Indian companies are poised to play a pivotal role in driving the next wave of innovation and accessibility in biologics and biosimilars. Let's explore further.



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Diabetes Day

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Event Report

Top Video

Arnab Majumdar, Associate Director - Data Science, HealthPlix shares his views on the current role of Generative AI, Advanced Analytics, and Automation in Healthcare in India.

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Zee Yoong Kang, Senior Partner, Healthcare NCS in Singapore talks about how healthcare providers are ensuring that their medical professionals are adequately trained to use AI-enabled workflows.

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Regulars

Disregarding Patient Safety & Industry Concerns?

Medical device imports are once again in the news following the Centre's recent policy change. The industry and the government are at loggerheads over the government's decision to allow the import of used and refurbished medical devices. The Ministry of Environment, Forest and Climate Change (MoEFCC), in consultation with the Directorate General of Health Services and the Ministry of Health and Family Welfare (MoHFW) issued an office memorandum (OM) in October. It revised the list of 38 high-end high-value (HEHV) used and refurbished medical equipment and allowed their import. This move will pit the used imported products against domestically produced new devices.

A similar OM was issued in 2023 listing 50 equipment evoking the industry's dissatisfaction. After industry protests, the OM was issued in October, allowing the import of 38 used equipment. The list includes high-end devices such as MRI, CT, PET-CT, and various radiography devices. In the same office order, an earlier mandatory clause of restriction on not allowing the import of equipment that is manufactured in India was also removed. Several industry associations have requested the government to reconsider its decision. The industry's opposition is mainly on two counts.

Firstly, industry leaders feel that allowing imports of refurbished and pre-owned medical devices poses a threat to the country's efforts for self-reliance in the MedTech sector. It will be a setback for domestic production and the 'Make in India' programme. The second issue is related to patient safety. Experts feel that the refurbished devices may not have the latest technology. Being refurbished the technical failure rate could be high. These issues have given rise to serious concerns about the safety of the equipment and the quality of the service patients may receive. There is a danger that in the absence of clear guidelines over refurbishment, sub-standard equipment could be imported. In such a situation, experts fear that India could be made a dumping ground for substandard equipment.

Considering these points, the Patient Safety and Access Initiative of India Foundation (PSAIIF), a non-profit organisation from Delhi, has filed a public interest litigation (PIL) in the Delhi High Court. The organisation has raised concerns in the PIL over the growing trend of importing refurbished equipment and the hazards they pose. The country has been experiencing an increase in the import of refurbished medical devices, sometimes even without the required approvals. On the one hand, the government has launched the National Medical Devices Policy 2023 to promote the domestic production of medical devices. The country can produce high-level, high-technology devices. Medical devices of international quality standards can be manufactured and are being manufactured in the country. Several startups and small/medium companies have made investments in manufacturing devices. Unfortunately, the office memorandum has created an unfair competition tilted against domestic producers.

In the early 90s, a controversy erupted over the use of refurbished devices for open heart surgeries in a civic public hospital in Mumbai. The patients had to buy some devices for open heart surgeries. As some very poor patients could not even afford that cost, a doctor started reusing the equipment used for one patient once. However, that sparked a controversy considering the patient safety angle. The government is using similar logic in the current case. The reason cited for allowing the import of refurbished and used devices is to make them affordable to small hospitals in smaller cities and towns.

Although the reasoning seems logical and convincing, the government should prioritise patient safety under any circumstance. When the experts from the sector have brought attention to this issue, it is not clear how patient safety will be protected. It is important to elaborate on the steps that will be made mandatory so as not to compromise on this issue. Though the government's intention in allowing refurbished imports is to help small hospitals, it needs to re-evaluate the possible repercussions for the industry and patient wellbeing. BS

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Punjab unveils Stroke Care Model in partnership with CMC Ludhiana and Medtronic

Punjab Health Minister Dr Balbir Singh has announced a transformative collaboration between the Government of Punjab, Christian Medical College (CMC) Ludhiana, and India Medtronic Private Limited. This first-of-its-kind public-private partnership in India aims to combat the rising burden of stroke in Punjab by creating a streamlined stroke care pathway for timely and effective treatment. The partnership introduces a

Hub and Spoke model for stroke care, designed to improve patient outcomes by providing rapid, coordinated care. CMC Ludhiana, a leading medical institution and India's first Advanced Stroke Center certified by the World Stroke Organization and NABH, will serve as the central hub for advanced stroke treatment. A network of government hospitals and medical colleges across the state will act as Spoke centres, responsible for providing immediate care and stabilising stroke patients before referring them to the hub for advanced interventions like mechanical thrombectomy.

PM announces launch of 4 CoEs at NIPER and 5 projects under PLI scheme for medical devices and bulk drugs

Prime Minister Narendra Modi laid the foundation stone of four Centres of Excellence (CoEs) at National Institute of Pharmaceutical Education and Research (NIPER) Ahmedabad in Gujarat for medical devices, NIPER Hyderabad in Telangana for bulk drugs, NIPER Guwahati in Assam for phytopharmaceuticals, and NIPER Mohali in Punjab for anti-bacterial anti-viral drug discovery and development. Also, in a major boost to Make in India initiative in the healthcare sector, Prime Minister inaugurated five projects under the Production Linked Incentive (PLI) scheme for medical devices and bulk drugs at Vapi in Gujarat, Hyderabad in Telangana, Bengaluru in Karnataka, Kakinada in Andhra Pradesh and Nalagarh in Himachal Pradesh. These units will manufacture high-end medical devices, such as body implants and critical care equipment, along with important bulk drugs.

Govt unveils 5 pioneering health research initiatives for medical innovation

Union Health Minister Jagat Prakash Nadda launched five Department of Health Research- Indian Council of Medical Research (DHR-ICMR) health research initiatives planned under the 100 days agenda. These initiatives aim to propel India to the forefront of global health research and innovation, aligning with the nation's vision of a Viksit Bharat. One of the key initiatives launched is the "First in the World" Challenge, inspired by the success of Chandrayaan-3. This high-risk, high-reward research and development scheme is designed to foster the creation of health technologies that are unprecedented globally. Additionally, under the Pradhan Mantri – Ayushman Bharat Health Infrastructure Mission (PM-ABHIM), ICMR is upgrading existing Viral Research & Diagnostic Laboratories (VRDLs) to Infectious Disease Research and Diagnostic Laboratories (IRDLs). ICMR has also launched the ICMR Data Repository, a centralised, secure, and accessible platform of high-quality datasets, ensuring data integrity and privacy.

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NPPA directs companies to reduce MRP on 3 anti-cancer drugs

In line with the government's commitment to ensure the availability of drugs at affordable prices, National Pharmaceutical Pricing Authority (NPPA) has issued an O.M. dated October 28, 2024 directing the concerned manufacturers to reduce the Maximum Retail Price (MRP) on three anti-cancer drugs, Trastuzumab, Osimertinib and Durvalumab. This is in pursuance to the announcement made in the Union Budget for the year 2024-25 exempting these three anti-cancer medicines from customs duty. The Department of Revenue, Ministry of Finance issued Notification 30/2024 dated July 23, 2024 reducing the custom duty to nil on these three anticancer drugs. Further, the Department of Revenue, Ministry of Finance has issued notification no. 05/2024 dated October 8, 2024 notifying the reduction in GST Rates from 12 per cent to 5 per cent with effect from October 10, 2024 on these three drugs. Accordingly, there should be a reduction in MRP of these drugs in the market and benefits of reduced taxes and duties should be passed on to the consumers. Hence, NPPA vide O.M. dated October 28, 2024 has directed all the manufacturers of above-mentioned drugs to reduce their MRP.

Centre to establish 5 CoEs in Virtual Reality and Mixed Reality at National Skill Training Institutes

The Ministry of Skill Development & Entrepreneurship (MSDE), Government of India, has announced its partnership with Meta for the launch of two key initiatives: an artificial intelligence (AI) Assistant for the Skill India Mission and establishing 5 Centres of Excellence (CoEs) in Virtual Reality (VR) and Mixed Reality (MR) at National Skill Training Institutes (NSTIs) located at Hyderabad, Bengaluru, Jodhpur, Chennai and Kanpur. Under this partnership, an innovative AI-chatbot powered by Meta's open-source Llama model will be developed, which will enhance the learner experience on the Skill India Digital (SID) Portal. Sarvam AI, the technical partner for the AI assistant project, will be responsible for the development and deployment of the chatbot, which will be piloted over a six-month period. Further, the 5 CoEs at NSTIs will equip learners and instructors with the latest VR technology to learn and enhance existing skills in a safe, immersive and engaging environment.

NPPA revises ceiling prices of 8 scheduled drugs

The National Pharmaceutical Pricing Authority (NPPA) has been receiving applications from the manufacturers for upward revision of prices citing various reasons like increased cost of Active Pharmaceutical Ingredients; increase in the cost of production; change in exchange rate etc.; resulting in unviability in sustainable production and marketing of drugs. Companies have also applied for discontinuation of some of the formulations on account of their unviability. Most of these drugs are low-cost and generally used as first line treatment crucial to the public health programmes of the country. These drugs are used for treatment of Asthma, Glaucoma, Thalassemia, Tuberculosis, mental health disorders, etc. Formulations for which ceiling prices have been revised include: Benzyl Penicillin 10 lakh IU injection; Atropine injection 06.mg/ml; Streptomycin powder for injection 750 mg and 1000 mg; Salbutamol tablet 2 mg and 4 mg and respirator solution 5 mg/ml; Pilocarpine 2% drops; Cefadroxil tablet 500 mg, Desferrioxamine 500 mg for injection; and Lithium tablets 300 mg.

OneSource Specialty Pharma receives equity commitments of Rs 801 Cr from marquee investors

Strides Pharma Science has announced that its associate company, OneSource Specialty Pharma (formerly known as Stelis Biopharma), Group's Specialty Pharma CDMO (contract development and manufacturing organisation), has received confirmed commitments for fundraising of Rs 801 crore (~$95 million) from marquee domestic and foreign institutional investors and family offices, in the pre-listing round. The share subscription agreements are being executed at a pre-money equity value of $1.65 billion, delivering to Strides' shareholders an embedded value of Rs 663 per share of Strides' holding in OneSource representing an ~82 per cent premium over the previous embedded value of Rs 364 per share as per the Scheme of Arrangement announced earlier in September 2023. The strong interest from leading investors reflects growing confidence in its capabilities and the immense potential of the CDMO sector emerging out of India.

Bain Capital-backed 360 ONE Asset Management invests in A4 Hospitals

360 ONE's Healthcare Opportunities Fund has entered into definitive agreements to invest in A4 Hospitals, a prominent integrated women's healthcare chain based in Tamil Nadu, with a robust presence in Chennai. Founded by experienced healthcare professionals Dr Ashok Kumar and Dr Aruna Ashok, A4 Hospitals offers a wide range of comprehensive services, including fertility treatments (IVF), maternity care, and gynaecological services. The growth capital from 360 ONE's Healthcare Opportunities Fund will be strategically invested to enhance their service offerings, elevate brand recognition, market positioning and further bolster A4 Hospitals' presence in Tamil Nadu as well as other newer geographies. Wodehouse Capital Advisors' was the sole financial and strategic advisor for the transaction. A4 Hospitals' unique model, anchored in rigorous clinical protocols and a patient-centric philosophy, has propelled it to prominence as one of Chennai's leading women's healthcare brands. In 2024, 360 One Asset also invested in Vastu Housing Finance, hearing solutions provider HearZap, D2C lifestyle and design brand DailyObjects.

Yatharth Hospitals acquires majority stake for Rs 91.2 Cr in 400-bedded hospital in Faridabad

Yatharth Hospital and Trauma Care Services has entered into a strategic collaboration agreement for the acquisition of a ~60 per cent stake in a ~400 bedded-hospital in Faridabad, Haryana. The hospital, built on approximately 2 acres of land, has completed its structure and is expected to be operational by the start of the next fiscal year. This acquisition will enhance Yatharth Hospitals positioning as the leading healthcare provider, with the largest bed capacity in the Faridabad region. Under the terms of the agreement, Yatharth Hospitals will acquire a 60 per cent stake in MGS Infotech Research & Solutions Private Limited for a cash consideration of Rs 91.2 crore, thereby making it a subsidiary of the company. The acquisition valued the hospital at an enterprise value of Rs 152 crore. The company plans to invest an additional Rs 100 crore in the new facility to equip it with the latest advanced medical equipment. This will enable the hospital to provide high-end super specialty services, including a full suite of oncology treatments and robotic surgeries, ensuring the highest standards of patient care in the region.

Lyfius Pharma unveils Penicillin-G facility in Andhra Pradesh

Lyfius Pharma has announced the inauguration of its state-of-the-art Pen-G manufacturing facility, at Kakinada, Andhra Pradesh. With an annual production capacity of 15,000 metric tonnes (MT), the facility was virtually inaugurated by Prime Minister Narendra Modi in the presence of other dignitaries. This facility represents a strategic investment of Rs 2,500 crore, under the Government of India's PLI (Production Linked Incentive) Scheme, and exemplifies how private sector participation can significantly contribute to national growth, drive innovation, and enhance healthcare security.

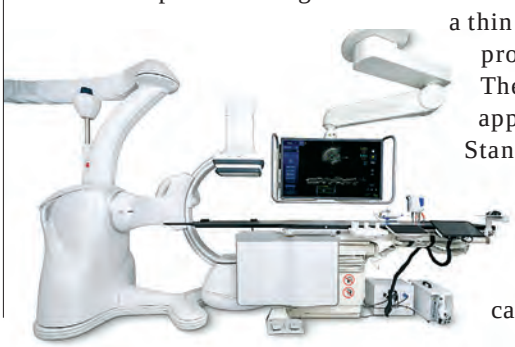
The PLI scheme for the pharmaceutical sector aims to strengthen domestic manufacturing capabilities in critical KSMs, DIs, and APIs. Lyfius Pharma is engaged in the manufacturing of Penicillin-G. Its state-of-art facility situated at Kakinada, approved under the PLI scheme, is dedicated towards ensuring self-sufficiency in the production of Penicillin-G, catering to both the domestic and international markets. This is one of the largest fermentation-based antibiotic intermediates plants in India with cutting edge technology including high-volume fermenters and automated starch & glucose plant.

WHO prequalifies Zydus's Typhoid Vi Conjugate Vaccine, ZyVac TCV

Zydus Lifesciences has received in principle acceptability from the World Health Organisation (WHO) for ZyVac TCV. The Typhoid Vi Conjugate Vaccine ZyVac TCV is now eligible for purchase by United Nations (UN) agencies. ZyVac TCV is indigenously developed and manufactured at the Zydus Biotech Park, Ahmedabad. ZyVac TCV is indicated for active immunisation against Salmonella typhi infection in the age group of 6 months to 65 years. This prequalification for ZyVac TCV makes it eligible to be part of UN agencies procurement programme. Annually over 150 million doses of the typhoid conjugate vaccine is procured by UN agencies to prevent this infectious disease in geographies where it is most prevalent, such as India, Africa and Southeast Asia. Typhoid fever is systemic febrile illness caused by ingestion of the bacterium Salmonella enterica serovar typhi (S. typhi) through contaminated water and food. In the South Asian region, India alone contributes for 75 per cent of incidence and mortality due to typhoid fever. As per GAVI (2022) it is estimated that Typhoid accounts for an estimated 11 to 21 million cases of febrile illness and 117,000 to 161,000 deaths are attributed to the disease each year.

Boston Scientific launches AVVIGO+ Multi-Modality guidance system in India

Boston Scientific Corporation has announced the launch of AVVIGO+ Multi-Modality Guidance System, a next-generation intravascular ultrasound (IVUS) and fractional flow reserve (FFR) system with advanced software and hardware features designed to provide high-quality IVUS vessel imaging and physiology experience during percutaneous coronary intervention (PCI) procedures. IVUS is a specialised diagnostic procedure that uses an ultrasound probe to create high-resolution images of the heart's structures and function from inside the heart. Unlike traditional echocardiograms that use sound waves to produce images from outside the body, IVUS involves inserting a thin catheter with an ultrasound probe directly into the heart.



The AVVIGO+ system received approval from the Central Drugs Standard Control Organization (CDSCO) in July 2024. Boston Scientific manufactures a wide variety of catheters for coronary, peripheral, and cardiac conditions.

Emcure Pharma strengthens derma portfolio with launch of Emcutix Biopharmaceuticals

Pune-based Emcure Pharmaceuticals is set to cater to a growing dermatology segment in India with the formation of a wholly-owned subsidiary, Emcutix Biopharmaceuticals. As a part of this strategic initiative, Emcure's existing dermatology business will also operate under Emcutix. With a renewed focus and a dedicated team, the newly set up entity plans to significantly expand Emcure's offerings. The focus will be on building a differentiated product portfolio including first-time launches designed to fulfil the unmet needs of the Indian dermatology market. The market is seeing strong growth primarily driven by a growing population. As per IQVIA, the Indian dermatology market stands at $1.84 billion (MAT sales July 2024). Emcutix will be spearheaded by G Sathya Narayanan, who brings with him over three decades of extensive experience in the dermatology sector, with his last stint as the Managing Director of Galderma for South Asia (including India). His notable career includes building some of the most iconic brands in prescription, consumer, and aesthetic dermatology.

Esaote Group expands production of ultrasound systems in India

Esaote Group, a leading Italian innovator in medical imaging - ultrasound, dedicated magnetic resonance imaging and information technology for healthcare – strengthens its presence in India with a new manufacturing site in Noida, Uttar Pradesh, created and managed by the subsidiary Esaote Asia Pacific Diagnostic Private Limited. The new Esaote manufacturing site will produce, for the Indian market, a full range of advanced ultrasound series - My Lab A, My Lab E series and Compact Portable Ultrasounds - as 'Made in India', which will be marketed shortly after completion of regulatory and quality assurance processes by the relevant local bodies. For Esaote, the new production plant is a strategic choice to increase its presence in a market with strong growth prospects, where the Italian company has been operating for over 20 years. These ultrasound systems are the latest results of Esaote's R&D efforts.

Meril opens advanced medtech manufacturing facility in Gujarat under PLI Scheme

Meril, one of India's leading global medtech companies, celebrated a significant milestone as Prime Minister Narendra Modi virtually inaugurated its state-of-the-art manufacturing facilities under the Production Linked Incentive (PLI) scheme. Gujarat's Chief Minister, Bhupendrabhai Patel was present in Vapi at the Meril headquarters during the inauguration. At the 2024 Vibrant Gujarat summit, Meril signed a Memorandum of

Understanding (MoU) with the Gujarat government, committing Rs 910 crore in new investments in the medical devices sector.

To date, Meril has invested over Rs 1,400 crore, highlighting its commitment to India's medtech ecosystem. This investment is expected to create 5,000 jobs and significantly reduce imports of critical medical devices. Under the PLI scheme, four of Meril's group companies operating in Structural Heart, Vascular Interventions, Orthopaedics, and Endo Surgery are included, supporting the production of essential devices domestically.

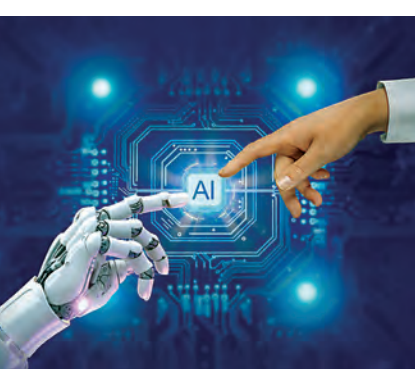
Lifechart raises $500K to scale full stack AI-powered gut wellness solutions

Lifechart, a Gurugram-based full-stack gut wellness brand, has raised approximately $250K from Prajay Advisors LLP, with Mumbai-based Cignas from NA Shah Advisors LLP acting as the transaction advisors to the deal. In addition to Prajay Advisors LLP, other investors i.e., Agility Ventures, Expert Dojo, and prominent angel investors such as Ahana Gautam, Nitish Mittersain, Founder of Nazara Technologies Pvt. Ltd., Sarath Sura, Founder of Sunn91 Ventures and Marwari Angels

who have invested approximately $250K through convertible instruments were converted into equity in this round. Lifechart is in the process of hiring 50 in-house Bachelor of Ayurvedic Medicine & Surgery (BAMS) and Bachelor of Homoeopathic Medicine and Surgery (BHMS) doctors, expanding its capacity to address the growing demand for gut health solutions in underserved regions. In addition to scaling operations in smaller cities, Lifechart is set to launch India's first plant-based microbiome-focused products specifically designed for the Tier 1 cities of India. These products will provide natural, holistic solutions, formulated by BAMS doctors, aimed at promoting better gut health.

Medprime Technologies secures funding to propel growth and AI innovations in health tech

Medprime Technologies, a Thane-based medical device company at the forefront of developing cutting-edge healthcare solutions in diagnostics, has announced the successful closing of its Pre-series A funding, with investment from renowned investor Ashish Kacholia, Co-founder of Hungama Digital and one of India's top 10 investors. The funds will drive Medprime's growth, with a particular focus on establishing an international market for CILIKA (world's first smartphone integrated microscope). Additionally, the investment will accelerate the launch of advanced AI modules to enhance its MICALYS platform in India. Medprime's MICALYS is a pioneer in AI-driven healthcare solutions, and the soon-to-be launched AI modules will further accelerate the company's mission to enhance medical diagnostics through advanced technology.



Even Healthcare secures $30 M in series A funding round to redefine India's healthcare ecosystem

Bengaluru-based startup Even Healthcare, the fast-growing Indian managed care provider, has raised $30 million in a Series A funding round led by Khosla Ventures, with participation from Founders Fund, 8VC, and Lachy Groom among others. This round brings the company's total funding to $50 million. The new capital will be used to launch hospital operations and scale patient care and recourse processes. Even Healthcare offers its members unlimited free consultations, diagnostic tests, and cashless hospitalisation through its in-house clinical team, a growing network of owned and partner clinics, and insurance partners. Unlike India's traditional fee-for-service healthcare model, which often results in delayed treatment and financial hurdles for patients, Even's model aligns health outcomes with profitability. This unique approach fosters trust and efficiency at every stage of care, addressing the misaligned incentives between patients, hospitals, and insurers. To further its mission of creating a seamless healthcare experience, Even plans to open three secondary-care-focused hospitals in Bengaluru.

QubeHealth raises Pre Series A funding from Unicorn India Ventures and CanBank VC

Deep-Tech focused, early-stage venture fund, Unicorn India Ventures and CanBank Venture Capital Fund, from VI Fund "Empower India Fund" led an undisclosed investment into the Mumbai-based healthcare payments startup, QubeHealth, as part of its Pre-Series-A round, setting up the company for its upcoming Series-A round at a valuation of Rs 270 crore. Funds raised will be used for further investment in technology and new feature launches like embedded insurance, gen-AI led recommendation engine and a healthcare marketplace; prior to its Series-A round later this financial year. Qube is looking to raise about $9 million in its upcoming Series-A. QubeHealth-Pay's app helps Indians pay for their family's healthcare bills, using multiple fund sources, at any hospital, clinic, doctor or pharmacy, offering an instant discount cash-back on every bill paid, and access to instant medical finance, if the bill is not covered through your health insurance.

HealthPlix announces integration with Google to simplify healthcare access

HealthPlix Technologies, an artificial intelligence (AI)-powered Electronic Medical Records (EMR) software provider for doctors, has launched an integration with Google to simplify healthcare access. This integration will enable patients to book appointments directly with doctors using HealthPlix's software, affiliated with clinics with a Google business profile. The integration marks a significant step in enhancing patient convenience, streamlining clinic operations, and enabling a frictionless experience for both doctors and patients. By allowing patients to schedule their appointments directly through Google platforms, Bengaluru-based startup HealthPlix is transforming clinician accessibility and making access to healthcare more efficient. With over 14,000 doctors currently using HealthPlix EMR across India, this integration ensures that all appointments booked via Google are unified into the clinic's existing HealthPlix EMR system, simplifying appointment flow management.

MicrobioTx unveils first fingerprick-based test to profile gut microbiome

Bengaluru-based startup MicrobioTx, a new-age gut microbiome company, has announced the commercial availability of Gut Function Test (GFT) that profiles gut microbiome with just a few blood drops. With this test, gut microbiome profiling, which was earlier only possible by stool sample, will now be possible with a finger-prick without the need of collecting stool samples. MicrobioTx's GFT is clinically validated in trials at leading Indian research institutes and has been recently approved by the Indian regulator. The commercial launch of the MicrobioTx's GFT is supported by a grant from DPIIT through the Institute of Life Science, Bhubaneshwar. Scientific evidence has established that a good gut microbiome could set the foundation for good health, such as better weight management, stronger immunity, and other physiological functions. This breakthrough test solution, developed after three years of intense research, allows users to gain valuable insights into their gut health at a fraction of the cost, making it a smart and affordable choice for everyone.

WHO lists additional mpox diagnostic tests for emergency use

As part of ongoing efforts to enhance quality-assured testing options, the World Health Organisation (WHO) has listed two additional mpox in vitro diagnostics under its Emergency Use Listing (EUL) procedure. WHO's EUL is based on the review of quality, safety and performance data in compliance with international standards while addressing the specific needs of low- and middle-income countries (LMICs). Polymerase Chain Reaction (PCR) testing, which detects viral DNA, is considered the gold standard for diagnosing mpox infection. WHO listed the Xpert Mpox, a real-time PCR test manufactured by Cepheid under its EUL procedure, on October 25, 2024 Another PCR-based option, the cobas MPXV assay, developed by Roche Molecular Systems, Inc., was listed on October 14, 2024. It is intended for use on the cobas 6800/8800 Systems. This tool is a real-time PCR test capable of detecting both mpox clades and delivering results in under 2 hours. WHO previously listed Alinity m MPXV assay, manufactured by Abbott Molecular Inc. under EUL on October 3. WHO is working with manufacturers of the EUL-listed products and national regulatory authorities in affected countries to facilitate domestic registration or emergency listing.

WHO study lists top endemic pathogens for which new vaccines urgently in need

A new World Health Organisation (WHO) study names 17 pathogens that regularly cause diseases in communities as top priorities for new vaccine development. The WHO study is the first global effort to systematically prioritise endemic pathogens based on criteria that included regional disease burden, antimicrobial resistance risk and socioeconomic impact. The study reconfirms longstanding priorities for vaccine research and development (R&D), including for HIV, malaria, and tuberculosis – three diseases that collectively take nearly 2.5 million lives each year. The study also identifies pathogens such as Group A streptococcus and Klebsiella pneumoniae as top disease control priorities in all regions, highlighting the urgency to develop new vaccines for pathogens increasingly resistant to antimicrobials. Pathogens where vaccine research is needed include- Group A streptococcus, Hepatitis C virus, HIV-1, Klebsiella pneumoniae; Pathogens where vaccines need to be further developed include- Cytomegalovirus, Influenza virus (broadly protective vaccine), Leishmania species, Non-typhoidal Salmonella, Norovirus, Plasmodium falciparum (malaria), Shigella species, Staphylococcus aureus; and Pathogens where vaccines are approaching regulatory approval, policy recommendation or introduction include- Dengue virus, Group B streptococcus, Extra-intestinal pathogenic E. coli, Mycobacterium tuberculosis, and Respiratory syncytial virus (RSV).

Egypt receives malaria-free certification by WHO

The World Health Organisation (WHO) has certified Egypt as malaria-free, marking a significant public health milestone for a country with more than 100 million inhabitants. The achievement follows a nearly 100-year effort by the Egyptian government and people to end a disease that has been present in the country since ancient times. Egypt is the third country to be awarded a malaria-free

certification in the WHO Eastern Mediterranean Region following the United Arab Emirates and Morocco, and the first since 2010. Globally, a total of 44 countries and 1 territory have reached this milestone. Certification of malaria elimination is granted by WHO when a country has proven, beyond reasonable doubt, that the chain of indigenous malaria transmission by Anopheles mosquitoes has been interrupted nationwide for at least the previous three consecutive years. A country must also demonstrate the capacity to prevent the re-establishment of transmission.

PAHO to facilitate access to maternal vaccines to protect babies from respiratory syncytial virus

Starting in the first quarter of 2025, the Pan American Health Organisation (PAHO), through its Regional Revolving Funds, will provide countries of the Americas with affordable access to the vaccine against respiratory syncytial virus (RSV), a leading cause of paediatric hospitalisation and death from respiratory infections during the first six months of life. Each year, around 13 million children are born in the region who could benefit from this measure if the vaccine is offered to pregnant women. In November 2023, the PAHO Technical Advisory Group (TAG) recommended administering the vaccine to pregnant women between 32 and 36 weeks of gestation. This strategy ensures effective protection for the newborn and reduces the risk of preterm birth. Maternal antibodies provide protection against RSV for approximately six months after birth, when the risk of severe disease is highest. Currently, only one vaccine has been approved by the World Health Organization (WHO) to prevent RSV-related diseases in infants. Countries in the region that request it will be able to access it through PAHO next year.

Pandemic Fund allocates second round of grants to boost preparedness in 50 countries

Concluding its second funding round, the Pandemic Fund's Governing Board has approved $418 million in new grants designed to bolster pandemic prevention, preparedness, and response (PPR) capacities in 40 countries across six geographical regions. These grants will provide much-needed investments to strengthen disease surveillance and early warning systems, upgrading laboratories, and building a healthy workforce. This latest allocation is in addition to the $128.89 million approved in September for five fast-tracked projects to support 10 countries impacted by the mpox Public Health Emergency of International Concern (PHEIC), bringing the total funding awarded under the second round to $547 million, which will mobilise an additional $4 billion for investments in PPR in benefiting countries. Over 50 per cent of the funds awarded under the second round are for countries in sub-Saharan Africa – the region with the highest demand for Pandemic Fund grants. Over 74 per cent of the funded projects will benefit low- and lower-middle income countries.

UK to create world-first 'early warning system' for pandemics

The United Kingdom (UK) will create the world's first real-time surveillance system to monitor the threat of future pandemics, prevent disease and protect the public. Plans have been announced to form a new partnership between the government, Genomics England, UK Biobank, NHS England and Oxford Nanopore - a UK-headquartered, world-leading life sciences company. Oxford Nanopore uses long read sequencing technology to analyse genes and pathogens to rapidly diagnose a range of cancers, along with rare and infectious diseases. The technology can sequence long strands of DNA or RNA in one go, without breaking it up into smaller fragments. In infectious diseases, Oxford Nanopore's technology will help to create an early warning system for future pandemics and potential biological threats, both preventing disease and protecting the public. It will be used in the expansion of NHS England's Respiratory Metagenomics programme, being led by Guy's and St Thomas' NHS Foundation Trust. It uses samples from patients with severe respiratory infections and rapid genetic testing to match those patients with the right treatments within 6 hours.

Sudan rolls out first malaria vaccines

Sudan's Federal Ministry of Health, in partnership with the United Nations Children's Fund (UNICEF), the World Health Organization (WHO) and Gavi, the Vaccine Alliance, has rolled out malaria vaccines for the first time in the country to bolster efforts to protect children from the deadly disease. The launch followed the arrival of the first consignment of 186,000 doses of malaria vaccines to Sudan in October. The vaccinations began in health facilities in 15 localities in the Gedaref and the Blue Nile states, benefitting more than 148,000 children under the age of 12 months. In 2025 and 2026, the vaccine will be introduced in 129 localities across Sudan. Sudan is among the first African countries, and the first in the WHO Eastern Mediterranean Region, to introduce the malaria vaccine, a remarkable accomplishment in a country grappling with an ongoing conflict. Recommended for children aged 5 to 12 months, the vaccine is expected to reduce child hospital admission & mortality from the disease.

Bangladesh launches final phase of HPV vaccination campaign

The Interim Government of Bangladesh has launched the final phase of its human papillomavirus (HPV) vaccination campaign in Barishal, Chattogram, Khulna, Mymensingh, Rajshahi, Sylhet and Rangpur divisions, with the support of Gavi, the Vaccine Alliance (Gavi), UNICEF and WHO, to protect 6.2 million girls aged 10–14 against cervical cancer. With Gavi's support, 6.2 million vaccines have been procured in 2024 and will be available at educational institutions or designated vaccination centres free of cost after registering on the VaxEPI app or on the dedicated website. In 2023, over 14 million girls across the world, including the 1.5 million girls in Bangladesh, were vaccinated against HPV with Gavi support. This critical second vaccination phase will build on last year's incredible progress and contribute towards the Alliance's goal of reaching 86 million girls by the end of 2025.

Immune-boosting bacterial platform to aid nasal vaccines

Researchers at Swedish biotech company Abera Bioscience are set to test whether their bacterial-based platform could strengthen intranasal vaccines being developed to protect against epidemic and pandemic threats. Supported by a new grant of up to $1 million by Norway-based Coalition for Epidemic Preparedness Innovations (CEPI), Abera Bioscience will investigate the role of bacterial outer membrane vesicles (OMVs) in boosting a special type of protection, known as mucosal immunity, which scientists believe could be key to stopping the

onward transmission of viruses. Unlike traditional vaccines, which are commonly injected into muscle, vaccines inhaled into the lungs or sprayed into the nose (the mucosal route) could induce this special type of protection. Abera Bioscience researchers will use the new CEPI funding to decorate OMVs, developed on its proprietary vaccine platform, BERA, with antigens produced by cell-free-production methods, resulting in new immune-boosted nasal vaccine sprays and powders. The BERA platform enables decoration of OMVs with antigens into one particle, by contrast with existing OMV vaccines consisting of a mix of OMVs and antigens. In this project, flu vaccines will be tested for proof-of-concept in preclinical models and the level of immunogenicity induced during the testing will be benchmarked against currently approved flu vaccines.

BioPharma's Transformative & Strategic OUTLOOK 2025

The Indian biopharma industry witnessed notable transformative developments and announcements, marked by innovation, regulatory advancements, and market expansion this year. From achieving global recognition in biosimilars to advancing biomanufacturing capabilities and precision therapeutics, the sector has solidified its role as a key player in the global pharmaceutical landscape. This progress underscores India's strategic focus on leveraging its robust infrastructure, skilled talent pool, and government support to meet the evolving demands of the healthcare industry. Key developments in 2024 include an increase in biosimilar approvals, enhanced collaborations for biologics and vaccines, and a focus on potential investments in cutting-edge technologies like Artificial Intelligence (AI), continuous manufacturing, and automation through biofoundries. Looking ahead, the industry is well-positioned to align with emerging trends that are shaping the global biopharma landscape for 2025 and beyond. These include the growing emphasis on precision medicine, a shift towards sustainable biomanufacturing practices, and an increase in demand for advanced therapies such as cell and gene therapies. With over $200 billion worth of biologic patents set to expire by 2030, Indian companies are poised to play a pivotal role in driving the next wave of innovation and accessibility in biologics and biosimilars. Let's explore further.

The Government of India has introduced several Production Linked Incentive (PLI) Schemes aimed at enhancing domestic manufacturing and attracting significant investments in the life sciences-related sectors. Additionally, initiatives like 'Make-in-India', the National Biopharma Mission (NBM), as well as new provisions from the Anusandhan National Research Foundation (ANRF), to name a few, are set to boost innovation and technological prowess. Key highlights of 2024 included the approval of the BioE3 (Biotechnology for Economy, Environment and Employment) Policy for biomanufacturing, the Bio-RIDE scheme, Vigyan Dhara scheme. The Union Budget 2024 also focussed on ramping up HPV vaccination efforts and announcing new provisions for the biopharma and healthcare sectors through initiatives like the ANRF. The biopharma sector also saw an influx of startups, SMEs, and international companies in 2024, focusing on precision medicine, biosimilars, and biotherapeutics.

Integration of advanced technologies like bioinformatics, data analytics, and artificial intelligence in bioresearch services is poised to accelerate, enhancing research capabilities and driving growth in BioIT/Research Services. A report by WNS, a leading Business Transformation company, states that the transformation of the pharma sector, globally, in 2025 will rely on technologies such as Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), data-driven platforms and blockchain. Innovation

in the future will take place on the back of digital investments in supply chains, clinical trials, and drug development. Personalised patient-centric healthcare will also become the norm.

Other key upcoming trends include the global biosimilars market, therapeutics innovation and sustainable bio-industrial practices. Tech integration in the bio IT/research services will also be a major driver in the coming years. Expanding global acceptance of Indian-made biosimilars presents a lucrative opportunity for the biopharma sector to capture a larger market share in developed countries. Continued advancements in biopharmaceuticals, personalised medicine, and precision treatments are expected to propel the therapeutics segment forward.

Increased Focus on Biomanufacturing

The government introduced the BioE3 policy—a strategic framework designed to propel India into the next era of industrialisation through high-performance biomanufacturing. The BioE3 Policy, approved on August 24, 2024, chalks a strategic roadmap to making India a global biomanufacturing hub by promoting high-performance biomanufacturing through innovation for the development of bio-based products and building an infrastructure that enables scale-up and commercialisation. The six thematic areas of focus highlighted in the BioE3 Policy include bio-based chemicals and enzymes, functional foods and smart proteins, climate-resistant agriculture, carbon capture and utilisation, futuristic marine and space research, and precision biotherapeutics. The policy draws attention to biologics/biotherapies like cell and gene therapy, mRNA therapeutics, monoclonal antibodies, immunotherapy, as well as next-generation vaccines. In line with these, with a growing portfolio of biosimilars, India has the potential to become a global leader in biotherapeutics. This trend includes precision therapies targeting specific disease markers, such as cancer and autoimmune diseases, highlighting India's ambition to meet rising global demand.

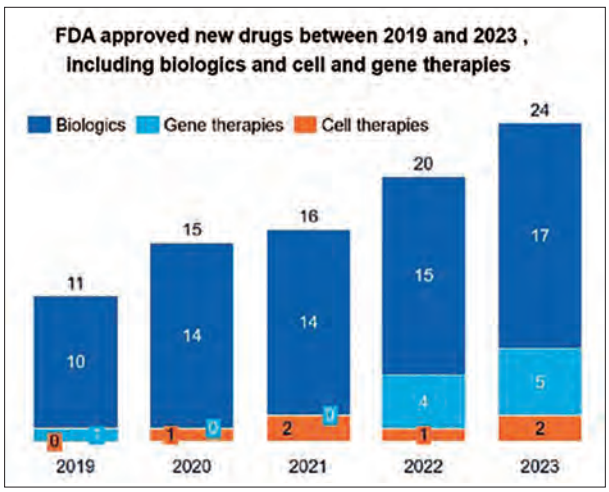
Catalyst to the reaction setup, India's interest in biofoundries is growing, with biofoundries being positioned as a critical infrastructure for the high-throughput design and testing of genetically engineered organisms. To integrate digital automation and robotic systems to scale up the production of cell lines, proteins, and other biologics, this focus aligns with the government's biomanufacturing push, signalling a shift toward advanced, automated production capabilities.

Biofoundries hold the potential to emerge as the backbone of biomanufacturing and synthetic biology, offering integrated infrastructure to streamline the design, construction, and testing of genetically engineered organisms. Biofoundry is a place where biomanufacturing meets automation. The highly modular structure of a biofoundry helps accelerate the design-build-test-learn (DBTL) workflow to deliver products fast and in a streamlined fashion. Advanced platforms to enable rapid, high-throughput experimentation, and automating processes that were once labour-intensive and time-consuming is a central theme.

Innovation-driven biomanufacturing - to develop new biologics, vaccines, gene therapies, and diagnostics - is underway across the globe. Biofoundries are instrumental in revolutionising biotechnology for healthcare, agriculture, and environmental sustainability - from personalised therapies and advanced biologics in healthcare to synthetic fertilisers and sustainable bio-based materials in agriculture. India, too, has come up with multiple initiatives to support and set up biofoundries, such as the BioE3 Policy, the Bio-RIDE scheme, and the Vigyan Dhara scheme. The BioE3 Policy lays out plans for accelerating the transition to biomanufacturing by promoting integrated use of Artificial Intelligence (AI), digitalisation with 'omics', and upstream biotechnology innovations through bio-AI hubs, biofoundries, and biomanufacturing hubs across the country. With the new BioE3 Policy in place, coming years will provide insight into how biofoundries will play a role in boosting innovation, scale-up and commercialisation of bio-based products. In addition, with a Global Biofoundry Alliance now established to coordinate biofoundry activities and innovations worldwide, India is positioning itself in this rapidly evolving field, through the establishment of biofoundries infrastructure to advance India's biomanufacturing goals.

A May 2024 report by Frost & Sullivan, exploring the topic of Contract Development and Manufacturing Organisations (CDMOs) empowering the large-scale production of biologics, reveals that CDMOs are advancing the biopharmaceutical industry with superior biomanufacturing capabilities. The biopharmaceutical industry is expanding rapidly. More biologics programmes have entered late clinical and commercialisation stages globally. The number of FDA-approved biologics and cell/gene therapies rose from 11 in 2019 to 24 in 2023. In 2023, more than half of the top 10 best-selling drugs were biologics with five monoclonal antibodies, one polypeptide, one vaccine, and three chemical drugs. This demand calls for scaling up commercial production, and efficiency has become essential to enterprises. Due to the trend of specialisation and especially contract development,

the global biopharmaceutical landscape is increasingly shaped by CDMOs undertaking commissioned productions and offering unique solutions with higher added value.



Source: FDA, Frost & Sullivan Analysis

Production expansion for a more complex category of biologics is facilitated by the flourishing industry, accelerated drug approvals, and booming global demand for biosimilars. This is an opportunity for biologics CDMOs who can address the high costs of self-built production lines, limited experiences in R&D and production, and other challenges faced by traditional pharmaceutical companies. The global market size of biologics CDMOs has grown significantly from $13.3 billion in 2018 to $29.3 billion in 2022 and is projected to reach $58.1 billion by 2026 and $100.4 billion by 2030.

The report also states that manufacturing capacities are shifting towards the Asia-Pacific region. CDMO services are rising in the Asia-Pacific region because biopharmaceutical companies are seeking cost-effective and efficient R&D and manufacturing services to address the increasing demand. Global biopharmaceutical production capacity and consequently CDMOs are shifting towards this region as a result of continued efforts in improving infrastructure, industry chain supply, project management, quality management systems, and intellectual property protection. Establishing international production facilities and R&D centres are essential strategies for CDMOs in the Asia-Pacific region to enter the global market.

With India aiming to implement large-scale biomanufacturing initiatives, boosting talent and investments in biotech and biopharma, in addition to global developments like the US Biosecure Act, this trend in the biopharma industry holds significance for APAC's leading biopharma hub.

Cell and gene therapy

In October 2023, the Central Drugs Standard Control Organisation (CDSCO) approved NexCAR19, India's domestically developed CAR-T cell therapy - the world's most affordable CAR-T cell therapy; and in 2024, the therapy has been made available to patients at several cancer centres/hospitals. In a recent success story from Bengaluru-based Eyestem Research, the company announced a positive outcome of the Drug Safety Monitoring Board (DSMB) review for the first cohort of its Phase one trial to treat Geographic Atrophy secondary to Dry Age-related Macular Degeneration. Eyestem's lead product, Eyecyte-RPE, is a patented suspension of retinal pigment epithelium cells aimed at combating geographic atrophy arising from Dry AMD. This pioneering treatment marks a major milestone in the global fight against vision loss, as it has the potential to replace damaged retinal cells.

With the BioE3 policy focussing on cell and gene therapy as part of the precision biotherapeutics space, this as-yet niche area is set to get a boost in the coming year. For example, larger, established companies like Miltenyi Biotech, and Intas Pharma are also entering into the cell and gene therapy space in India. Miltenyi Biotec, a global leader in biomedical solutions, has announced the signing of a Letter of Intent with the Translational Health Science and Technology Institute (THSTI), an autonomous institute of the Department of Biotechnology, Ministry of Science and Technology. With this partnership, both organisations aim to address the growing need for innovative treatments in the fight against cancer through cell and gene therapies. The purpose of this collaboration is to focus on leveraging the strengths of both organisations to enhance research and development in cell and gene therapy focusing on cancer and sickle cell disease. This collaboration would help in capacity building, technology transfer, training programmes, and joint research initiatives which would then be translated into medical therapies.

Vaccine Innovation

India's vaccine manufacturing is poised for further growth, supported by the Government of India's Production Linked Incentive (PLI) scheme, encouraging the use of new technologies to expand capacity. Additionally, international collaborations with countries such as the US, Japan, and Australia are aiding India in enhancing its capabilities. While challenges remain in making advanced, next-generation vaccines accessible and affordable for India's large population, continued investment, technological progress, and strategic policies position India as a key player in global vaccine innovation and

production. India's current focus on interdisciplinary research, government support, and collaborations seems to be laying the groundwork for sustainable vaccine innovation.

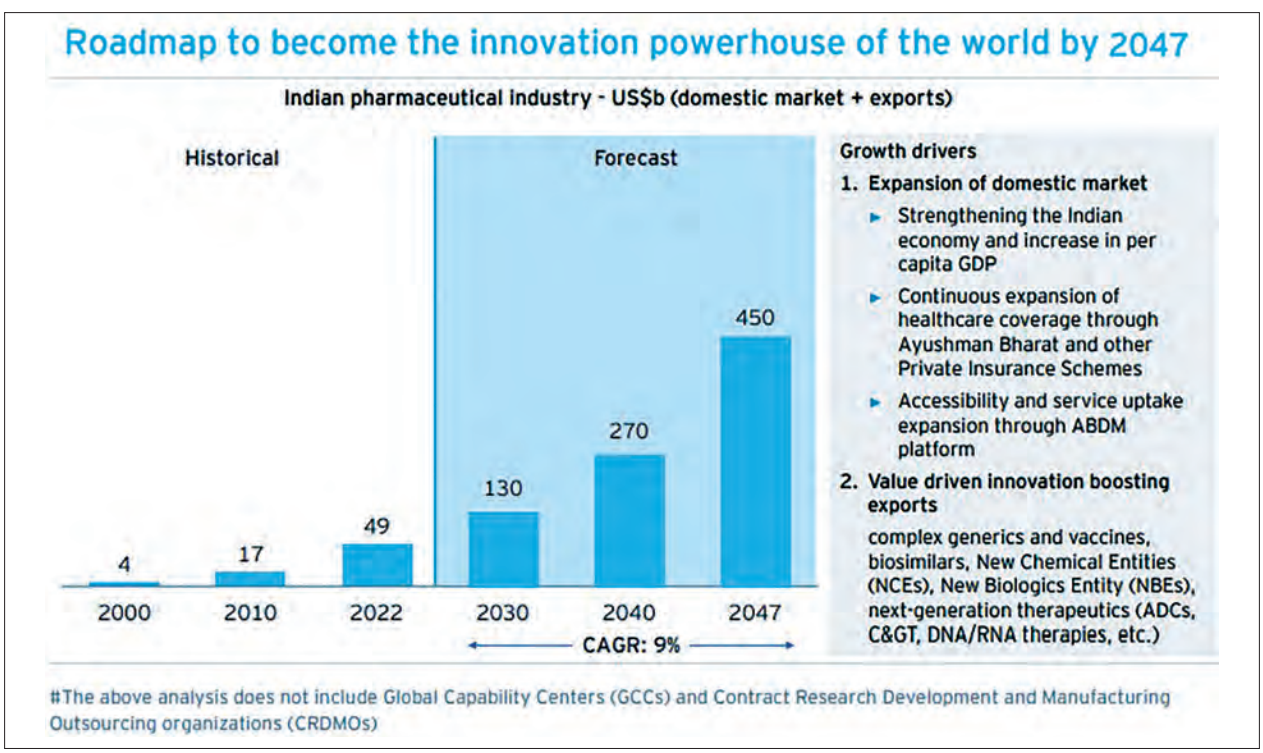
Novel vaccine platforms are emerging worldwide. COVID-19 has resulted in an innovation surge in vaccine development globally. The advent of the COVID-19 pandemic brought the mRNA technology to the forefront. Beyond Pfizer and Moderna, who were pioneering leaders in bringing mRNA vaccine platform to the community, the indigenously developed 'GEMCOVAC-19' vaccine is the only third mRNA vaccine to be approved for COVID-19 in the world and is the very first mRNA vaccine developed in India in June 2023. Developed by Pune-based Gennova Biopharmaceuticals in collaboration with the Department of Biotechnology (DBT), this Omicron-specific mRNA (booster) vaccine 'GEMCOVAC-OM' is thermostable, which does not require ultra-cold chain infrastructure used for other approved mRNA-based vaccines, making it easy for deployment pan India. It is delivered intradermally using a needle-free injection device system.

In May 2024, biopharma companies Gennova and Emcure announced the resumption of their mRNA collaboration with US-based HDT. The long-term agreement will focus on developing mRNA vaccines against a broad range of infectious diseases, in India and several other countries. As part of their agreement, HDT has granted a license to Gennova to use HDT's patented mRNA vaccine technology in multiple fields. In September 2024, Hyderabad-based Bharat Biotech announced a collaboration with US-based Alopexx, Inc., for the co-development and commercialisation of Alopexx's proprietary broad-spectrum anti-microbial vaccine, AV0328, in India and other low-income and lower-middle-income countries. As part of the collaboration, the companies will co-develop and commercialise AV0328, a synthetic vaccine targeting poly N-acetyl glucosamine (PNAG), in India and other licensed territories. A phase I, first-in-human trial has been completed, demonstrating that AV0328 is well-tolerated with no serious adverse events observed. The vaccine-induced antibodies are capable of killing a wide range of PNAG-expressing pathogens, reaffirming its potential as a broad-spectrum antimicrobial solution.

Looking ahead, India's new government policies and the global scenario could start shaping the trend in the direction of vaccine innovation in the coming year - looking to expand its research and development of next-gen vaccines, bridging gaps with faster, more economical platforms to address both local and global health challenges.

Growth in Biosimilars

During September and October 2023, The Organisation of Pharmaceutical Producers of India (OPPI) and EY conducted primary research with the CXOs of the leading Indian and global multinational



Source: 'Reimagining pharma and healthcare for India@100', a 2023 report analysis by OPPI and EY

pharma companies, contract research development and manufacturing outsourcing organisations (CRDMOs), startups, patient advocacy groups, and other organisations to understand their perspective about the potential ambition for the pharma and healthcare sectors in the country for India@100. The report sheds light on some elements of the country's pharma/biopharma sector that we can expect to see growing in the coming year(s).

The report conveys that the research pointed out three goals for the industry: Become the innovation powerhouse of the world, become an integral part of the global pharma supply chain, and achieve sustainable and equitable healthcare access for all.

The report also states that as the competition and pricing challenges in the generics market continue to grow, some Indian companies have started venturing into the less crowded complex generics space. Biosimilars are increasingly becoming a focal point for India. Continued endeavours are underway in the realms of new chemical entities (NCEs) and new biological entities (NBEs).

India's position as an emerging leader in the global biosimilar market, emphasises the country's capabilities, growth trajectory, and strategies to address accessibility and affordability in healthcare. Valued at $349 million in 2022, the Indian biosimilars market is projected to grow to $2.1 billion by 2030. It represents nearly 20 per cent of the domestic pharmaceutical market, with sales expected to double from $6 billion in 2022 to $12 billion by 2025.

India approved its first biosimilar, a hepatitis B vaccine 2000, ahead of the U.S. and Europe. Over 100 biosimilars have since been approved, covering vaccines, insulin, and monoclonal antibodies. Indian biosimilars are exported to highly regulated markets like North America, Europe, and Japan, fueled by the expiration of over 55 biologic patents globally between 2022 and 2032.

With advancements in technology and support from government initiatives, Indian companies are set to drive significant global impact, delivering affordable and high-quality biosimilar therapies to meet growing healthcare demands. To put this in perspective, this is a critical factor for an emerging and growing market like India as biologics worth over $200 billion are set to go off-patent by 2030, an opportunity in the waiting for Indian companies to grab.

Leading Indian firms in this space are expected to take advantage of the off-patent regime and further penetrate the global biosimilar markets by providing low-cost high-quality medicines. The pipeline for biosimilars in India is robust, fuelled by the government's initiative to offer subsidies to the local biosimilars manufacturers. This growth is also driven by the Central Drugs Standard Control Organisation (CDSCO)'s aligning guidelines closely with global regulators, including the United States Food and Drug Administration (USFDA) and the Medicines and Healthcare Products Regulatory Agency (MHRA).

Bengaluru-based Biocon Biologics has been a leader in this category. Over the last year, Biocon has further expanded its biosimilar portfolio with new product offerings and has deepened partnerships in the US and Europe to strengthen distribution channels. The company has also invested in its R&D pipeline for oncology and immunology treatments, reflecting a broader industry trend towards biosimilars.

A Forward-looking Strategy

Significant milestones in India's biopharma industry over the past year include advancements in biosimilars, novel biologics, and precision medicine, along with scaling manufacturing capabilities to meet international standards. Industry leaders have embraced cutting-edge technologies such as AI-driven drug development, continuous manufacturing, and biofoundry automation, driving innovation and efficiency. The growing pipeline of biosimilars and biologics, coupled with increasing regulatory approvals in global markets, reflects the sector's commitment to quality and compliance. This progress aligns seamlessly with emerging trends anticipated for the coming year.

As numerous Indian companies embark on their journeys into the realms of ADCs, DNA and RNA-based vaccines and therapies, and cell and gene therapy, India is poised to undergo a transformative shift, progressing toward its Discovery 1.0 phase. The global focus on personalised healthcare, rising demand for biologics, and increasing adoption of advanced biomanufacturing technologies will create opportunities for Indian biopharma to expand further. The industry's emphasis on affordability, accessibility, and innovation positions it to address the global demand for cost-effective therapies, particularly in regions facing healthcare inequities.

As India continues to leverage its strengths—such as a skilled workforce, robust infrastructure, and government support—2025 promises to be a year of greater collaboration, research breakthroughs, and market expansion. With a forward-looking strategy, the Indian biopharma sector is not only poised to sustain its growth trajectory but also to redefine its role as a global hub for biopharma innovation and excellence. BS

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Indian Lifesciences Industry Going Ahead in its Innovation Journey While Navigating Challenges

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While India is a hub for biosimilar manufacturing and continues to build its capabilities to manufacture these complex therapeutics, Indian biopharma companies are building R&D capabilities and establishing public-private collaborations and Centre of Excellences (CoEs) to develop innovative biologics and advanced therapeutic modalities like cell and gene therapy (CGT) and mRNA vaccines and therapies, biopharma sector remained robust in 2023, accounting for $53.8 billion (35 per cent of the BioEconomy). The growth was primarily driven by advances in biotechnology, personalised medicine innovations, and an expanding market for biosimilars in 2024.

India is a major supplier of vaccines, with more than 50 per cent of the world's vaccines coming from India. According to the WHO Global Vaccine Market Report, the vaccine major Serum Institute of India (SII) accounted for 24 per cent of the global vaccine market. SII joined the CEPI, (the Coalition for Epidemic Preparedness Innovations), network of vaccine producers, which will support rapid, agile responses to possible future infectious disease outbreaks. In addition to conventional vaccines, India has also emerged strong with two mRNA vaccines approved for the omicron variant. Innovations have also increased, with Indian Immunologicals Ltd (IIL), launching India's 'first' indigenously developed Hepatitis A vaccine, Havisure in February 2024.

Many Indian startups and academic organisations have been relentlessly working to advance affordable cell and gene therapies for oncology, rare diseases, and other indications. The push to develop more efficacious and accessible CAR-T therapies to millions of patients finally saw fruition, with the first indigenous CAR-T cell therapy receiving approval in 2023, making it the most affordable CAR-T therapy. The commercial launch of NexCAR19 in 2024 has helped India firmly establish its position in the advanced cell and gene therapy space. This launch has also sparked interest in investors and companies investing in cell and gene therapy developers. Other players like Cellogen Therapeutics are developing advanced CAR-T therapies by developing bi-specific CARs and adding immunostimulatory molecules. They received a $2 million investment from Natco Pharma in 2024 to support the R&D programmes. Immuneel Therapeutics also received $12 million in funding in 2024, which will help propel its CAR-T therapy manufacturing and development platform. Other notable developments included approving the country's first gene therapy clinical trial for Hemophilia A in February 2024.

Growing Focus on Precision Health

Globally, there is a notable push for value-based precision medicine approaches, and India has also embarked on the precision medicine journey with several federal and corporate initiatives and projects. Council of Scientific and Industrial Research (CSIR) launched the Phenome India project in December 2023, which aims to develop country specific prediction models for cardio-metabolic diseases targeted at the Indian population. Phenome India project exemplifies CSIR's commitment to advancing precision medicine through Predictive, Personalised, Participatory, and Preventive healthcare.

Pharma and biopharma companies have focused on utilising digitalisation and AI to accelerate precision medicine efforts with flagship projects and collaborative initiatives. Notable collaborations, such as the one between Siemens Healthineers and the Indian Institute of Science (IISc) with the launch of the Siemens Healthineers-Computational Data Sciences (CDS) Collaborative Laboratory for AI in Precision Medicine in January 2024 will develop open-source AI-based tools to automate digital pathology results in neuroimaging, will help in accurate diagnosis and population health analytics. As healthcare becomes more patient-centric, Indian hospitals strive to provide personalised offerings. Apollo Hospitals launched India's first AI-Precision Oncology Centre at Apollo Cancer Centres in Bengaluru in 2024. This, along with many other examples of how pharma companies, hospitals,

diagnostics developers, and other stakeholders across the healthcare and life sciences value chain are adopting AI and digitalisation, is also indicative of the progress India is making to keep itself abreast in terms of tech-enabled innovations.

Partnerships Play a Pivotal Role in Sustaining Momentum

Building a strong and sustainable infrastructure for biomanufacturing will keep India ahead in its global position, and the recent BioE3 (Biotechnology for Economy, Environment, and Employment) Policy approved in August 2024 will help position India as a global leader.

While the 2024 Indian budget did not particularly have special provisions or policy announcements to foster pharma and biopharma R&D, specific announcements, such as the government setting up a mechanism for private sector-driven research and innovation, the pool of Rs 1 lakh crore and more than Rs 2000 crore of The Production Linked Incentive (PLI) allocation for the pharmaceutical industry for this fiscal year.

Expediting access to advanced therapies is also critical for improved accessibility, and the Central Drugs Standard Control Organisation (CDSCO) recently waived off the requirement for local trials for drugs that already have approval in certain foreign markets. Advanced therapies such as cell and gene therapies, drugs for orphan diseases, and other advanced therapeutic modalities that have been approved by the US, Japan, Europe, and other major countries would be eligible for waiver of the local clinical trials.

The life sciences sector has witnessed strategic partnerships to expand capabilities and market access. In May 2024, Merck inked a partnership with Aurobindo Pharma-owned TheraNym Biologics to expand its biologics manufacturing facilities and advance contract manufacturing. In July 2024, Miltenyi Biotec, a global biomedical solutions company, partnered with the Translational Health Science and Technology Institute (THSTI), an autonomous institute under the Department of Biotechnology, collaboratively developed innovative cell and gene therapies for oncology and haematological indications.

Facing Flaks over Quality and Compliance

Despite the advances and the strong position of the Indian Contract Development and Manufacturing Organisation (CDMO) industry, many of the Indian companies have been under scanner due to significant quality control and regulatory lapses in the last two years. The CDSCO inspected 400 drug manufacturing units over the past year and a half, ordering the closure of more than 36 per cent due to non-compliance leading to quality concerns.

The CDSCO has intensified its monitoring and enforcement if such lapses are found and flagged several drugs in 2023 and 2024 due to quality or efficacy issues from many renowned pharma companies.

With pharma exports accounting for a substantial share of the global market, India is taking solid measures to regain its reputation and re-emerge as a reliable supplier of generic, high-quality, affordable medicines. Since August 2024, more than 200 fixed-dose drug combinations have been banned, citing potential risks to human health.

Many companies, such as Astra Zeneca and Novartis, are re-evaluating their India business strategy, trimming down portfolios and refraining from making new investments. Facing regulatory hurdles, IPR challenges, and pressure to generate revenue and net profit, most multinational corporations are reevaluating their strategies for the Indian market.

What is on the horizon?

The innovation ecosystem is expected to strengthen further in 2025 and the years ahead, with more advanced therapies like cell and gene therapies, mRNA therapies, and advanced antibodies entering clinical development. With stringent monitoring and streamlining regulatory measures, pharma companies are expected to collaborate with regulatory bodies to make quality control and production processes more airtight and transparent.

Stakeholders eagerly await specific policies and initiatives to drive biopharma R&D in the next annual budget, not a mere reduction in taxes and regimes. Incentivisation of high-value, high-risk projects for innovative therapeutics must be in place for India to make a mark in the biotech race.

Geopolitical changes resulting in a significant legislative shift with the U.S. Biosecure Act coming into force in September 2024 are likely to have positive implications for the Indian pharma CDMOs. This Bill aims to reduce US dependence on Chinese pharmaceutical supply chains by restricting collaborations with certain Chinese biotech firms, which would directly increase demand from US pharma companies for Indian Contract Research Organisations (CROs) and CDMOs in the next year. However, Indian CDMOs can seize the opportunity by levelling up in terms of infrastructural investments and regulatory protocols, and reducing dependence on China to make its supply chain more resilient. BS

What's dampening the GLOBAL AMR BATTLE?

Although there have been significant national and worldwide efforts to provide financial incentives for antibiotic research and development, it is still unclear how best to fortify the existing programmes to further spur antibiotic innovation. The incentive programmes in place now are a crucial first step in enhancing the economic viability of antibiotic development. However, it seems like there isn't enough global coordination among all the programmes, which could lead to duplication of effort, funding gaps in the value chain, and the failure to include crucial AMR objectives. Let's dig deeper.

Antimicrobial resistance (AMR) is a growing global concern, with the situation worsening year by year. The speed of developing resistance is at par or, in fact, more than the speed of novel antibiotic development. Most of the big pharmaceutical companies have left antibiotic research due to the high risk of failure and poor return on investment. Antibiotic research is mostly carried out by academic institutes and small- and medium-sized enterprises. However, they lack sufficient funds to take the compounds from early and mid-stage to clinical trials and market.

Insufficient funding remains a major challenge in advancing research on AMR, both in India and globally. The funding landscape for AMR research is characterised by a lack of sustained investment and inadequate financial support from both the public and private sectors. This lack of resources significantly hampers the development of new antibiotics, diagnostic tools, and treatment approaches. In a scenario where countries fail to contain drug resistance, we could face a staggering $1.7 trillion annual reduction in global economic output by 2050, amounting to a 0.88 per cent decrease in GDP. This would not only escalate hospital treatment costs but also adversely affect tourism and domestic hospitality.

An annual investment of $63 billion spent improving access to, and developing new antimicrobials, could generate more than $1.7 trillion in benefits a year by 2050. While $63 billion may sound like a lot of money—in reality, it's less than the world spends on cosmetic surgery, less than video gamers spend on in-game purchases, each year—and it's about an eighth of what the world spends on takeout coffee. These findings are from the recent report from Center for Global Development, based at Washington DC and London, a think tank that uses economic research to reduce global poverty and inequality.

"Scenario that promotes increased access to high-quality treatment for bacterial infections, coupled with funding that spurs the development of new gram-negative antibiotics, presents a more hopeful future. Such initiatives could boost the global economy by an estimated $960 billion by 2050, while simultaneously reducing health care costs by $100 billion. This is in addition to the benefits of simply improving people's lives and the insurance value of reducing the risk of an AMR outbreak. Inaction on AMR carries a significant economic burden. However, the potential economic gains from measures that stem the rise of AMR are substantial," said ***Mark Plant, Chief Operating Officer and Senior Policy Fellow, the Center for Global Development, USA.***

In India, funding for AMR research and initiatives has been relatively limited compared to the need. Public and private sector investments in AMR research have been insufficient, with most resources directed towards modifying existing antimicrobial compounds rather than discovering new therapeutic agents.

Misalignment of incentives

Only a handful of countries have addressed the AMR issue by implementing or proposing financial incentive models to promote antibiotic innovation. In India, many initiatives towards financial incentives have been made which include the UK-India Fleming Fund (a partnership between the Fleming Fund and India's Ministry of Health and Family Welfare. The fund's goal is to accelerate collaboration on AMR surveillance across One Health sectors), a

partnership between C-CAMP and CARB-X that provides funding opportunities for Indian medical innovators working on AMR, Grand Challenges India, etc. However, the misalignment of these incentives is not allowing the achievement of desirable AMR goals in India.

"One important hurdle is misalignment of incentives. While governments and health services are incentivised to promote prudent use of this common good, pharmaceutical companies are incentivised to increase the volume of sales to maximise profits. This problem must be addressed or else the major efforts going into developing new antibiotics will be in vain," opined ***Olof Lindahl, Project Coordinator at Uppsala Antibiotic Center, Uppsala University, Sweden.***

The disconnect between costly antibiotic development and low net present value (NPV, a value calculated based on ultimate costs and revenue) stresses the need for financial incentives that can either decrease the cost of R&D or increase the market revenues. Therefore, several global organisations have put forward funding strategies to lower the cost of developing an antibiotic, directly or indirectly, by cutting down the risk of failures, as they cover both successful and unsuccessful projects. Of the major financial incentives in the field of antibiotic R&D, 71 per cent are strictly push incentives funding the development of novel antibiotics. For instance, the flourishing preclinical antibiotic pipeline in Europe (52 per cent) and America (35 per cent) can be attributed to the proactive approach of government and non-government philanthropic organisations in these continents.

Although these strategies showed a positive impact on NPV, they are insufficient as they do not cover the revenue generation after antibiotic approval and are inadequate alone to recuperate the dried antibiotic arena. ***Dr Reeta KH, Professor at All India Institute of Medical Sciences (AIIMS), Delhi*** said, "Equal attention to market sustainability through pull incentives is needed after antibiotic approval to mitigate the market failure challenges, as evidenced by the bankruptcy of Achaogen, an SME that developed plazomicin. Achaogen was unable to sustain the market of plazomicin despite being push-funded from initial stages to clinical trials by Wellcome Trust, the National Institute of Health (NIH), and the Biomedical Advanced Research and Development Authority (BARDA)."

Revitalising the antibiotic pipeline through financial assistance in the form of push funding and uniting the scientific community can bring back the lost art of discovery. Various push funding mechanisms in the last decade have tried to narrow the discovery void that occurred after the lucrative 1980s era of antibiotic development. However, despite numerous funding mechanisms, the pace of development is still slow, and the antibiotic market is unattractive for the big pharmaceuticals. Along with push funding, there is a need to incentivise antibiotic developers through pull funding after regulatory approval to sustain the market.

Recent developments in Indian AMR space

- Innominds, a US-based digital transformation and product engineering company, partnered with Hyderabad-based startup SCIINV Biosciences to introduce AMRx, an advanced AI/ML-driven digital diagnostic tool designed to combat the growing threat of AMR (June 2024).
- The Indian Medical Association (IMA) formed the National Alliance of Medical Professionals on Antimicrobial Resistance (NAMP-AMR) (July 2024).
- Hyderabad-based Bharat Biotech collaborated with US-based Alopexx, Inc., for the co-development and commercialisation of Alopexx's proprietary broad-spectrum anti-microbial vaccine, AV0328, in India and other low-income and lower-middle-income countries (September 2024).
- Orchid Pharma, a Chennai-based company, formed Orchid AMS (Antimicrobial Solutions), a dedicated division focused on helping address the critical challenge of AMR in India (September 2024).
- Telangana launched the AMR Action Plan (October 2024).
- The International Centre for Antimicrobial Resistance Solutions (ICARS) signed a partnership with the Centre for Cellular and Molecular Platforms (C-CAMP), under the aegis of the India AMR Innovation Hub (IAIH), to tackle the growing threat of AMR across the One Health domain (October 2024)

Pharma's apathy towards AMR R&D

Indian pharmaceutical companies have significantly reduced investments in AMR research due to several interconnected factors. Developing

Can the academic sector provide robust solutions to counter AMR by driving innovative research?

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Resistance to existing drugs has been observed even before the discovery of antibiotics, particularly against natural agents such as plant extracts. After the discovery of penicillin in 1928, the first instances of antibiotic resistance were documented during World War II in the 1940s. However, it wasn't until 2016 that antimicrobial resistance (AMR) garnered significant political attention, leading to the establishment of National Action Plans and stewardship programmes in over 170 countries. Despite this, by the end of 2024, less than 20 per cent of these programmes have been adequately funded or implemented. Meanwhile, the emergence and rapid spread of AMR has continued, driven by factors such as the misuse and improper disposal of antibiotics, environmental conditions, and the role of various agents like soil, water, and animals in spreading resistant genes. This has created a significant gap between the rising threat of AMR and the mechanisms in place either to prevent or to combat it.

Addressing AMR effectively requires a multifaceted approach focusing on three key areas: assessment of AMR's current status and spread, accurate diagnosis of resistance mechanisms, and development of both improved treatments and novel technologies. Although AMR remained underappreciated for many years, the post-COVID era has brought renewed attention to the issue. The foremost priority understands the current spread of AMR, which is being actively studied by researchers worldwide. This includes tracking the spread of pathogenic infections, identifying resistance genes, and understanding resistance mechanisms across different regions at regular intervals.

Recent academic research has highlighted new pathways for AMR transmission, such as ocular infections, the gut microbiome, disinfectants and antiseptics, and plastics, which represent critical areas of concern. Additionally, understanding microbiome dynamics as predictors of disease resolution during antibiotic treatment of chronic infections has emerged as a promising avenue in combating resistance. Novel contributors to resistance, such as extracellular vesicles (EVs), along with established agents like plasmids and integrons, have also been identified. While improving existing antibiotic therapies remains essential, the development of innovative technologies is crucial to address the growing challenge of AMR.

Cutting-edge approaches such as bacteriophage therapy, antimicrobial peptides, and antibody-antimicrobial conjugates are being explored and advanced through academic research. These novel strategies represent a vital part of the global effort to curb the threat of AMR and ensure effective treatment options for future generations. Thus, the academic sector can provide robust solutions to counter AMR by driving innovative research, such as exploring microbiome dynamics as predictors of treatment success, identifying novel contributors like extracellular vesicles, and advancing cutting-edge technologies like bacteriophage therapy and antimicrobial peptides. These efforts complement the pharmaceutical industry by uncovering foundational knowledge and pioneering alternative approaches that can be scaled for practical applications. BS

new antibiotics is less profitable compared to other therapeutic areas like chronic diseases or lifestyle drugs. Antibiotics are usually prescribed for short durations, making their market potential smaller than drugs for chronic conditions, which have long-term usage and higher sales volumes. Moreover, the Indian pharmaceutical industry is highly competitive, with a focus on producing generic drugs at lower costs. Investing in new antibiotic research is seen as less lucrative because generic drugs dominate the antibiotic market, making it difficult for new, more expensive antibiotics to gain traction.

Even if a new antibiotic is successfully developed, it is often reserved for severe cases to prevent the development of resistance, leading to limited usage. This controlled application reduces sales potential, discouraging companies from investing in AMR research. Furthermore, Global efforts to limit the overuse of antibiotics further decrease the potential returns on investment for pharmaceutical companies.

Policies that encourage the prudent use of antibiotics make it difficult to recoup the significant costs associated with research and development.

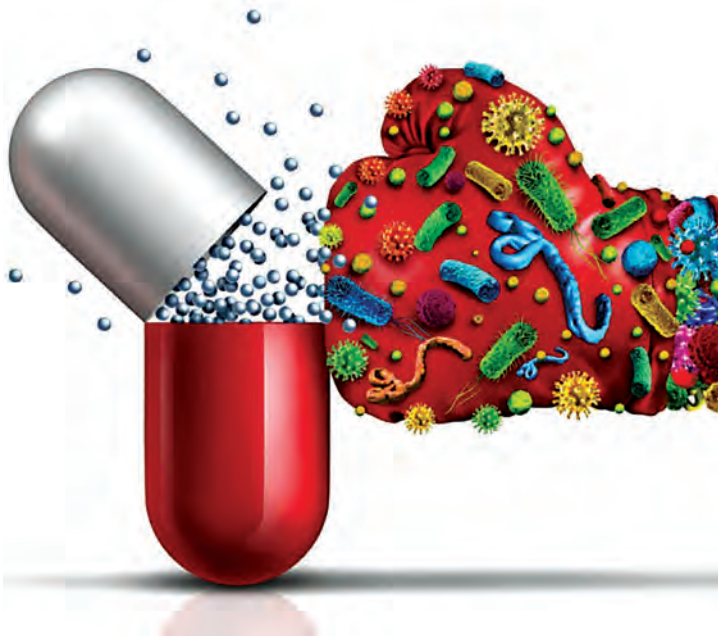
While commenting on the need for action from pharmaceutical companies, ***Marijn Verhoef, Director of Operations and Research, Access to Medicine Foundation, Netherlands*** said, "Tackling the sheer scale and pace of drug resistance is a complex global health issue that will require action from pharmaceutical companies across several areas. This includes providing appropriate access and implementing stewardship measures to safeguard the effectiveness of innovative antimicrobials. Failure to do this will limit efforts to tackle drug resistance."

The hesitance in investments by Indian pharmaceutical companies in AMR research is largely driven by economic considerations, scientific challenges, lack of robust incentive structures, and a focus on more profitable therapeutic areas with few approval processes and no need for extensive clinical trials. To reverse this trend, there needs to be stronger government support, global collaboration, and innovative funding models that can make AMR research a financially viable venture for these companies.

Why the urgency?

According to the United Nations Environment Programme (UNEP), up to 10 million deaths per year could occur by 2050 due to AMR. "The threat of AMR is not just theoretical; it's something we're seeing every day in our ICUs. Patients who would have had a fighting chance just a few years ago are now facing infections we struggle to treat. We need new weapons in our arsenal, and we need them now. While the development of new antibiotics is crucial, we cannot neglect the importance of antibiotic stewardship. By using these life-saving drugs responsibly and implementing effective infection control measures, we can help slow the spread of resistance." shared ***Prof. Dr Rahul Pandit, Chair Critical Care, Sir HN Reliance Foundation Hospital, Mumbai***

Although major international and national initiatives are aimed at financially incentivising the research and development of antibiotics, it remains unclear how to effectively strengthen the current set of incentive programmes to further accelerate antibiotic innovation. The current set of incentive programmes is an important initial step to improving the economic feasibility of



antibiotic development. However, there appears to be a lack of global coordination across all initiatives, which risks duplicating efforts, leaving funding gaps in the value chain and overlooking important AMR goals.

In conclusion, we can say that there are significant holes in the global incentive scheme that will impede progress towards bringing novel antibiotics to the market. Firstly, the majority of R&D funding focuses on early-stage push incentives aimed at basic research and preclinical trials, while late-stage push incentives for clinical development remain limited. Secondly, there is a significant lack of large-scale pull incentives that effectively stimulate private investment in clinical trials and the commercialisation of antibiotic products. Thirdly, key public health policies, which outline target product profiles, sustainability goals, and patient access considerations, are not well-integrated into existing R&D incentive frameworks.

Lastly, there is a lack of comprehensive guidance and coordination among the various initiatives currently in place. This fragmented approach could be a major factor contributing to gaps in the incentive structure and unmet public health needs. Establishing an international coordination and governing body to support national implementation could be a crucial step toward addressing these policy issues. At the national level, countries must reassess their funding strategies to better drive antibiotic innovation in response to the urgent global threat of AMR. High-level commitments need to be transformed into concrete actions across all sectors. BS

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How To Control Indian Diabetes Growth

World Diabetes Day, observed on November 14, reminds us of the growing impact of diabetes on global health and the urgent need for collective action to prevent, diagnose, and manage this chronic condition. In 2024, the theme 'Breaking Barriers, Bridging Gaps' underscores the critical importance of accessible, high-quality diabetes care, especially for underrepresented communities. The Government of India has taken many measures intending to reduce the prevalence of diabetes and alleviate its long-term complications, contributing to a healthier future for all citizens.

An estimated 828 million adults (those aged 18 years and older) had diabetes in 2022, an increase of 630 million from 1990. Of these, 420 million were women and 408 million were men. India (212 million) and China (148 million) accounted for the largest proportion of this number, followed by the USA, Pakistan, Indonesia, and Brazil, according to The Lancet report published on November 13, 2024. From 1990 to 2022, the age-standardised prevalence of diabetes increased in 131 countries for women and in 155 countries for men with a posterior probability of more than 0·80.

The report, which used 1108 studies conducted across the world from 1980 to 2022 with 141 million participants aged 18 years or older, noted that a total of 445 million adults aged 30 years or older with diabetes were not treated with oral hypoglycaemic drugs nor insulin, 3·5 times the number in 1990 (129 million). 30 per cent of those with untreated diabetes (133 million) were in India, more than 50 per cent greater than the next largest number of people with untreated diabetes, which was in China (78 million) because treatment coverage was higher in China than in India.

The Lancet reported that an important driver of the rise in diabetes, and its variation across countries, is obesity. In addition to obesity, the consumption of specific foods might influence the risk of diabetes. For example, yoghurt and possibly some other forms of dairy, whole grains, and green leafy vegetables reduce the risk of diabetes, whereas refined carbohydrates, including sugar-sweetened beverages, increase this risk. Genetic and phenotypic differences due to foetal and childhood nutrition and growth also influence worldwide variations, especially when accompanied by rapid weight gain—for example, the high diabetes prevalence in South Asia. For people who already have diabetes, lifestyle modification and pharmacological treatment, as well as blood pressure and cholesterol control, can delay progression to complications and reduce mortality, or even help with remission, especially if started early.

India currently has approximately 77 million individuals aged 20–79 living with diabetes, a number projected to rise to 134.2 million by 2045, as per the International Diabetes Federation (IDF). This places India at the forefront of countries grappling with the socioeconomic burden of diabetes. The impact is evident, with >1 million deaths in India related to diabetes and its associated complications. The IDF data published in 2019 highlights a concerning aspect: approximately 44 million people with diabetes in India remain undetected due to limitations in healthcare systems. This situation is particularly worrisome in India as cases progress from prediabetes to diabetes, occurring rapidly in the Asian population compared to other ethnic groups. Additionally, there is an alarming trend of increasing prevalence of diabetes in children and young adults.

Challenges

Diabetes is a significant health priority in India due to its large population and ongoing socioeconomic transitions. Several challenges exist in the management of diabetes in India, including lack of awareness, poor diagnosis, limited access to quality care, medication adherence issues, and physicians' limited time and knowledge. Diagnosis and access to quality care for diabetes remain major challenges, with a significant number of cases going undiagnosed, especially in rural areas. Factors such as treatment costs, logistical challenges, and underdeveloped healthcare infrastructure contribute to this issue.

Poor medication adherence among patients

with diabetes is a significant concern, influenced by factors like high medication costs, complex treatment regimens, and limited transportation options. The lack of trained healthcare professionals, including diabetes educators and dietitians, contributes to the increasing prevalence of diabetes and hinders its management. Current policies in India aim to improve diabetes care, but there are challenges in implementation and limited data on their effectiveness. Overall, addressing the challenges in diabetes care in India requires a multi-faceted approach involving increased awareness, improved diagnosis and access to care, medication affordability, enhanced healthcare professional knowledge and training, and effective implementation of policies and programmes.

Proactive measures

The Government of India has launched several proactive measures to tackle diabetes as part of the broader National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD) under the National Health Mission (NHM). The Government of India provides technical and financial support to the States/UTs under the NP-NCD, as part of NHM, based on the proposals received from the States/UTs and subject to the resource envelope. Diabetes is an integral part of the programme.

The programme focuses on strengthening infrastructure, human resource development, health promotion and awareness generation for prevention, early diagnosis, management and referral to an appropriate level of healthcare facility for treatment of the NCDs. Under NP-NCD, 743 District NCD Clinics, 210 District Cardiac Care Units, 326 District Day Care Centres and 6237 Community Health Centre NCD Clinics have been set up.

A population-based initiative for prevention, control and screening for common NCDs i.e., diabetes, hypertension and common cancers has been rolled out under NHM and also as a part of Comprehensive Primary Health Care. Under the initiative, persons more than 30 years of age are targeted for their screening for common NCDs. Screening of these common NCDs is an integral part of service delivery under Ayushman Bharat – Health and Wellness Centres which generates awareness of risk factors of NCDs including diabetes.

Furthermore, healthy eating is promoted through the Food Safety and Standards Authority of India (FSSAI). Eat Right Initiative, Safe and Nutritious Food at Home and 'Aaj se thoda kum' awareness activities are also initiated. This initiative

aims to promote both the demand for and the supply of safe and healthy food in a sustainable way. Fit India and Khelo India movements are implemented by the Ministry of Youth Affairs and Sports, and various Yoga-related activities are carried out by the Ministry of AYUSH.

Diabetes patients are getting treatment at various health facilities in the health care delivery system including District Hospitals, Medical Colleges, Central Institutes like AIIMS, Central Government hospitals, and private sector hospitals. The treatment in Government Hospitals is either free or highly subsidised for the poor and needy.

Under NP-NCD, glucometer and drugs for diabetes are provided as per the proposals received from the states. Under the Free Drugs Service Initiative of NHM, financial support is provided to States/UTs for the provision of free essential medicines including insulin for poor and needy people. Furthermore, quality generic medicines including insulin are made available at affordable prices to all, under 'Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP), in collaboration with the State Governments.

These initiatives from the Government of India reflect a proactive, multi-faceted approach to diabetes prevention through enhanced healthcare access, awareness programmes, and lifestyle promotion programmes. By fostering awareness, providing resources, and encouraging healthy living, these initiatives aim to reduce the prevalence of diabetes and alleviate its long-term complications, contributing to a healthier future for all citizens. BS

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How strategic angel investment is driving global expansion in medtech and diagnostics

« **Karna D Shinde,** Founder KDS Global and Strategic Angel Investor

India has firmly established itself as a key player in the global medtech and diagnostics sectors. With a burgeoning healthcare ecosystem and a growing focus on innovation, the country offers a fertile ground for startups looking to scale their solutions both domestically and internationally. Central to this growth is the role of strategic angel investment, which not only provides financial backing but also offers critical mentorship and strategic direction to help these companies expand their reach.

The medtech and diagnostics sectors are among the fastest-growing industries worldwide. Factors such as an ageing global population, increasing rates of chronic diseases, and a greater focus on preventive healthcare have all fuelled the demand for advanced medical technologies and diagnostic tools. As a result, many companies are racing to develop innovative solutions that meet the needs of patients and healthcare providers.

India, with its extensive and diverse healthcare system, is poised to take advantage of these trends. The country is already home to a rapidly expanding medtech ecosystem, driven by advancements in areas like artificial intelligence, wearable medical devices, and diagnostic imaging technologies. These innovations have the potential to not only improve healthcare delivery in India but also to create scalable solutions that can be adopted worldwide. This is where strategic angel investment comes in, enabling startups to navigate the complexities of both domestic and global markets.

The Vital Role of Strategic Angel Investors

Strategic angel investors play a crucial role in the development of medtech and diagnostics companies. While they provide essential early-stage capital, their value goes far beyond financial support. These investors bring decades of experience in scaling businesses and offer mentorship that helps startups refine their strategies, products, and market positioning.

Strategic angel investors are particularly important for startups looking to expand internationally. Their extensive networks and global market knowledge allow them to provide startups with access to international markets, regulatory pathways, and distribution channels. This is invaluable for MedTech companies aiming to scale their products and reach healthcare providers across different regions.

For instance, Promaxo, a company that develops innovative imaging technology for prostate cancer diagnosis, has benefited from strategic angel investors who have helped them enhance their product offerings and expand into global markets like the US and Europe. Such companies leverage the expertise of their investors to refine their technology, meet international standards, and find strategic partnerships that accelerate growth in new markets.

Advantage of India's Healthcare Market

India's healthcare market offers significant advantages for medtech startups. With its vast population and diverse healthcare needs, the country provides a unique testing ground for medical technologies and devices. Startups can develop and fine-tune their products by addressing the distinct challenges of delivering healthcare in both urban and rural areas.

Indian strategic angel investors often possess a deep understanding of the domestic market, which enables them to guide startups through the intricacies of local regulations, distribution, and market adoption. This expertise allows MedTech companies to gain a competitive edge within India before looking to expand globally.

Moreover, the Indian government has also been supportive of the medtech sector, with

initiatives aimed at fostering innovation, improving infrastructure, and encouraging research and development. Strategic angel investors leverage these opportunities to help startups scale efficiently within the country and position themselves for global success.

Strategic Mentorship Beyond Funding

Beyond capital, strategic angel investors are invaluable for their tactical and prudent guidance they offer. Their experience in scaling businesses internationally helps startups navigate the complex regulatory, financial, and operational challenges that come with global expansion. Strategic angel investors with a background in both healthcare and business management understand the nuances of global market entry, including regulatory hurdles, clinical trials, and reimbursement models.

Take Neuro42, a company focused on advanced diagnostic technology for neurological diseases. This startup, like many others, has been able to refine its product and clinical processes with the guidance of strategic angel investors who offer invaluable support in navigating regulatory approval processes in major markets like the US and Europe. Their mentorship extends to identifying potential partners, securing strategic collaborations, and tapping into new revenue streams.

For startups in the medtech and diagnostics sectors, having access to experienced strategic investors who understand the nuances of both technology and business operations is a key differentiator. These strategic investors provide more than just capital; they enable the companies they back to evolve into global players.

India as Medtech Innovation Hub

India's role as an emerging hub for medtech innovation is crucial. The country's ability to develop affordable, high-quality medical devices that cater to both local and international markets sets it apart. Strategic angel investors are recognising the country's potential and investing in startups that focus on cutting-edge technologies such as minimally invasive surgery, diagnostic imaging, and artificial intelligence in healthcare.

Companies like Otomagnetics, which is developing non-invasive MRI technology, are benefiting from strategic angel investors who help them refine their technologies and scale their operations. India's cost-effective manufacturing capabilities, combined with its rapidly expanding digital infrastructure, make it an ideal location for startups to develop innovative medical devices.

With strategic angel investors playing a pivotal

role in helping these companies scale, India is increasingly being recognised as a centre for high-impact medtech solutions. This strategic positioning enables startups to develop solutions that address both the unique healthcare challenges of the Indian market and the broader global needs.

Scaling Global Impact: The Path Forward

Looking ahead, the future of the medtech and diagnostics industries is promising, with tremendous opportunities for innovation and expansion. As these industries continue to grow, strategic angel investors will remain key players in driving the global success of startups. The next wave of medtech companies will focus on areas such as precision medicine, digital health solutions, and AI-driven diagnostics—fields where India is poised to lead the way.

Medtech startups, backed by strategic angel investors, will continue to play a crucial role in addressing global healthcare challenges. By leveraging India's vast talent pool, manufacturing capabilities, and healthcare infrastructure, these startups are well-positioned to develop products that meet the needs of patients worldwide.

As these companies continue to innovate, strategic angel investors will play an integral role in enabling them to scale, refine their products, and tap into international markets. By providing both financial support and calculated advice, investors ensure that Indian medtech startups can successfully navigate global challenges, break into new markets, and revolutionise healthcare delivery worldwide.

In conclusion, the symbiotic relationship between medtech startups and strategic angel investors is driving the global expansion of innovative healthcare solutions. As more companies refine their products and scale internationally, India will remain a critical hub for healthcare innovation, with strategic angel investors continuing to empower startups to make a meaningful impact on global healthcare. BS

Innovations in Urological Imaging: Transforming Patient Care in India

« **Dr Vinay Prabhu,** Consultant - Department of Radiology, Ramaiah Memorial Hospital, Bangalore

Despite advancements in urological imaging, challenges persist in India, particularly regarding cost and accessibility. Government initiatives and public-private partnerships should expand access to imaging facilities. Continued research investment is crucial for developing cost-effective solutions.

The landscape of urological care in India is undergoing a significant transformation, driven by cutting-edge innovations in medical imaging. These advancements are revolutionising the diagnosis, treatment, and management of urological conditions, offering new hope to millions nationwide. Urologic cancers, including bladder, kidney, prostate, testicular, and urethral cancers, present unique challenges in detection and treatment.

According to the Global Cancer Observatory (GLOBOCAN), India ranked third globally in cancer incidence for 2020, with projections indicating a 57.5 per cent increase in cancer cases by 2040, reaching an estimated 2.08 million cases. In response, integrating state-of-the-art imaging technologies is proving transformative in urology. These innovations enhance the ability to detect and characterise urological malignancies, paving the way for precise, personalised treatment strategies.

Multiparametric MRI: A Paradigm Shift in Prostate Cancer Detection

One of the most significant breakthroughs has been the adoption of multiparametric MRI (mpMRI) for prostate cancer diagnosis. Prostate cancer ranks as the third leading cancer site among males in India. mpMRI has emerged as a superior imaging modality compared to standard MRI for prostate cancer evaluation. While standard MRI primarily provides anatomical details, mpMRI incorporates a combination of imaging techniques, including diffusion-weighted imaging (DWI) and dynamic contrast-enhanced imaging (DCE). These functional imaging techniques assess tissue characteristics such as cellular density and vascularity, enabling mpMRI to achieve higher sensitivity and specificity in detecting clinically significant prostate cancer.

Studies also show that mpMRI can detect clinically significant prostate cancers with a sensitivity of up to 93 per cent and a specificity of 41 per cent. It allows for more precise targeting during biopsy procedures, improving cancer detection rates while reducing unnecessary biopsies by up to 28 per cent. However, challenges remain in terms of accessibility and the need for specialised radiological expertise.

Fusion Biopsy: Merging the Best of Two Worlds

Fusion biopsy technology is a significant advancement in prostate cancer diagnosis, combining the strengths of mpMRI and real-time ultrasound. This innovative approach leverages detailed imaging data from mpMRI to identify suspicious areas within the prostate gland. During the biopsy procedure, specialised software aligns these MRI images with live ultrasound feeds, enabling urologists to precisely target lesions that may harbour cancer.

The integration of AI technology further enhances fusion biopsy by marking abnormal areas, increasing the likelihood of detecting clinically significant cancers. This precision reduces the risk of missing aggressive tumours and minimises unnecessary biopsies, improving patient outcomes.

Prostate cancer accounts for 3-7 per cent of all cancers in India, with an estimated 33,000-42,000 new cases annually. Fusion biopsy offers a greater chance of cancer detection by marking abnormal areas with AI technology. While still in the early stages of adoption, several centres of excellence have incorporated this technique into practice. As of 2024, approximately 18 major hospitals across India offer fusion biopsy services.

Contrast-Enhanced Ultrasound: Redefining Renal Imaging

Contrast-enhanced ultrasound (CEUS) has emerged as a valuable tool in evaluating renal masses and other urological conditions. Microvascular Imaging Super Resolution Contrast Enhanced

Ultrasound (CEUS) enhances resolution by over 200 per cent. It is an advanced imaging technique that enhances blood flow visualisation using microbubble contrast agents. These microbubbles, injected intravenously, are gas-filled spheres that reflect ultrasound waves more effectively than surrounding tissues, providing enhanced echogenicity of blood vessels. This allows for real-time, dynamic imaging of tissue vascularity and perfusion patterns.

In urology, CEUS is particularly valuable for characterising complex cystic lesions and small renal masses, as well as assessing renal ischemia, trauma, and post-operative complications. Unlike traditional contrast agents, CEUS microbubbles do not contain iodine, reducing the risk of allergic reactions and nephrotoxicity; hence can be used in children as well. The technique offers limited spatial resolution and can be performed repeatedly without radiation exposure, making it a safe and effective tool for improving diagnostic accuracy in evaluating urological conditions.

In contrast, standard ultrasound relies solely on sound waves to create images, which may not capture detailed vascular information. CT scans, while offering detailed cross-sectional images and the ability to visualise structures with high resolution, involve exposure to ionising radiation and often require iodine-based contrast agents, which can pose risks of allergic reactions and nephrotoxicity. CEUS, therefore, offers a safer alternative with its non-invasive nature and absence of radiation, making it suitable for repeated use and providing unique insights into tissue perfusion that complement the anatomical details obtained from CT scans.

The adoption of CEUS in India has been gradual but steady, with usage primarily concentrated in major urban centres.

PET/CT Imaging: Molecular Insights into Urological Malignancies

Positron Emission Tomography/Computed Tomography (PET/CT) has significantly improved the staging and management of urological cancers. This technology seamlessly blends functional and anatomical imaging, offering valuable insights into tumour activity and spread throughout the body.

The development of novel radiotracers, such as those targeting Prostate-Specific Membrane Antigen (PSMA), has further enhanced the capabilities of PET/CT. PSMA PET/CT demonstrates exceptional sensitivity and specificity in identifying recurrent prostate cancer and metastases. Studies have shown that PSMA PET/CT is 27 per cent more accurate than conventional approaches in detecting metastases, both in pelvic lymph nodes and distant sites like bones. Additionally, PSMA PET/CT significantly reduces radiation exposure compared to traditional methods. The cost of a PET scan in India, ranging from $70 to $150, is significantly lower than in the US, where it can range from $1,200 to $10,000. This price difference attracts many international patients to India for their PET scans. However, despite the affordability for foreigners, a large portion of the Indian population still finds these costs prohibitive.

Artificial Intelligence: The Next Frontier

Integrating artificial intelligence (AI) and machine learning into urological imaging is at the forefront of innovation, with the potential to transform image interpretation, enhance diagnostic accuracy, and streamline workflow efficiency. AI models can evaluate cancer aggressiveness using non-invasive radiology images like MRI and ultrasound, as well as histopathology images from prostate biopsies. For clinicians and AI researchers working on prostate cancer, developing a comprehensive understanding of this interdisciplinary field is crucial for advancing AI-driven precision medicine, which aims to revolutionise diagnosis and treatment. In India, numerous research institutions and tech startups are leading the development of AI solutions for urological imaging. Although these technologies are in the early clinical stages, they offer significant promise for improving patient care and addressing the shortage of specialised radiologists across the country.

Despite advancements in urological imaging, challenges persist in India, particularly regarding cost and accessibility. Advanced technologies remain expensive, limiting adoption in rural areas, with mpMRI scans costing Rs 9,750 to Rs 35,000. Infrastructure and expertise are also lacking; only 6 CT scanner machines in Delhi government hospitals and just 4500 MRI scanners in India. Standardisation and integration into clinical practice require collaboration among healthcare professionals. To address these issues, a multi-pronged approach is essential. Government initiatives and public-private partnerships should expand access to imaging facilities. Continued research investment is crucial for developing cost-effective solutions. While telemedicine and AI integration can bridge expertise gaps.

As healthcare professionals, it is imperative to stay abreast of these developments and work collaboratively to integrate these technologies into clinical practice. By doing so, one can ensure that patients across India benefit from the latest advancements in urological imaging, ultimately leading to improved outcomes and a higher quality of life for those affected by urological conditions. BS

The 27th Edition of the Bangalore Tech Summit 2024 was inaugurated by Siddaramaiah, Chief Minister of Karnataka, and D K Shivakumar, Deputy Chief Minister of Karnataka in presence of other dignitaries on November 19 in Bangalore.

Bengaluru Tech Summit 2024

Karnataka launches India's first GCC policy

The 27th Edition of Bengaluru Tech Summit (BTS) 2024, organised by the Department of Electronics, IT, Bt, Government of Karnataka and Software Technology Parks of India, Bengaluru, was inaugurated by Siddaramaiah, Chief Minister of Karnataka, in the august presence of other dignitaries, at Bangalore Palace on November 19. The event witnessed the launch of India's first policy for Global Capability Centre (GCC).

Key highlights of the policy include the creation of Global Innovation Districts with three new tech parks in Bengaluru and Beyond Bengaluru, and the establishment of a Centre of Excellence (CoE) for Artificial Intelligence (AI) to boost AI R&D and talent development.

The Centre of Excellence in AI, in collaboration with IIT Alumni Centre Bangalore, positions Karnataka as a hub for advanced R&D and startup innovation. This CoE will work on a hub and spoke model with multiple academic institutions of excellence across the State (especially Beyond Bengaluru) to create compute capacity, curated datasets, responsible/ethical AI principles, startup acceleration facilities and other support needed to build the AI ecosystem.

It is envisioned as India's premier accelerator for AI startups. This initiative is designed to support the next generation of AI-driven innovations by providing startups with access to capital, high-quality mentorship, industry partnerships, and state-of-the-art technical resources.

The GCC policy also introduces the Beyond Bengaluru Package, offering recruitment assistance and rental support, while creating 3.5 lakh jobs. The government aims to attract establishment of 500 new GCCs achieving a total number of 1,000 GCCs in Karnataka by 2029; to support creation of 3.5 lakh new jobs in Karnataka by 2029; and to generate economic output of $50 billion in Karnataka through the GCCs being established by 2029.

The government is also announcing an Innovation Fund with an allocation of Rs 100 crore, to support joint research between GCCs and academia, and innovation challenges. The government will set up a dedicated unit within the Department of Electronics, IT, Bt, and S&T to offer dedicated support for GCCs establishing operations in Karnataka.

Global Capability Centres (GCCs) have significantly transformed the country's economic landscape. These centres have been instrumental in job creation, technology advancement, and skill enhancement; positioning India at the forefront of innovation and service delivery. As of March 2024, the GCCs in India generated annual revenues of $64.6 billion having grown at nearly double digits (~9.8 per cent) between FY2019 and FY2024. 31 per cent of Healthcare GCCs (75+) leverage Bengaluru's digital solutions to expedite processes like drug discovery and clinical trials, enhancing global healthcare impact through AI/ML and data analytics.

A key highlight of the Bengaluru Tech Summit 2024, a three-day summit from November 19, was the Karnataka GCC Roundtable, where global leaders from major Global Capability Centres

(GCCs) gathered to discuss the sector's challenges, experiences, and future prospects. Moderated by Bhaskar Verma, Regional Director at NASSCOM, the roundtable featured industry giants such as Philips, HSBC, SAP, JP Morgan, Nokia, and Novo Nordisk, alongside key stakeholders.

The Minister for IT and Bt, Government of Karnataka Priyank Kharge highlighted Karnataka's role as a global hub for GCCs and reiterated the government's commitment to fostering innovation and growth in the sector. The session also explored critical topics such as talent acquisition, infrastructure development, and expanding GCC operations into Tier 2 and 3 cities under the state's Beyond Bengaluru initiative. Through insightful discussions, the roundtable further reinforced Karnataka's position as a prime destination for GCCs and set the stage for the continued evolution of its GCC ecosystem.

Another key announcement was the launch of the Nipuna Karnataka Logo marking the beginning of a transformative skills initiative. Nipuna Karnataka aims at enhancing the skills of local talent to improve their global competitiveness in emerging technologies. The objective is to equip Karnataka's workforce with advanced skills that align with the requirements of high-demand sectors, thus fostering economic growth and increasing employment opportunities both within and outside the state. It will aim to ensure that the local talent is skilled locally and they work globally.

Siddaramaiah, Chief Minister of Karnataka said, "Bengaluru Tech Summit 2024 showcases Karnataka's leadership in innovation, sustainability, and inclusive growth. The launch of India's first Policy for GCCs and the Nipuna Karnataka programme, aimed at skilling 100,000 individuals in cutting-edge technologies, reflects our commitment to empowering local talent and fostering global competitiveness."

As part of the Nipuna initiative, five strategic MoUs were exchanged with global tech giants, Microsoft, Intel, Accenture, IBM, and the BFSI Consortium, aiming to bolster collaboration and drive innovation. These MoUs aim to train 1,00,000 trainees in the next year with a placement of 70 per cent of the trained professionals.

In his address, D K Shivakumar, Deputy Chief Minister of Karnataka, highlighted Bengaluru's role as a global leader in tech innovation. He emphasised Karnataka's remarkable ecosystem, which extends beyond the city, offering immense potential to drive transformative advancements in technology and innovation.

Dr Ekroop Caur, Secretary to the Government,

Smart Bio Awards 2024

- **Startup of the Year-** Anabio Technologies
- **Innovator of the Year-** KoshKey Sciences
- **Woman Entrepreneur of the Yar-** Divya Chandradhara (BioAgile Therapeutics)
- **Best Social Enterprise/ Institute-** TeOra
- **Best Campus Company of the Year-** Appachiiii
- **Best Business Mentor of the Year-** Manipal- Government of Karnataka Bioincubator
- **Startup of the Year (Beyond Bengaluru)-** Plotnew Bio Innovations

Ecosystem Enablers Felicitation

- Ecosystem Enablers Felicitation
- Machine Intelligence & Robotics Centre of Excellence (MINRO), IIIT-Bangalore
- Centre for Cellular And Molecular Platforms (C-CAMP)
- K-tech Centre of Excellence IoT & AI, powered by MeitY and Nasscom
- Bangalore Bioinnovation Centre
- Manipal- Government of Karnataka Bioincubator
- Semiconductor Fabless Accelerator Lab (SFAL)
- I-Hub for Robotics and Autonomous Systems Innovation Foundation (ARTPARK), IISc
- Nasscom Startups
- Sahyadri College of Engineering & Management
- Shri BM Patil Medical College, Hospital and Research Centre, Vijaypura

BTS Product Launch (Life Sciences)

- **DiscoverAI & ReviveAI-** ultraceuticals
- **Dental implant system-** Intessence Solutions
- **IXanner 7vn Ver 2.0-** Medevplus
- **Chitosan and its derivatives-** Ecogenie Biotech
- **MiMo-** Zeuron.ai
- **3D-printed cast for limb fracture-** Addere Creations
- **Eye drop dispenser grip-** Maitra Medtech Technology
- **Composite Prosthetic foot (PyroStancer)-** Rock Stance
- **Mayai-** ProductDev Edge
- **Automated liquid handling system (Liquid Xpert)-** Avay Biosciences
- **Mocxa 360EEG-** Mocxa Health

Highlights of Bengaluru Tech Summit 2024

- 51 countries represented
- 84 sessions
- 521 speakers
- 686 exhibitors including 403 startups
- 4,775 meetings exchanged
- 570 meetings were conducted in the B2B Lounge
- 50,000+ expo footfalls

Siddaramaiah, Chief Minister of Karnataka, and D K Shivakumar, Deputy Chief Minister of Karnataka, unveiled the Nipuna Karnataka Logo in presence of other dignitaries at the 27th Edition of the Bangalore Tech Summit 2024 on November 19 in Bangalore.

Department of Electronics, IT, Bt, and S&T, Government of Karnataka, emphasised reimagining Karnataka as a global leader in technology and highlighted how BTS2024 can set the tone for achieving this vision.

More push for Startups

Another significant announcement that took place at BTS 2024 was for Startup Springboard programme- a platform at BTS 2024, designed to empower Karnataka's startups through three pillars; Investor Connect (linking startups with key investors and industry leaders); Mentor Connect (enabling invaluable guidance through mentor-mentee interactions) and Innoverse (providing infrastructure, plug-and-play facilities, and training to support prototype development and innovation for emerging entrepreneurs).

BTS 2024 turned out to act as the ultimate platform for startups to meet investors and scale their businesses. Having participants including 23 ideation stage startups, 142 early traction stage startups, 75 concept validation stage startups, and 82 growth stage startups, the summit hosted a three-day Venture Connect Programme. Drawing over 50 leading global investors, including family offices, angel investors, and venture capital firms from across the globe, the summit brought a combined potential investment fund of more than $17.5 billion.

The Founder's Stage featured a 3-day dedicated track, bringing together influential speakers to inspire and empower the next generation of entrepreneurs. On the other hand, the Startup Pavilion hosted startups showcasing cutting-edge products and tech solutions across sectors, including Healthtech, Agritech, Manufacturing, Edutech, and more. BTS 2024 served as a pivotal platform for startups, with 2500+ startup attendees from India and beyond.

Adding to the excitement, the Product Launch Arena served as a launchpad for over 50 startups spanning 30+ sectors, showcasing cutting-edge innovations and groundbreaking solutions.

Further, a roundtable on AI/ GovTech invited startups to showcase their innovative solutions to reshape governance, address key challenges, and accelerate the State's growth in the digital era. A roundtable on Industry-Academia-R&D connect was also planned with renowned US universities like Johns Hopkins, Rice and Stanford Life Sciences, to explore collaboration with Karnataka universities.

Karnataka is set to launch the Hypergrowth Karnataka programme in partnership with Startup Genome, aiming to propel the state's most promising scaleups to global success. Starting this year, the programme's inaugural cohort will target Enterprise SaaS and Fintech companies, providing them with essential skills, global networks, and strategic support for international growth. Participants will benefit from commercialisation assistance, investor connections, and insights from global executives, empowering them to scale into global category leaders. Eligible companies must have raised Series A funding, generate over $1 million in ARR, and have ambitions to expand into international markets like the US.

What was in store for Biotech?

BTS 2024 featured a multi-stage conference across six tracks: IT, Deeptech & Trends, Biotech & Health tech (Life Stage), Startup Ecosystem, Global Innovation Alliance, India-USA Tech Conclave, and the newly introduced Electro-Semicon track.

The Life Stage focusing on Biotech and Health tech kicked off with the keynote session by Dr Rajesh Gokhale, Secretary, Department of Biotechnology, Ministry of Science & Technology, Government of India on Biomanufacturing E3 – Towards a Viksit Bharat. The track also featured distinguished speakers including Prof. Sanjeev Jain, Emeritus Professor, Department of Psychiatry, Molecular Genetics Laboratory, Laboratory, NIMHANS; Dr Jitendra Kumar, Managing Director, BIRAC, Government of India; Dr Sindura Ganapathi, Visiting PSA Fellow, Office of the Principal Scientific Adviser (PSA), Government of India, to discuss on topics like unlocking the Bioeconomy Potential, sustainable food production, bio-employment and skilling, biotech innovations, the future of therapeutics and next-gen cancer immunotherapy.

In an engaging session on 'Unlocking the

Bioeconomy Potential', experts discussed how India's thriving Bio Economy, currently valued at $150 billion, is on track to reach $300 billion by 2030. Karnataka, leading the charge with a $31 billion contribution, aims to drive one-third of this growth. From Bio Pharma to Bio Industrial and Bio Agriculture, the session spotlighted Karnataka's bold vision and transformative opportunities for innovation and investment.

A Letter of Intent was signed by the Department of IT, Bt, Govt of Karnataka with Stanford Bio for establishing a Founders Forum, and a joint declaration with Health Tech Hub Copenhagen was announced to advance digital health collaboration.

The BTS Innovation Dome at the Summit hosted diverse programmes, including workshops, product launches, and the 17th BioQuiz finale, which received over 500 registrations from across India, with participation from students representing 23 states and Union Territories (UTs). Mohammad Hashmi from Osmania Medical College emerged as the winner, earning Rs 50,000, while Paramjot Singh from Dr B.R. Ambedkar State Institute of Medical Sciences, Mohali, secured the second position with Rs 25,000. The Bio Posters - Walkway of Discovery showcased innovative research by 101 young talents from top institutions, with winners like Harsha Rani from Institute of Bioinformatics and Applied Biotechnology (IBAB). The Smart Bio Awards recognised achievers across categories, including Startup of the Year (Anabio Technologies) and Women Entrepreneur of the Year (Divya Chandradhara).

A global & inclusive exposure

The "Women in Leadership: Breaking the Glass Ceiling to Unbound Possibilities" session at Bengaluru Tech Summit 2024 featuring Sandhya Devanathan, Vice President & Head, Meta, Priya Mohan, Investor General Catalyst and Ipsita Dasgupta, Managing Director, HP India Market spotlighted the challenges women face in leadership, including gender bias, pay gaps, and societal expectations. Panellists emphasised the importance of support systems, flexible work policies, and shared parenting responsibilities in fostering an inclusive workplace. The discussion also highlighted the need for self-awareness, open family conversations, and advocating for systemic change to ease the burden on women and minorities while empowering them to thrive in leadership roles.

The Bengaluru Tech Summit 2024 has been a global standout, with participants from 51 countries, 84 sessions, and insights from 521 speakers. The event featured 686 exhibitors including 403 startups, 4,775 meetings exchanged, 570 meetings were conducted in the B2B Lounge, along with 35 on-the-spot physical meetings at the venue. With strong attendance 36,837 and 21,372 registered business visitors, the summit also recorded an impressive 50,000+ expo footfalls.

Countries such as Australia, Russia, Germany, Denmark, Korea, USA, Japan, Bavaria, Israel, and more made significant contributions at the GIA Expo, alongside academic institutions like GITAM, Amity, Manipal, Alliance, SRM, VTU, RV, JSS Science & Technology, and Christ University, and industry leaders such as Infosys, Biocon, and Microsoft Startups.

The BTS 2024 exhibition also showcased participation of 61 companies in the International Pavilions, highlighting groundbreaking technologies from global exhibitors representing countries like Australia, Russia, Germany, Denmark, South Korea, the USA, Japan, Bavaria, and Israel. Special sectorial pavilions highlighted breakthroughs in Deeptech, Biotech, Health tech, Spacetech, Mobility, Greentech, and Fintech. Prominent exhibitors included Kyndryl, Biocon, Applied Materials, Intel, Lam Research, NXP Semiconductor, Groww, Uber, Teceze, LSEG, Novo Nordisk, Norwich Clinical, ARTPark, along with R&D leaders like DRDO, CSIR, C-DAC, BIRAC, IIIT-Bangalore, Raman Research Institute, and Indian Institute of Science (IISc).

Throughout the summit, groundbreaking technologies, solutions, and policies were unveiled, promising to reshape industries and societies. Renowned innovators, scientists, and tech evangelists from around the world actively participated, emphasising the transformative potential of technological advancements. The Global Innovation Alliances (GIA) World Stage 1 and 2 featured 183 speakers, 17 countries the USA, Austria, France, Singapore, Finland, Germany, Denmark, Netherlands, UK, European Union, Belgium, South Korea, Israel, Japan, Australia, Switzerland, UAE participated in the sessions and witnessed the contribution of ambassadors from 4 countries - Finland, Australia, UK and South Korea.

The summit exemplified Karnataka's spirit of sustainability and ingenuity, fostering a dynamic platform for dialogue, partnerships, and growth. Bengaluru, the nation's tech capital, once again demonstrated its leadership in shaping the future of technology and innovation. Looking ahead, the 28th edition promises to build on this momentum, delivering even greater milestones and advancements in technology and sustainability. BS

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Premji Foundation to support CMC Vellore with Rs 500 Cr grant to set up new medical college

Christian Medical College (CMC), Vellore has unveiled plans to set up a new medical college and a teaching hospital on its Chittoor campus and announced a partnership agreement with Azim Premji Foundation to offer value-based healthcare and medical education, primarily for the disadvantaged. As a part of the agreement, the Foundation will extend a Rs 500 crore grant to CMC Vellore to set up the medical college and upgrade the existing 120-bed hospital into a teaching hospital with 422 beds. The grant will also enable CMC Vellore, a pioneer in medical education, to extend the distinctive elements of their MBBS education and focus on the discipline of Primary-cum-Secondary Healthcare (PSHC) to address the widening disparities in the Indian healthcare sector.

IIT Delhi launches MS (Research) programme in Healthcare Technology

As an innovative programme aimed at bridging the gap between medicine and engineering, the Centre for Biomedical Engineering (CBME) at the Indian Institute of Technology (IIT) Delhi has launched an exclusive Master of Science (Research) programme in 'Healthcare Technology'. This unique programme starting in January 2025 is specifically designed for medical and allied clinical professionals, integrating the principles of medicine with cutting-edge engineering disciplines to foster deep-tech innovations in healthcare. The MS (Research) in Healthcare Technology stands out for its highly project-centric approach, ensuring that students gain hands-on experience with real-world applications. Participants will benefit from clinical and industrial immersion with leading institutes and corporates, providing them with a comprehensive understanding of both the medical and technological landscapes. This immersive experience is expected to pave the way for graduates to embark on entrepreneurial ventures or engage in advanced medical technology research and development (R&D).

IIT Madras partners with French University to offer sustainable biomanufacturing course

Indian Institute of Technology Madras (IIT-M) is partnering with University of Tours, France, to offer a course on 'Sustainable Bio-Manufacturing of high-value Phytochemicals'. This course is being offered through the 'Global Initiative of Academic Networks' (GIAN) programme to promote collaboration with international universities. The course is in line with the vision of the Government of India's recently-announced 'BioE3' Policy, which aims to promote and facilitate

large-scale manufacturing of bio-products for sustainable development with high-performance biomanufacturing. The course deals with sustainable biomanufacturing of high-value plant-derived natural products using plant and microbial bio-factories, which can also conserve nature while fulfilling the increasing market demand for phytochemicals for various commercial applications. This course is also open for those outside IIT Madras. Researchers, industry professionals, students (BTech, MTech, MSc, PhD) in plant biotechnology/bioprocess engineering/biotechnology and faculty from recognised institutions can apply.

Samsung R&D Institute, Noida and IIT Bombay sign MoU to pioneer research in digital health, AI

Samsung R&D Institute, Noida (SRI-Noida), has strengthened its commitment to industry-academia collaboration by signing a Memorandum of Understanding (MoU) with the Indian Institute of Technology Bombay (IIT Bombay).

Under this MoU, SRI-Noida and IIT Bombay will explore breakthroughs in artificial intelligence (AI), digital health, and other critical areas. The five-year partnership will facilitate joint research projects, providing IIT Bombay students and faculty an opportunity to collaborate with Samsung engineers. This approach will not only open newer avenues for the students, but will enhance their industry readiness. In addition, it will equip Samsung engineers with specialised training and certification programmes from IIT Bombay in emerging technologies such as digital health and AI.

UCL and IISc join forces to co-create pioneering new approaches to healthcare

The Indian Institute of Science (IISc) and University College London (UCL) have launched a new phase of their strategic partnership to expand innovative work together in healthcare. The two institutions have signed a 'Letter of Intent' to facilitate closer collaboration with IISc's forthcoming Postgraduate Medical School across research, education, innovation and commercialisation. The letter will underpin a new and exciting phase for UCL and IISc's partnership as the universities seek to co-create significant new research capability together in areas across basic and clinical sciences, applied engineering and clinical practice. UCL and IISc will create a joint working group to explore several potential collaborative initiatives across future-focused interdisciplinary areas such as digital health, quantum tech, artificial intelligence (AI) and medicine. The partners hope that the framework will lead to new programmes, leveraged together through external funding, such as collaborative PhDs, sharing health systems best practices, faculty exchange and research fellowships.

IIT Kharagpur inks MoU with Central Council for Research in Homeopathy

Indian Institute of Technology Kharagpur (IIT KGP) has signed a Memorandum of Understanding (MoU) with Central Council for Research (CCRH) in Homeopathy on a collaborative study between IIT KGP and CCRH on the project titled "Fourier Transform Infra-Red (FTIR) Spectroscopic Study and Raman Study in Homeopathic Potentised Medicines and Characterisation, Standardisation and Analysis of the Imponderable Medicines (X-Ray, Electricity, Magnetis Polus, Australis etc.).

The study includes research activities, research schemes on Clinical Verification Research, Clinical Research, Drug Proving etc. The MoU was signed by Dr Subhash Kaushik, Director General, CCRH and Prof. Rintu Banerjee, Deputy Director, IIT Kharagpur in the presence of Prof. V. K. Tewari, Director, IIT Kharagpur. The period of the project is for 3 years. All the patents will be registered with the help of National Research Development Corporation (NRDC) with joint ownership. Both the institute shall consult each other for any publication in respect to the project which shall be a joint publication.

Dr Bipin Chevale joins Gleneagles Hospitals, Parel, Mumbai as CEO

Dr Bipin Chevale has been named the Chief Executive Officer (CEO) of Gleneagles Hospitals located in Parel, Mumbai. He previously worked with Kokilaben Dhirubhai Ambani Hospital, Navi Mumbai. Before joining Gleneagles Hospitals (IHH Healthcare network), he was working as a Director and Head at Kokilaben Dhirubhai Ambani Hospital, Navi Mumbai from December 2019 -September 2024. Previous to this, he served at Seven Hills Hospital in Mumbai as Chief Operating Officer (from August 2019 - December 2019). He was GM-Operations at Kokilaben Dhirubhai Ambani Hospital, Andheri, Mumbai from October 2018 - August 2019. He has also worked as the CEO and Zonal Director of S L Raheja Hospital - A Fortis Associate from August 2016 - October 2018. He was also associated with Bombay Hospital for 11 years as Medical Superintendent. Dr Chevale has an experience spanning over 23 years in the healthcare sector.

MyHealthcare appoints Diwakar Bhowmik as Co-Founder & COO

MyHealthcare, a Gurugram-based health tech company revolutionising patient care with its innovative digital healthcare solutions, has announced the appointment of Diwakar Bhowmik as Co-Founder and Chief Operating Officer (COO). Bhowmik, an accomplished healthcare IT professional with over 25 years of experience, will join the founding team, bringing his expertise to drive MyHealthcare's strategic expansion across India, South-East Asia, and the Middle East. Bhowmik has been instrumental in the development and implementation of Hospital Information and Management Systems (HIMS) across prominent hospitals, both in India and globally. Since joining MyHealthcare in 2020, he has led the MyHealthcare Enterprise Application (MHEA), combining best practices with cutting-edge digital solutions to build a comprehensive healthcare ecosystem, driving efficiency across hospital operations and a clinical ecosystem that delivers better patient care outcomes. In his new role, Bhowmik will oversee MyHealthcare's operations and strategic planning, as the company expands its business across India, Asia, Middle East and Africa.

Zynova Shalby Hospitals names Reny Varghese as Chief Operating Officer

Zynova Shalby Hospitals, Ghatkopar, Mumbai has announced the appointment of Reny Varghese as the new Chief Operating Officer (COO). With a distinguished career spanning over 24 years in healthcare management and administration, Varghese brings unparalleled expertise and leadership to the hospital's operations. Before undertaking the role of COO, Varghese served as the Chief Administrative Officer (CAO) at Zynova Shalby Hospitals, where he played an integral part in streamlining hospital functions and improving operational efficiency. His prior experience includes leadership roles at several prominent healthcare institutions, including Wadia Hospital, Hinduja Healthcare, and Apollo Health and Lifestyle. He also contributed to public health initiatives during his time as an Honorary Advisor for the Commissionerate of Police, Thane.

Dr Pooja Wadwa joins Marengo Asia Hospitals as Clinical Director, Critical Care Medicine & ECMO Specialist

Marengo Asia Hospitals, Gurugram, has taken a major leap in its critical care capabilities with the appointment of Dr Pooja Wadwa as Clinical Director of Critical Care Medicine and Extracorporeal Membrane Oxygenation (ECMO) Specialist. With over 12 years of extensive experience in critical care, Dr Pooja's leadership marks a key milestone in the hospital's commitment to providing cutting-edge patient care. Previously a pivotal figure at Fortis Memorial Research Institute, she is widely recognised for her expertise in ECMO and her contribution to raising critical care standards. Her addition to Marengo Asia Hospitals is set to enhance the hospital's critical care services, benefiting patients and elevating healthcare outcomes. Dr Pooja's arrival at Marengo Asia Hospitals signifies a renewed commitment to delivering world-class critical care services. As the leader of a highly skilled team of critical care professionals, Dr Pooja will play a pivotal role in advancing the hospital's critical care infrastructure.

Lupin appoints Claus Jepsen as President, Global Specialty

Global pharma major Lupin has announced the appointment of Claus Jepsen as President, Global Specialty. He brings over three decades of experience in commercial strategy, portfolio management, and launch planning across Europe, Asia, and the United States. Jepsen joins Lupin from Takeda Pharmaceuticals, where he led the Global Strategy for Rare Diseases. Prior to that he was at GlaxoSmithKline, where he served in many roles including country head in Asia, and Global franchise management in Immunology, Respiratory and Neurology therapeutic areas. Jepsen has launched major brands like Ellipta in the US and led Advair and Seretide success in Europe and US. Lupin Limited is a global pharmaceutical leader headquartered in Mumbai, with products distributed in over 100 markets. Lupin specialises in pharmaceutical products, including branded and generic formulations, complex generics, biotechnology products, and active pharmaceutical ingredients.

Shyamakant Giri to join as CEO of Gland Pharma

Gland Pharma's Board has approved the appointment of Shyamakant Giri, as the new Chief Executive Officer (CEO) of the company. Giri is expected to join the company with effect from January 15, 2025. Giri is a business leader with over 25 years of strategic and operating experience in pharmaceuticals, devices, diagnostics and healthcare services in leading Indian and multinational organisations across Asia, Africa, MENA & LATAM markets. He possesses rich experience in creating new ventures and improving existing businesses, developing leaders, identifying opportunities for value creation, and executing with discipline. His specialties include Business Development, Operations, Strategy, Product Marketing, startups, and turnarounds. Giri is currently the President (India Business & Emerging Markets) of Amneal Pharmaceuticals, responsible for the commercial expansion and growth in India and Rest of the World markets. Previously, Giri was associated with Rivaara Labs as the Chief Executive Officer. Earlier, Giri was associated in various roles with Abbott India, AbbVie (India Region) and Abbott Diagnostics for almost 18 years (2002-2020).

Centre of Excellence in Ayurveda for Diabetes and Metabolic Disorders opens at IISc

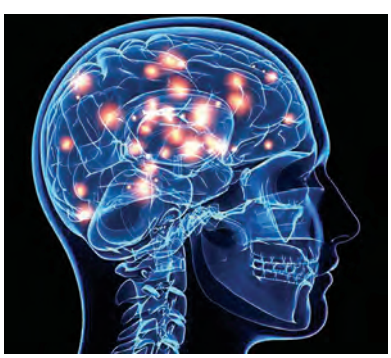
Prime Minister Narendra Modi recently launched a Centre of Excellence (CoE) in Ayurveda for Diabetes and Metabolic Disorders at the Indian Institute of Science (IISc), Bengaluru. The CoE will collaborate with leading institutions in India with expertise in Ayurveda, diabetes, and medical research. These partnerships will facilitate interdisciplinary research, knowledge sharing, and the translation of research findings into real-world clinical practice. As a part of this CoE, a randomised active comparator controlled clinical trial will be conducted, with a longitudinal study over two years, to assess the efficacy of two new Ayurvedic formulations (Mustadi Ghana Vati and Varadi Ghana Vati) in prediabetes and Type II diabetes. The enrolment of subjects has just begun, after completing due processes of ethics committee approval, registration of study on the Clinical Trial Registry of India (CTRI), and constitution of the Data Safety Monitoring Board (DSMB).

New way to create hydrogels from viral protein fragments for improving drug delivery

Researchers from Bose Institute, an autonomous institute of the Department of Science and Technology (DST), in Kolkata, have discovered a new way to create hydrogels using tiny protein fragments of just five amino acids from the SARS-CoV-1 virus, that could help improve targeted drug delivery & reduce side effects. Due to the increase in chronic and infectious diseases, researchers are forever on the lookout for new methods of drug delivery to improve the effectiveness of treatments. Hydrogels are known to be suitable for drug delivery because of their swelling behaviour, mechanical strength and biocompatibility. Short peptide-based hydrogels hold enormous potential for a wide range of applications. However, researchers have found the gelation of these systems very challenging to control. Minor changes in the peptide sequence can significantly influence the self-assembly mechanism and thereby the gelation propensity.

INST develops unique drug delivery method to improve treatment of brain TB

Researchers at the Institute of Nano Science and Technology (INST), Mohali, have created a unique way to deliver Tuberculosis (TB) medicines directly to the brain bypassing the challenging blood-brain barrier (BBB) that limits the effectiveness of many brain TB medicines. This innovative drug delivery method can effectively treat brain TB, a life-threatening condition with a high mortality rate. Traditional treatments involve high doses of oral anti-TB drugs, but these often fail to achieve effective concentrations



in the cerebrospinal fluid due to the blood-brain barrier. This limitation underscored the need for more effective delivery methods that can target the brain directly. Scientists at INST used tiny particles made of a natural material called chitosan, to deliver TB medicines directly to the brain through the nose, bypassing the BBB. The drug delivery technology used was nose-to-brain (N2B) drug delivery, which utilises the olfactory and trigeminal nerve pathways in the nasal cavity to bypass the BBB. By delivering the drug through the nasal route, the nano-aggregates can transport the drugs directly into the brain, significantly improving drug bioavailability at the infection site.

Waters unveils new software to deliver lab-centric business intelligence

Waters Corporation has announced the launch of waters connect Data Intelligence software, a new cloud-based application that helps customers in regulated industries improve how they access, organise, analyse, and drive productivity from laboratory information. The software leverages data from Waters Empower Chromatography Data System (CDS) enabling laboratories to achieve confident audit-readiness, helping laboratory managers respond more quickly to audit inquiries with insights, and making informed decisions faster. Designed to work with Empower CDS, waters connect Data Intelligence software generates in-depth, configurable dashboards that deliver advanced analytical insights on laboratory data such as aborted injections and sample sets to help reduce the risks associated with adverse findings in regulatory audits. Where users of Empower CDS can take, on average, two days to respond to an auditor's question, they can instead avoid costly manual data consolidation and interpretation that could lead to data analysis errors.

Avantor opens new innovation centre for solving life science's biggest challenges

Avantor, Inc., a leading global provider of mission-critical products and services to customers in the life sciences and advanced technology industries, has announced the opening of its new flagship Bridgewater Innovation Centre. The state-of-the-art research and development facility, located in Bridgewater, in the US, is part of Avantor's network of 13 research and innovation centres across the globe. Avantor's new Bridgewater Innovation Centre spans 60,000 square feet, doubling its previous laboratory and pilot plant capacity. Purpose-designed for collaborative work, the centre houses spaces for upstream and downstream process development, dedicated analytical testing labs, and a viral vector laboratory. An expanded pilot plant supports scale-up simulations, enabling rapid customisation across the entire bioprocessing workflow. It allows Avantor to optimise and accelerate biomanufacturing processes at scale; resulting in faster problem solving, streamlined knowledge exchange, and strategic co-innovation.

Revvity broadens relationship with Genomics England

Revvity, Inc. has announced an expansion of its work with Genomics England that leverages both organisations' expertise and resources to advance critical genomic initiatives across the United Kingdom. Building on the parties' long and productive work history, this advanced collaboration is dedicated to accelerating Genomics England's renowned research programmes, supporting diverse areas in genomics, and fostering talent in innovative healthcare fields. A cornerstone of the collaboration is the Generation Study, a world-leading study led by Genomics England, in partnership with the National Health Service, that aims to screen up to 100,000 newborns for 200 rare genetic conditions in England. In the study, which launched earlier this year, Revvity's Omics laboratory in Manchester, UK will work with Genomics England to advance the early detection of genetic conditions in newborns. Utilising the chemagic 360 instrument, Revvity's team will extract DNA from cord blood samples collected from newborns across England.

VFL Sciences announces launch of GreatFlo Parallel Bioreactors and Fermentors

Chennai-based VFL Sciences has announced the launch of GreatFlo Parallel, a range of seamlessly parallel Bioreactors and Fermentors at the IKMC 2024 event organised by IKP Knowledge Park at Hyderabad recently, by Dr Jitendra Kumar, Managing Director, BIRAC. For the first time in India, the company has launched a seamlessly parallel bioreactor with flexibility for easy expansion from 2-fold to 16-fold glass bioreactors with a working volume of 200-500 ml. The 2-fold system is a great starting point for labs which are looking to experience the parallel bioreactor for their optimisation experiment and add additional vessels as and when needed. Complete Peltier controlled heating and cooling system and exhaust condensers ensures no external utilities are needed. Complete stainless-steel body and 21 CFR part 11 complaint software supports the use of the product in regulated labs.

Burkert inaugurates new manufacturing facility in Pune to strengthen portfolio in India

Burkert Fluid Control Systems India, a leading manufacturer of measurement and control systems for liquids and gases, recently inaugurated its new manufacturing facility in Pune, Maharashtra. This state-of-the-art facility is a significant addition to Burkert's global value chain, aimed at meeting the growing demand in the region by producing components and system solutions. Located in Talegaon MIDC, Phase 2, the new facility spans 50,000 square feet and is equipped with advanced machining centres, assembly lines, and testing centres designed for optimum productivity. It has the capacity to produce over 30,000 valves and 500 systems annually. This new unit brings production closer to Burkert's customers, boosting local employment and enhancing service delivery. Initially, the Talegaon facility will focus on manufacturing Mass Flow Controllers, Angle Seat Valves, Diaphragm Valves, and System Solutions, with plans to expand production in phases to meet the diverse needs of Indian industries. The Talegaon unit is expected to employ up to 32 people by the end of this year, with the potential to grow to 100 employees next year. In India, Burkert serves notable clients such as Zydus, Alembic, Sun Pharma, Biocon, Bharat Biotech, and Serum Institute, reinforcing its position as a key player in the country's industrial sector.

Thermo Fisher and Telangana to establish Bioprocess Design Centre for novel biotherapeutics

Thermo Fisher Scientific has announced the signing of a Memorandum of Understanding (MoU) with the Government of Telangana to establish a Bioprocess Design Centre (BDC) in Genome Valley, Hyderabad. Totalling 10,000 sq. ft., the Bioprocess Design Centre will become operational in early 2025 and serve as a benchmark to accelerate the development and manufacturing of innovative biotherapeutics in India and Asia-Pacific region. The Centre will feature state-of-the-art labs as well as training hubs to drive scientific research. Thermo Fisher will equip the centre with advanced workflow capabilities across upstream and downstream research, cell culture media development, single-use scale-up manufacturing, and product validation.

Univercells Technologies launches miniaturised scale-X Nexo Bioreactor

Univercells Technologies has announced the launch of its latest innovation, the scale-X nexo bioreactor. This cutting-edge addition to the scale-X portfolio introduces a miniaturised, fixed-bed bioreactor offering a 0.5 m^2 growth surface, designed for efficient cell culture process development across multiple modalities. Engineered for seamless scalability, the scale-X nexo bioreactor reduces process development timelines, driving down costs for researchers and biopharma companies alike. As the smallest member of the scale-X family, the tiny but mighty scale-X nexo bioreactor ensures consistent cell distribution and high cell density, laying the groundwork for efficient, scalable biomanufacturing. Its direct scalability to the scale-X carbo (10-30 m^2) and nitro bioreactor (200-600 m^2) makes it a powerful tool for companies aiming to move swiftly from lab to commercial production while minimising costs. The scale-X nexo bioreactor is designed to dramatically reduce media and reagent consumption, thanks to its low-volume, low-surface-area approach.

Agilent releases next-gen HPLC systems with enhanced automation and sustainability capabilities

Agilent Technologies Inc. has announced the release of its next generation Agilent InfinityLab LC Series portfolio, which includes the 1290 Infinity III LC, 1260 Infinity III Prime LC, and 1260 Infinity III LC systems, all including the biocompatible versions. These are the first HPLC systems on the market to feature the new Agilent InfinityLab Assist Technology, offering enhanced, built-in system assistance capabilities. This technology allows labs to focus more on achieving results rather than on daily operation and maintenance tasks. With the introduction of these new LC systems, Agilent is revolutionising the LC user experience. These systems significantly enhance task automation, connectivity, predictive feedback, and error reduction. The innovative built-in sample tracking, utilising barcoding and camera technologies ensures the elimination of sample mix-ups, providing users with greater accuracy.

BD announces new robotics solution to automate, standardise single-cell research

US-based BD (Becton, Dickinson and Company) has announced the commercial launch of the first in a family of high-throughput, robotics-compatible reagent kits that will enable automation to ensure greater consistency and increased efficiency of large-scale, single-cell discovery studies. The automated solution from the BD and Hamilton collaboration standardises traditionally manual processes and speeds the generation of material for genetic sequencing. The solution includes the newly released BD OMICS-One XT WTA Assay and the Hamilton Microlab NGS STAR automated liquid handling platform. Because the NGS STAR is already installed in many laboratories and facilities worldwide, more researchers, processing samples across an array of genomics applications, can easily integrate the new automation-ready BD assay into existing workflows. The BD OMICS-One XT Library Preparation Reagent Kits and Hamilton Microlab NGS STAR automated liquid handling platform and applications are commercially available globally.

HIV Prevention Remains Elusive

On December 1, the world gathers every year to commemorate World AIDS Day, which serves as an important reminder that we must remain steadfast in our commitment to prevent new HIV (Human Immunodeficiency Virus) infections and provide essential services to all people living with HIV globally. In 2024, the 37th World AIDS Day opens with the theme, "Collective Action: Sustain and Accelerate HIV Progress."

According to reports by the World Health Organisation (WHO), approximately 39.9 million people were living with HIV at the end of 2023. To be specific, an estimated 1.3 million people became infected with HIV in 2023. While there has been marked progress in sub-Saharan Africa, for the first time, in 2023 more than half of the new HIV infections occurred outside of sub-Saharan Africa.

Within the South East Asian region, an estimated 4 million people were living with HIV in 2023, of which 78 per cent knew their status, and 66 per cent were receiving treatment. Speaking of India, reports suggest that in 2023, 68,000 people were newly infected with HIV.

As HIV continues to be a major global public health issue, claiming 42.3 million lives so far, in 2023, 630,000 people died from HIV-related causes globally. It must also be noted that the global HIV epidemic claimed 69 per cent fewer lives in 2023 since the peak in 2004.

The scientific advances and tools available have changed the way we look at this infection, both epidemiologically, in terms of preventing new diseases, and therapeutically, with highly effective and well-tolerated treatments. But if 1.3 million people continue to acquire HIV every year, the response will become more challenging, more complex and more costly in the years to come, and we must act on it urgently.

Long-acting technologies like pre-exposure prophylaxis (PrEP) continue to play a major role in preventing new infections, but access is limited to only a few countries. Further, new HIV prevention products in the pipeline such as long-acting injectable cabotegravir (CAB-LA) and most recently, lenacapavir, are raising expectations due to their convenience and high efficacy. However, the key challenge is accessibility and affordability.

The WHO, hence, is now training sights on vaccine development to prevent HIV infection. In November 2024, the WHO published a new study naming 17 pathogens, including HIV, as top priorities for new vaccine development. This study is the first global effort to systematically prioritise endemic pathogens based on criteria that included regional disease burden, antimicrobial resistance risk and socioeconomic impact.

However, the complex biology of HIV makes the virus a tough target to tackle, because of which we still do not have a vaccine candidate ready with us. While the wait is still on, we do see hopeful projects reaching a stage of culmination which might just bring in the desired results very soon. For example, Immuno Cure BioTech, a clinical-stage biotechnology group based in Hong Kong Science Park, has recently completed the first-in-human novel therapeutic HIV vaccine, ICVAX, Phase I clinical trial with encouraging findings of exceptional safety and promising immunogenicity profiles.

The company is now communicating with the National Medical Products Administration (NMPA), the Chinese regulatory authority, for the upcoming Phase II clinical trial, anticipated to commence in mid-2025.

As another major development, eight African countries including Nigeria, South Africa, Zambia, Zimbabwe, Tanzania, Uganda, Kenya, and Mozambique, have begun a groundbreaking, African-led HIV vaccine research and development project, offering hope for a vaccine tailored to the needs of the region's population.

Although in some parts of the US, testing is underway for mRNA-based HIV vaccines as well, the final breakthrough remains elusive. Even if an effective solution for HIV prevention is developed, optimum policy implementation and minimising patient stigmatisation needs to be addressed as well. BS

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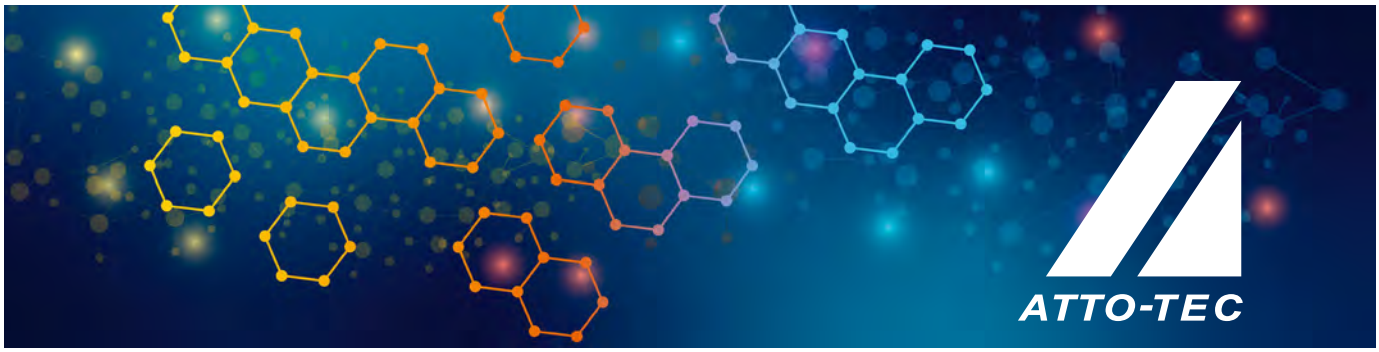

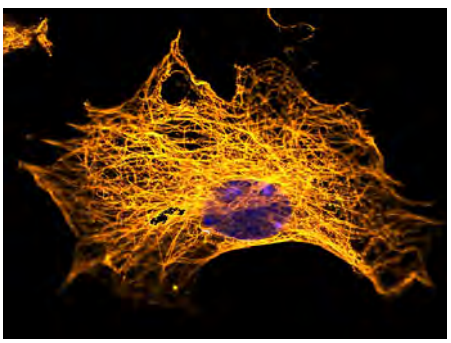

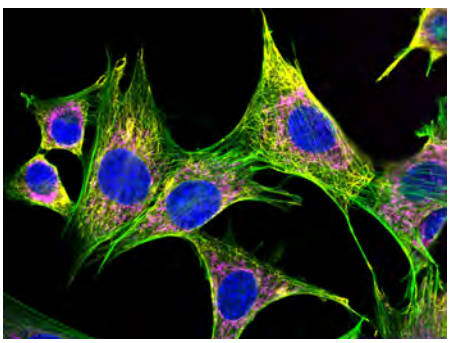

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