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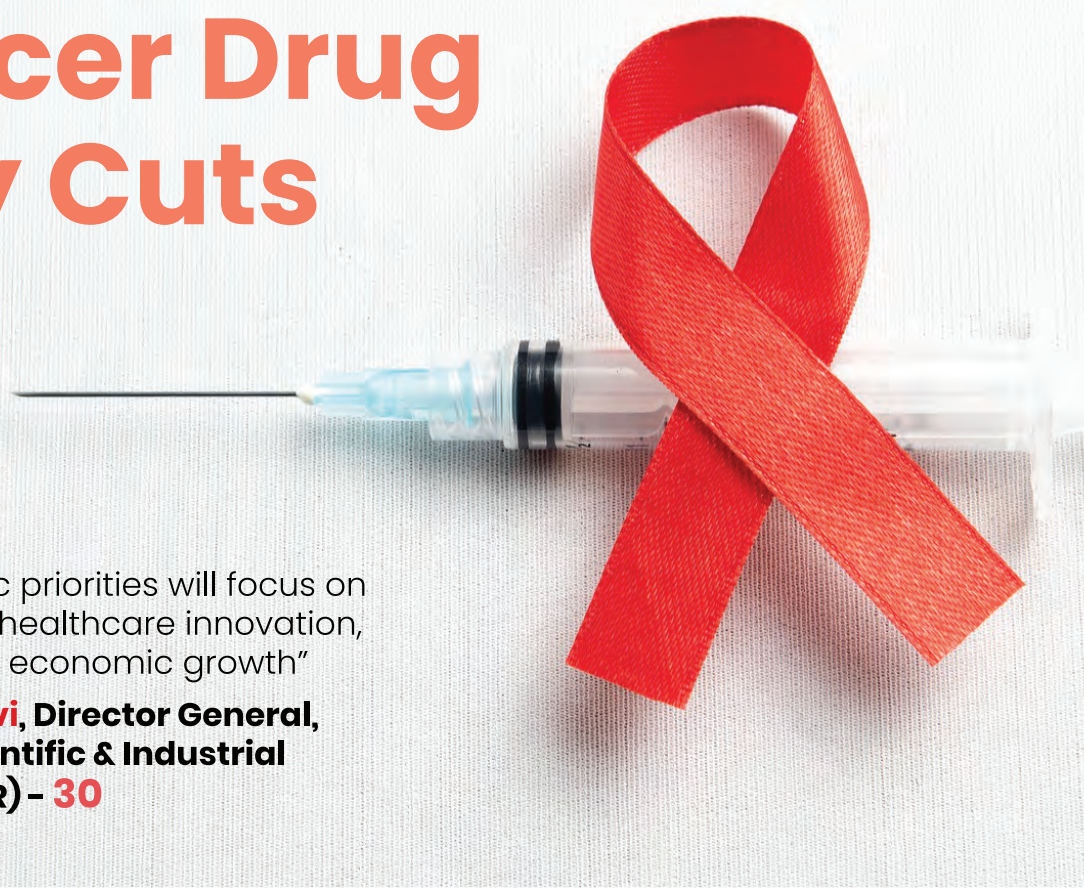
RIPPLE EFFECT of Cancer Drug Duty Cuts



"CSIR's strategic priorities will focus on indigenisation, healthcare innovation, and bio-based economic growth"

– Dr N Kalaiselvi, Director General, Council of Scientific & Industrial Research (CSIR) – 30

Industry Leaders Drive CRDMO Reform, Unite Under IPSO for a Transformational Leap – **24**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Acknowledgement/ Feedback

Thank you BioSpectrum for the feature on Women in Life Sciences. Unlike in other areas such as physical sciences, mathematics, and computer technology, women have a very strong representation in health sciences or life sciences, globally as well as in India. I would say that women are in a very good space when it comes to the life science sector.

-Dr Geetanjali Sachdeva, Mumbai

Thank you BioSpectrum India for the coverage on the medtech company Getinge in the March 2025 edition.

-Abhigale B, Mumbai

Thank you for covering Everest Group's thoughts on How India's Vaccine Renaissance Rests on Innovative & Equitable Solutions.

-Aarthi J, Chennai

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Letter from Publisher

Dear Readers,

In the Union Budget 2025, Finance Minister Nirmala Sitharaman announced that 36 life-saving drugs would now be fully exempt from customs duties. Currently, most drugs attract a basic customs duty of 10 per cent, while some categories of life-saving drugs and vaccines are subject to a concessional rate of 5 per cent or are fully exempt. These steps are expected to alleviate the financial burden on cancer patients and increase access to life-saving treatments across the country.

The 36 medicines exempted from customs duties include treatments for rare diseases, cholesterol, and other critical conditions. Among these, 13 are cancer medicines, which include some of the most advanced and costly therapies on the market. However, will this truly reduce the financial burden on patients? Our team has endeavoured to answer, as prices decrease, 'will this have a significant negative impact on pharmaceutical companies' revenue stream?', is another crucial aspect of the duty and reduction in drug prices.

India's Contract Research, Development, and Manufacturing Organisation (CRDMO) sector, currently valued at $3-3.5 billion, has the potential to scale up to $22-25 billion by 2035, driven by the global shift in pharma outsourcing, rising demand for biologics, and the country's established strengths in chemistry and process innovation. However, due to lack of a clear and unified industry definition, the sector is witnessing sluggish growth. The CRDMO industry leaders joined hands and formed the Innovative Pharmaceutical Services Organization (IPSO) to create a strategic blueprint. We have put together an article on how the sector will take India to the next level as a global leader in biopharma outsourcing.

Technology is driving a significant digital revolution in the pharmaceutical sector, changing clinical trials, drug discovery, and regulatory compliance while providing enormous opportunity to spur innovation. But this quick change comes with serious problems, especially when it comes to protecting private information, staying in compliance with regulations, and guaranteeing IT scalability. These difficulties have been made worse by India's recent enactment of the Digital Personal Data Protection (DPDP) Act, which has forced pharmaceutical businesses to reconsider how they handle data security and IT infrastructure. According to an expert, virtualisation allows for a highly regulated IT environment in which confidential data is safeguarded, with access granted only to authorised staff.

On February 1, American President Donald J Trump announced tariffs on imports from Canada, Mexico and China, three of the biggest US trade partners. Trump intends to increase tariffs on imports from other countries including India. The Indian pharma industry, which supplies over 47 per cent of the generic medicines to the US, is likely to face a 25 per cent or more tariff in the coming days. To shed more light on this tariff war, in an Insightful piece, our team has looked at how Indian companies are taking proactive steps in view of high tariffs imposition by the Trump administration.

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

Thanks & Regards,

Ravindra Boratkar,
Publisher & Managing Editor

COVER 20

RIPPLE EFFECT of Cancer Drug Duty Cuts

To ease the financial strain on patients, the Union Budget 2025-26 has removed Basic Customs Duty (BCD) on 36 life-saving drugs used for cancer, rare diseases, and chronic conditions. This move is expected to make essential treatments more affordable by lowering overall costs. However, the real question remains: will this truly reduce the financial burden on patients? As prices decrease, what effects will this have on pharmaceutical companies, particularly in terms of sales and competition? Most importantly, how will local players adapt to these changes? Let's find out.

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Speaking With

Top Video

Shailendra Vyas, CEO and Director, Bioheaven360 Genotec talks about how AI is revolutionising genomics and disease risk prediction.

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How can India become a health tech powerhouse? A perspective by Pradeep Chakravarthy, Senior Vice President of Global Customer Success at Model.

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Virtualisation

Regulars

Trump's Tariff Tactics

The Indo-US trade turbulence triggered by US President Donald Trump's repeated statements over reciprocal trade tariffs continues to be a cause for concern. Under such circumstances, the latest McKinsey – Indian Pharmaceuticals Alliance (IPA) report is very positive and encouraging, as it noted that the Indian pharmaceutical sector is at a tipping point and over the next decade it could redefine operational strategies to tap potential opportunities, unlocking the next level of performance as a global leader.

It has recommended the Indian industry to adopt several initiatives like zero-error quality and autonomous planning to further accelerate its global leadership even with significant disruptions on the horizon.

Some reports quoted the US President claiming that India has agreed to reduce the tariffs. However, this claim could not be substantiated from the Indian government sources till this piece was being written.

Trump has been repeatedly stating that India is a very high tariff nation and reiterating that reciprocal tariffs on nations that impose duties on US goods will come into effect from April 2. Several economic analysts and experts feel that India is vulnerable to the new reciprocal tariffs as it has a wide tariff gap. Some studies have shown that the average rate that India levies on imports from the US is more than 10 percentage points higher than US charges on the imported Indian goods. A study by Morgan Stanley suggests that India and Thailand could see their tariffs increase by 4 to 6 percentage points if the Trump administration goes ahead with its plan.

Trump's threat to impose reciprocal tariffs may result in estimated losses of about $7 billion a year for Indian exporters of all types, as per Citi Research analysts. The most vulnerable sectors include chemicals, metal products, automobiles and pharmaceuticals.

The US is an important export destination for the Indian pharma industry, considering the sheer volume of exports. In 2022, Indian companies supplied 47 per cent of all generic prescriptions in the US. That amounts to four out of ten of all prescriptions filled. In FY 2023-24, Indian pharma exports to the US reached $8.7 billion, making it the largest market for Indian companies while the value of the pharma imports from the US to India is just one tenth of that amount, nearly $800 million.

More than figures -volume and value- Indian generic drugs exported to the US are more important to the US healthcare system as they reduce the cost. The IQVIA report revealed that Indian pharma saved $219 billion to the US healthcare system in 2022 alone. The total savings between 2013 to 2022 was $1.3 trillion. The US will have to take into consideration this aspect too.

One view is that reciprocal tariffs will have limited impact on Indian pharma as the most lifesaving drugs imported from the US to India have zero or very less duty. Still, efforts are on from the Indian side to resolve the issue. Both the countries were negotiating to understand each other's concern. There is a likelihood of India reducing the duties on the US import also.

The Indian pharmaceutical industry has expressed concern over the likelihood of the US imposing reciprocal tariffs. It has warned that the move may lead to increased drug costs and as a result potential shortage of generic drugs to US consumers as the higher tariffs will have to ultimately be absorbed by consumers, profit margins in generics being thin. Hence, any rise in cost will have to be passed on to the consumers.

During the recent Stateside visit of Prime Minister Narendra Modi, both the countries announced their commitment to more than double the trade to $500 billion by 2030. The two countries aim to increase market access, reduce tariff and non-tariff barriers and deepen supply chain integration. However, all these objectives depend upon resolving the reciprocal tariff issue. BS

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ICMR publishes addendum to ethical requirements for research in integrative medicine

The Indian Council of Medical Research (ICMR) has published an addendum to the ICMR National Ethical Guidelines for Biomedical and Health Research Involving Human Participants (2017) to provide a structured ethical framework for Research in Integrative Medicine (RIM). Integrative Medicine (IM) involves a multimodal approach where Ayush systems are integrated alongside modern/conventional medicine to enhance patient care and improve health outcomes. This addendum aims to guide researchers, institutions, Ethics

Committees (ECs), and regulatory bodies involved in Integrative Medicine research, ensuring that scientific integrity and patient safety remain paramount. The addendum introduces key measures to enhance the ethical and regulatory framework for Integrative Medicine research. Ethics Committees overseeing such research must now include two Ayush subject-matter experts, with at least one being external to the institution, ensuring well-rounded and informed deliberations. Informed consent standards have been strengthened, requiring that research participants receive clear, tailored information about Integrative Medicine interventions while adhering to India's standard ethical guidelines for biomedical and clinical research.

Tamil Nadu approves primary hemostatic agent SeraSeal under NK-48 CMCHiS scheme

Developed by US-based Wortham Labs, SeraSeal, the world's first and only primary hemostatic agent, has been approved for use in trauma and emergency bleed management under the Nammai Kaakkum 48 (NK-48) scheme of the Chief Minister's Comprehensive Health Insurance Scheme (CMCHiS) in Tamil Nadu. This milestone approval will strengthen emergency care across 702 empanelled state hospitals, covering a wide range of specialties including neuro, ENT, spine, cardiac, vascular, liver, kidney transplant, and orthopaedic surgeries. The NK-48 scheme, a crucial component of the Innuyir Kappom Thittam (IKT), provides cashless treatment for road accident victims within the first 48 hours. The initiative aims to reduce mortality rates and improve trauma care efficiency by ensuring access to immediate medical intervention.

CDSCO approves AstraZeneca to import SZC for treatment of Hyperkalaemia in adults

AstraZeneca Pharma India Limited has received permission from the Central Drugs Standard Control Organisation (CDSCO), Directorate General of Health Services, Government of India to import pharmaceutical formulations of new drug for sale or distribution for Sodium Zirconium Cyclosilicate (SZC) powder - oral suspension 5g and 10g. This pioneering treatment is poised to significantly enhance the management of hyperkalaemia in adults, a condition characterised by elevated potassium levels that often accompanies cardiovascular, renal, and metabolic diseases. SZC, an insoluble, non-absorbed sodium zirconium silicate, is administered as an oral suspension. It is odourless, tasteless, and stable at room temperature. Clinical trials have demonstrated its effectiveness, with action onset in an hour and normalisation of potassium levels within 2.2 hours, achieved by 92 per cent of patients within just 48 hours, sustained over a 12-month period.

I-STEM launches 'One District, Minimum One Equipment' project

I-STEM (Indian Science, Technology, and Engineering facilities Map), an initiative from the Office of Principal Scientific Adviser, Government of India, is launching 'One District, One Equipment' to ensure that every district in the country has access to scientific equipment. According to I-STEM data, over Rs 1,500 crore worth of lab equipment in scientific and educational institutions across India, already listed on the I-STEM portal, remains unutilised due to various factors. Institutions that actively optimise equipment availability not only accelerate research but also boost India's Global Innovation Index ranking. This revolutionary programme aims to connect researchers, startups, and industries with a vast network of labs and equipment across diverse sectors through an I-STEM-operated portal. It provides a platform for academic institutions to register their scientific equipment that can be rented by startups, industry, entrepreneurs & researchers.

Telangana signs 11 MoUs with Green Pharma City project

Pharma MoUs were signed for the Green Pharma City, a flagship initiative of the Government of Telangana during the recently held 22nd edition of BioAsia 2025. Already six pharma companies have signed MoUs with the government of Telangana with 11 more companies joining the initiative, as MoUs were signed with Granules, Orbicular, Aizant, Biological E, Virchow, Virupaksha, Jubilant, Vimta, Aragen, Bharat Biotech and Sai Life Sciences, bringing an investment of Rs 5445 crore, and creating 9800 new jobs. With these commitments, the total investment in Green Pharma City now stands at Rs 11,100 crore, with employment opportunities exceeding 22,300. The government plans to develop Hyderabad and Telangana into one of the largest ecosystems for biosciences, biotech and life sciences innovation, R&D, manufacturing, skill development, and investment. 160 km Outer Ring Road (ORR) has been developed and the government is now building a Regional Ring Road (RRR) of 360 km outside the core urban area along with a network of radial roads connecting the two ring roads and creating manufacturing hubs for pharma, EV's data centres, green energy, seed manufacturing, agri-processing and other sectors.

ALIMCO sets up first auxiliary production centre in Tripura to boost assistive device manufacturing

In a landmark step towards enhancing accessibility and service delivery for Persons with Disabilities (PwDs) and Senior Citizens in the North-East region, Artificial Limbs Manufacturing Corporation of India (ALIMCO), a PSU under Union Ministry of Social Justice and Empowerment, is set to establish its first Auxiliary Production Centre (AAPC) at Purba Laxmibill, Sepahijala district, Tripura. With an investment of Rs 45 crore, the centre will mark the beginning of a new era in assistive device manufacturing and service

delivery in the North-East region. It will serve the need for a dedicated production and distribution facility to efficiently cater to the North-East. This new initiative further aims to enhance accessibility to assistive devices while generating employment opportunities for the local population. This initiative is a significant step towards regional empowerment and inclusivity, reinforcing Central Government's commitment to serving the persons with disabilities across India. The Government of Tripura has played a key role in facilitating land acquisition in Sepahijala district, and efforts have been expedited under the guidance of the Department of Empowerment of Persons with Disabilities (Divyangjan), Government of India.

Metropolis Healthcare buys Agra's leading diagnostic chain Scientific Pathology

Metropolis Healthcare Limited has announced that its wholly owned subsidiary, Metropolis Clinical Pathology Private Limited, will acquire Agra-based Scientific Pathology, founded by Dr Ashok Kumar Sharma, through a Business Transfer Agreement (BTA). This strategic move strengthens Metropolis' presence in Western Uttar Pradesh, accelerates its B2C expansion, and unlocks growth opportunities across the state and beyond. Under the agreement, Metropolis Clinical Pathology will acquire and operate all laboratories and collection centers of Scientific Pathology in Agra and neighbouring towns through a slump sale transaction. The consideration for the acquisition will range between Rs 55 crore and Rs 83 crore, determined at 12.2x of the adjusted EBITDA over a defined assessment period. The transaction will be executed through a Securities Subscription Cum Shareholders' Agreement (SHA), backed by Metropolis Healthcare Limited. Upon completion, Metropolis Clinical Pathology will transition from a wholly owned subsidiary while continuing to be an integral part of the Metropolis Healthcare Group.

M|O|C Cancer Care & Research Centre raises $18 M in growth capital led by Elevation Capital

M|O|C Cancer Care & Research Centre, India's largest network of community cancer centres, has raised $18 million in funding led by Elevation Capital. Over the past seven years M|O|C has successfully treated over 4.5 lakh cancer patients with a highly qualified team of 47 oncologists while scaling operations to 24 centres in Mumbai, Pune, Rest of Maharashtra, Ahmedabad, Indore and Chhattisgarh. Previously, M|O|C had raised $10 million from Tata Capital Healthcare Fund in 2023 to expand their operations and technological capabilities. M|O|C is addressing multiple challenges by setting up high quality, safety-equipped community cancer centres, that deliver 20-30 per cent savings to patients, while helping them save a great deal of time. Their comprehensive care model offers services like nutrition guidance, physiotherapy, and genetic counselling that are essential for improving quality of life for cancer patients. In May 2024, the company expanded its services by joining hands with Hemato Oncology Clinic (HOC), which was the second largest independent chain of community cancer care centres in India. This merger has allowed the company to expand its operations in the state of Gujarat. M|O|C shall soon expand their operations in Delhi NCR and other parts of India and develop a molecular oncology lab and preventive oncology services to expand their scope of services.

Senores Pharmaceuticals acquires 14 ANDAs from Dr. Reddy's Laboratories

Ahmedabad-based Senores Pharmaceuticals Limited (SPL), through its wholly-owned subsidiary Senores Pharmaceuticals, Inc., USA (SPI), has signed agreements to acquire a basket of 14 Abbreviated New Drug Applications (ANDAs) from Hyderabad-based Dr. Reddy's Laboratories and its applicable affiliates. The basket acquired consists of 13 ANDAs, which are approved by the USFDA and 1 ANDA, which is pending approval from the USFDA. The addressable opportunity of the acquired ANDAs in the USA is approx. $421 million as per IQVIA and ~ approx $1.13 billion as per the specialty data aggregator Symphony. The acquisition will be funded through the Initial Public Offer (IPO) proceeds raised by SPL.

KKR acquires controlling stake in Healthcare Global Enterprises for $400 M

KKR, a leading global investment firm, and Bengaluru-based Healthcare Global Enterprises have announced the signing of definitive agreements with CVC, a leading global private markets manager, under which funds managed by KKR will become the largest shareholder in HCG and assume sole control of HCG's operations. Dr BS Ajaikumar, Founder of HCG, will take on the role of Non-Executive Chairman and be focused on driving clinical, academic and research and development excellence. As part of the transaction, KKR will acquire up to 54 per cent of equity in HCG from CVC Asia V at a purchase price of Rs 445 per share. Pursuant to the Securities and Exchange Board of India's (SEBI) Takeover Regulations, an open offer will be conducted by KKR to purchase additional equity shares in HCG from public shareholders. Upon completion of the transaction, KKR is expected to hold an equity stake of between 54 and 77 per cent. KKR makes its investment from its Asia Fund IV. This transaction marks KKR's latest investment in India's healthcare space.

Motilal Oswal Alternates invests Rs 460 Cr in Megafine Pharma

Motilal Oswal Alternate Investment Advisors Private Limited (MO Alts) has agreed to invest upto Rs 460 crore for a majority stake in Mega Fine Pharma Private Limited. The Sanghvi Family, one of the founding-promoter groups, has also participated in this transaction, increasing their stake in the company. Megafine is a Mumbai-based export focused API company with two USFDA approved manufacturing facilities in Nashik and Vapi. The company specialises in the manufacture and sale of a diverse range of high-value, low-volume niche Active Pharmaceutical Ingredients (APIs) for chronic therapies. Established in 1995, Megafine is backward integrated to manufacture its own intermediates while also offering contract manufacturing services for APIs and Intermediates to third-party customers. The company has long-standing relations with leading global pharmaceutical companies and has achieved global market leadership in some of its key APIs.

Aster DM Healthcare to inject Rs 850 Cr in Kerala in next 3 years

Aster DM Healthcare, one of India's leading integrated healthcare providers, has reinforced its deep-rooted commitment to Kerala with a strategic vision for expansion and long-term investment. Aligned with the state's efforts to attract and facilitate high-impact investments under the 'Invest Kerala Global Summit' initiative held in Kochi, Dr Azad Moopen, Founder and Chairman, and Anoop Moopen, Director at Aster DM Healthcare met Kerala Chief Minister Pinarayi Vijayan and P Rajeev, Minister of Law, Industries, and Coir to discuss the current healthcare landscape and explore opportunities for growth and innovation. As part of the engagement, Aster has said that it plans to invest around Rs 850 crore in the next three years towards scaling up its infrastructure, medical services, and employment generation in the region. This commitment builds on the Rs 500 crore Aster has already invested in Kerala during the last three years, further solidifying its leadership in the state's healthcare landscape. Looking ahead, Aster has an aggressive investment plan in Kerala that will result in a significant increase in bed capacity, bringing the total number of beds in the state to 3,453 by FY27.

TechInvention to introduce Quantoom's cutting-edge RNA manufacturing solutions in India

TechInvention Lifecare has announced a strategic collaboration with Belgium-based Quantoom Biosciences. The Memorandum of Understanding (MoU) was formally signed during the Belgian Economic Mission to India recently. As part of this collaboration, TechInvention is introducing Quantoom's cutting-edge RNA manufacturing solutions to India with a strong focus on accessibility, scalability, and affordability. This advanced suite of technologies is designed to de-risk and accelerate the development of RNA-based vaccines. Complementing this, TechInvention will leverage its translational research expertise, regulatory know-how, and GMP manufacturing capabilities to streamline developing, scaling, and commercialising novel RNA-based products. This partnership represents a transformative milestone in India's biotechnology landscape, establishing end-to-end mRNA production capabilities at TechInvention's forthcoming EU-GMP-approved facility, the Global Collaborative Centre for Medical Countermeasures (GCMC), in Mumbai. The collaboration positions India as a hub for next-gen RNA-based vaccines, driving global partnerships for equitable healthcare.

TCS partners with Danish Academy of Technical Sciences to combat dengue through technology

Tata Consultancy Services (TCS), a global leader in IT services, consulting, and business solutions, has collaborated with the echo network, a global social innovation initiative hosted by the Danish Academy of Technical Sciences (ATV), to combat outbreaks of dengue fever and other viral diseases. This collaboration aims to harness digital technology and citizen engagement to address pressing public health challenges. As part of this initiative, TCS will provide technology support to echo network's 'I am OneHealth' programme in Bengaluru. Leveraging its TCS TECH4HOPE programme, a pro bono initiative that provides technology solutions to non-profit organisations, TCS is driving impactful change by enabling communities to combat dengue through data-driven insights and citizen participation. The echo network is funded by the Novo Nordisk Foundation, which supports public health and sustainability worldwide. The 'I am OneHealth' programme in collaboration with the Bengaluru Science and Technology Cluster, an initiative by the office of Principal Scientific Adviser to the Government of India of India, unites local communities, academic institutions, and health authorities to fight viral diseases through technology and collective action.

Biocon Biologics and Civica collaborate to expand insulin Aspart access in US

Bengaluru-based Biocon Biologics Ltd (BBL), a fully integrated global biosimilars company and subsidiary of Biocon Ltd, and Civica, Inc., a not-for-profit generic drug and pharmaceutical company founded in 2018 to address and resolve life-saving drug shortages and affordability, have announced a strategic collaboration agreement to expand access and affordability of Insulin Aspart in the United States (US). Under the terms of the agreement, Biocon Biologics will supply Insulin Aspart drug substance to Civica, Inc., who will use the drug substance to produce Insulin Aspart drug product, a rapid-acting insulin analog, at its manufacturing facility in Petersburg, Virginia. Civica will commercialise the medicine for patients in the United States, after completion of development work and clinical trials. No technology transfer is involved in the agreement.

Wipro GE Healthcare launches AI enabled ultrasound system Versana Premier R3

Wipro GE Healthcare has announced the launch of the Versana Premier R3, an advanced artificial intelligence (AI)-enabled ultrasound system designed to enhance clinical efficiency and accuracy, streamline workflows, and improve patient outcomes. Catapulting the government's 'Make in India' vision, the state-of-the-art ultrasound system will be manufactured at Wipro GE Healthcare's PLI factory in Bengaluru. An extension of the Versana ultrasound range, Versana Premier R3 integrates artificial intelligence and offers automation and AI-enabled productivity tools to improve workflow and clinical features designed to enhance clinical efficiency and accuracy. The advanced ultrasound system aims to help clinicians deliver more personalised, ubiquitous, and preventive care. Addressing the skill gap, the system will optimise dynamic tissue imaging, assist with volume calculations, and streamline workflows. Its self-learning onboarding tool will empower the clinicians to enhance their skills and adapt to new workflows.

Zydus Lifesciences to offer protection against new strain of influenza virus

Ahmedabad-based Zydus Lifesciences, a leading, discovery-based, global pharmaceutical company, is ready to launch the season's first India's Flu protection as per WHO recommended composition of quadrivalent influenza virus vaccines for use in the 2025 southern hemisphere. A quadrivalent vaccine, by covering strains of both influenza A and influenza B, provides a broader protection and significantly reduces the risk of vaccine mismatch. The vaccine has been cleared by the Central Drug Laboratory (CDL). VaxiFlu-4 is being marketed by Zydus Vaxxicare-a division of the group focussing on preventives. The Quadrivalent Inactivated Influenza vaccine has been developed at the Vaccine Technology Centre (VTC) in Ahmedabad which has proven capabilities in researching, developing, and manufacturing of safe and efficacious vaccines.

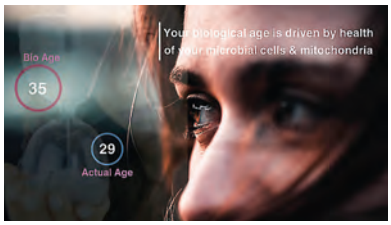
Global companies to open new centres across life sciences and tech sectors in Hyderabad

A series of announcements were made by global companies at the 22nd edition of BioAsia 2025, Asia's largest life sciences and healthcare conference organised by Department of Industries & Commerce, Government of Telangana on the theme 'Catalysts of Change – Expanding Global Healthcare Frontiers, Transforming Healthcare with Innovation, Collaboration and Progress'. The US-based Agilisium, a company

revolutionising the pharma sector by leveraging data-driven insights, has launched its new office at RMZ Spire, Hyderabad. The company has also established a Life Sciences and Innovation & Talent Development Lab. MSD from the US has announced the opening of a global tech centre in Hyderabad. On the other hand, ALS, an Australia-based global leader in testing, inspection, certification, and verification solutions, is establishing a state-of-the-art Bio Pharma cGMP testing lab in Genome Valley; and Taiwan-based company Lotus is setting up its second R&D centre in Hyderabad.

Genefitletics unveils Agegorithm to measure biological age

Delhi-based startup Genefitletics has launched Agegorithm, a machine learning driven human biology model that quantifies biology at molecular & cellular level to measure biological age. The company ascertains the efficiency of gut & oral microbiome functions & mitochondria to determine how well an individual is aging at cellular level in comparison for chronological age. The company asserts that Agegorithm is built on a mathematical algorithm which is completely data driven



and has been constructed using 6 billion molecular data, phenotype metadata & longitudinal data points specific to Indian adult population with subjects in the age band of 18-55 years. The company's comprehensive machine learning platform-PROTEBA runs this algorithm to discover the molecular activity of gut and oral microbiome & mitochondrial efficiency that enables the platform to decode & assign a number to biological age. The model statistically combines 400 plus biochemical pathways and integrates health scores such as oral health, immune system health, heart & metabolic health, energy efficiency, gut health, stress response & many more to pinpoint source of systemic inflammation & oxidative stress causing rapid ageing.

VeGen Labs secures BIRAC funding of Rs 3.76 Cr to advance KRAS inhibitor

Hyderabad-based biotechnology startup VeGen Labs LLP has been awarded Rs 3.765 crore Royalty-based financial support from Biotechnology Industry Research Assistance Council (BIRAC), a Government of India enterprise set-up by Department of Biotechnology. This funding will support Investigational New Drug (IND)-enabling toxicology studies for IND126, a novel KRAS inhibitor, marking a significant step toward clinical development for Non-Small Cell Lung Cancer (NSCLC) patients in India. The BIRAC funding will enable comprehensive toxicology assessments, a critical step in preparing for IND submission with regulatory agencies. Upon successful completion, VeGen Labs will be positioned to initiate first-in-human clinical trials, further strengthening India's role in cutting-edge drug discovery and precision oncology.

Arva Health raises $1 M in pre-seed round to build India's next-gen fertility clinics

Bengaluru-based fertility care startup Arva Health has raised $1 million in pre-seed funding, led by All In Capital, with participation from iSeed, Bharath Founders Fund, and Galaxy. The first flagship clinic in Whitefield, Bengaluru will provide fertility testing, consultations, egg freezing, and IVF in a modern, judgment-free setting. The clinic is designed to redefine the fertility experience, moving beyond cold, clinical settings to create a warm, welcoming space where patients feel comfortable, supported, and in control of their reproductive choices. The funding will fuel the launch of India's first network of tech-enabled fertility clinics, beginning in Bengaluru. The aim is to make reproductive care affordable, accessible, and free from stigma. The company plans to open clinics in ten locations, including Mumbai and Delhi, by 2027. Additionally, the company intends to expand into men's fertility services and develop a digital platform to offer continuous support for fertility.

C-CAMP and PariSanté Campus to establish Indo French Life Sciences Sister Innovation Hub

Bengaluru-based Centre for Cellular and Molecular Platforms (C-CAMP), India's premier science and technology innovation hub in the life sciences domain, has inked a pact to launch a bilateral innovation collaboration in the healthcare domain called the Indo French Life Sciences Sister Innovation Hub with PariSanté Campus, a leading digital health innovation cluster in France. After detailed discussions, both sides identified two focus areas – One Health and Digital Health Technologies. The intent is to enable targeted innovative solutions from one geography for challenges impacting another. The aim is to foster links between both the hubs so as to enhance science-based entrepreneurship, research, academia and businesses by leveraging upon each other's ecosystems. The Letter of Intent (LoI) has been signed by Dr Taslimarif Saiyed, Director-CEO of C-CAMP and Prof. Antoine Tesnière, Director, PariSanté Campus. The primary focus of the LoI remains the milestone agreement to jointly facilitate research and innovative solutions in a bilateral manner.

CrisprBits develops PathCrisp for early detection of antibiotic resistance

Bengaluru-based biotechnology startup CrisprBits has developed PathCrisp, a platform for CRISPR-based molecular diagnostics for early detection of antibiotic resistance in hospital-acquired infections. Carbapenems, a class of antibiotics, often serve as the last line of defense against multi-drug-resistant bacterial infections. However, New Delhi metallo-beta-lactamase (NDM) driven carbapenem resistance is a major concern in hospitals across India, contributing significantly to the antimicrobial resistance burden. CrisprBits' latest study, published in Nature Scientific Reports, showcases PathCrisp's ability to detect carbapenem resistance in bacterial samples from patients. In the study, the PathCrisp platform was used to test the presence or absence of NDM in DNA isolated from 49 clinical bacterial samples. The data showed 100 per cent concordance with other techniques used as the gold standard (PCR-Sanger sequencing) for the same. The study is a collaborative research between CrisprBits, with Sri Sathya Sai Institute of Higher learning, Puttaparthi, and Asoka University, NCR region. Future R&D efforts will focus on adapting PathCrisp for low-resource settings by developing lyophilised reagents for room-temperature stability.

Salubrious Technologies launches new digital platform to connect doctors with patients

India's healthcare system is at a crossroads, with digital transformation accelerating, yet critical gaps in accessibility and efficiency still persisting. Recognising this, Delhi-based health-tech startup Salubrious Technologies has launched 120 by 80, a dedicated digital platform designed exclusively for doctors reshaping how medical professionals connect with patients. Designed as a doctor-first solution rather than just another platform, 120 by 80 enables doctors, whether just starting out or deep into their practice, to manage consultations more efficiently while maintaining strict patient confidentiality. The mobile app offers seamless integration into a doctor's workflow, allowing them to extend their reach beyond physical clinic hours. To facilitate early adoption, 120 by 80 has opened its waitlist allowing doctors to be among the first to experience this transformative platform. By signing up, doctors can expand their consultation reach, tap into a broader patient base and leverage digital healthcare tools for seamless practice management.

WHO announces new collaborating centre on AI for health governance

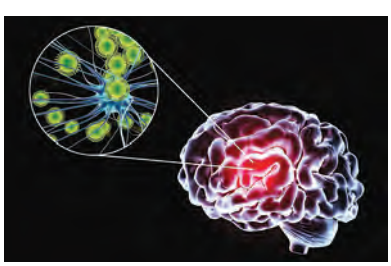
The World Health Organization (WHO) has designated the Digital Ethics Centre at Delft University of Technology in the Netherlands as a WHO Collaborating Centre on artificial intelligence (AI) for health governance. The WHO Collaborating Centre designation recognises the Digital Ethics Centre at Delft University of Technology's decades-long history of cutting-edge research on responsible innovation, and its leadership in incorporating ethical values into design requirements for digital technologies. This inauguration marks the continuation of a strong partnership between the Digital Ethics Centre and WHO with the two entities jointly organising international consultations, workshops, and the development of normative guidance and training in the past. The Collaborating Centre on AI for health governance will be instrumental in WHO's efforts to ensure the ethical and responsible use of AI for health by advancing research on priority topics and providing expert input for WHO's guidance development and policy-making. The Centre will serve as a hub for education and advocacy for science-driven research and facilitate knowledge-sharing and training through regional and country-level workshops.

WHO announces recommendations for influenza vaccine composition

The World Health Organization (WHO) has announced the recommendations for the viral composition of influenza vaccines for the 2025–2026 influenza season in the northern hemisphere. The announcement was made at an information session at the end of a 4-day meeting on the Composition of Influenza Virus Vaccines, a meeting that is held twice annually. WHO organises these consultations with an advisory group of experts gathered from WHO Collaborating Centres and WHO Essential Regulatory Laboratories to analyse influenza virus surveillance data generated by the WHO Global Influenza Surveillance and Response System (GISRS). The recommendations issued are used by the national vaccine regulatory agencies and pharmaceutical companies to develop, produce, and license influenza vaccines for the following influenza season. The periodic update of viruses contained in influenza vaccines is necessary for the vaccines to be effective due to the constantly evolving nature of influenza viruses, including those circulating and infecting humans.

WHO releases first technical brief on Encephalitis

The World Health Organization (WHO) and Encephalitis International have launched a critical Technical Brief on Encephalitis in London, which identified encephalitis (infectious and autoimmune) as an increasing global threat making it an urgent public health priority. The technical brief outlines the worldwide burden of encephalitis, key actions required to improve prevention, data collection and surveillance, diagnostics and treatment, after care and awareness, and research innovation. Encephalitis, a



condition caused by infectious and autoimmune causes in individuals, is an often-deadly brain inflammation that can affect anyone regardless of age, sex or ethnicity. It can lead to severe neurological consequences, including permanent brain injury. It arises either from an infection invading the brain, such as Japanese Encephalitis, Scrub Typhus that are more prevalent in India or from the immune system mistakenly attacking the brain (autoimmune encephalitis). WHO and Encephalitis International urge policymakers, public health professionals, healthcare providers, & researchers to engage with this brief and implement its recommendations to save lives & reduce disability associated with encephalitis.

RIPPLE EFFECT of Cancer Drug Duty Cuts

To ease the financial strain on patients, the Union Budget 2025-26 has removed Basic Customs Duty (BCD) on 36 life-saving drugs used for cancer, rare diseases, and chronic conditions. This move is expected to make essential treatments more affordable by lowering overall costs. However, the real question remains: will this truly reduce the financial burden on patients? As prices decrease, what effects will this have on pharmaceutical companies, particularly in terms of sales and competition? Most importantly, how will local players adapt to these changes? Let's find out.

Cancer is a critical public health challenge in India, with cases projected to rise significantly. Approximately 100 out of every 1 lakh people are diagnosed with cancer. According to the Indian Council of Medical Research (ICMR), the estimated number of cancer cases in 2023 was more than 14 lakh, making India the third-highest in terms of cancer incidence, after China and the USA.

Cancer also poses a high economic burden on patients. Several studies have highlighted this issue. An article published by Sage Journals examined drug pricing policies and cost containment measures in India, analysing spending and price variations of cancer drugs. The results showed that medicines accounted for the highest share of out-of-pocket (OOP) cancer medical expenditures in both the private and public sectors. Another significant study by the Tata Memorial Centre revealed that fewer than 3 per cent of cancer patients in India have access to promising new treatments. Additionally, a 2022 study published in JCO Global Oncology revealed that, despite most high-priority cancer medicines identified by Indian oncologists being generic chemotherapy agents that provide substantial survival improvements and are already included in the WHO Essential Medicines List (EML), access to these treatments remains severely limited due to major financial burdens faced by patients.

To address these challenges and make cancer drugs more accessible, the Government of India has been implementing various measures. In 2024, the government reduced the customs duty to nil and the GST rate from 12 to 5 per cent for three anti-cancer drugs, with the National Pharmaceutical Pricing Authority (NPPA) directing companies to pass the benefits on to consumers. These drugs — Trastuzumab Deruxtecan, Osimertinib, and Durvalumab, all manufactured by British drugmaker AstraZeneca — were among the first to receive this benefit.

In the Union Budget 2025, Finance Minister Nirmala Sitharaman announced that as many as 36 life-saving drugs would now be fully exempt from customs duties. Currently, most drugs attract a basic customs duty of 10 per cent, while some categories of life-saving drugs and vaccines are subject to a concessional rate of 5 per cent or are fully exempt.

These steps are expected to alleviate the financial burden on cancer patients and increase access to life-saving treatments across the country.

Tax and Customs Cuts

The 36 medicines exempted from customs duties under the Union Budget 2025 include treatments for rare diseases, cholesterol, and

"While reduced taxes may lower margins in the short term, the increased affordability could lead to higher demand, potentially compensating for any initial revenue loss."

- Sudarshan Jain,
Secretary General of the
Indian Pharmaceutical Alliance (IPA)

"Customs cuts will lead to a decrease in the cost of many of the drugs, which is a welcome step. While this will increase the affordability of these medicines, pharma companies may not see a decrease in profitability, as these taxes were ultimately passed on to the patients."

- Dr Kumar Prabhash,
Professor, Medical Oncology,
Tata Memorial Hospital, Mumbai

"The current tax cuts on cancer drugs will not improve affordability of treatments, as the availability of the drugs might get impacted. The tax cuts will also cut down on the revenue of the manufacturers and this would lead to a shortage of doses. The tax cuts might actually adversely impact the availability of the drugs, mitigating any advantage the affordability might have offered."

- Dr Ranjana Sarma,
Business Program Manager,
Bharath Advanced Therapeutics

other critical conditions. Among these, 12 are cancer medicines, which include some of the most advanced and costly therapies on the market.

Notable cancer treatments in the list include Onivyde (pegylated liposomal irinotecan) for pancreatic cancer from Ipsen and Asciminib, used for the treatment of Philadelphia chromosome-positive chronic myeloid leukemia, manufactured by Novartis.

Roche stands to benefit significantly, with five of its drugs exempted from customs duties. These include Alectinib (Alecensa), used to treat non-small cell lung cancer (NSCLC); Obinutuzumab (Gazyva), a humanised anti-CD20 monoclonal antibody for chronic lymphocytic leukemia (CLL); Polatuzumab vedotin (Polivy), used for diffuse large B-cell lymphoma; Entrectinib (Rozlytrek), a selective tyrosine kinase inhibitor for ROS1-positive NSCLC and NTRK fusion-positive solid tumours; and Atezolizumab (Tecentriq), which treats various cancers, including urothelial carcinoma and non-small cell lung cancer.

Johnson & Johnson's four drugs are also on the list. These include Darzalex (daratumumab), an anti-cancer monoclonal antibody for multiple myeloma; and Teclistamab (Tecvayli), a bispecific monoclonal antibody used for relapsed and refractory multiple myeloma. Another drug, Amivantamab (Rybrevant), is a bispecific monoclonal antibody used to treat NSCLC.

Merck benefits from the inclusion of Tepotinib (Tepmetko), a drug for NSCLC, and Avelumab (Bavencio), a monoclonal antibody used for Merkel cell carcinoma, urothelial carcinoma, and renal cell carcinoma.

It is important to note that the majority of these drugs are monoclonal antibodies and are some of the best-selling treatments globally. These drugs are largely imported into India, and their costs range from Rs 50,000 to Rs 1.5 lakh per vial, making them either inaccessible or a significant financial burden for many patients. As of 17th March 2025, none of the companies have announced the revised pricing, so it's unclear by what percentage it will benefit the patients.

Affordability vs Profitability

While experts have welcomed the move to enhance accessibility to cancer drugs for patients, they hold mixed opinions on whether it will effectively achieve its intended goals.

"The recent tax cuts on cancer drugs in India are a significant step toward making life-saving treatments more affordable for patients, especially given the high cost of cancer care. By reducing

the tax burden, the overall price of these drugs will likely come down, improving accessibility for a larger segment of the population, particularly middle- and lower-income groups who often struggle with high out-of-pocket healthcare expenses. The Indian Pharmaceutical Alliance welcomes this forward-thinking approach that supports both patients and the broader healthcare ecosystem, ensuring that critical treatments are more accessible and equitable," said Sudarshan Jain, Secretary General of the Indian Pharmaceutical Alliance (IPA), an association of 23 leading research-based pharmaceutical companies in India.

Customs cuts will lead to a decrease in the cost of many of the drugs mentioned, which is a welcome step, agrees, Dr Kumar Prabhash, Professor, Medical Oncology, Tata Memorial Hospital, Mumbai, India's Premier Cancer Treatment, Education and Research Centre.

Dr Prabhash stated, "While this will increase the affordability of these medicines, pharmaceutical companies may not see a decrease in profitability, as these taxes were ultimately passed on to the patients. There are also limitations to the impact of this effort on affordability. The cost of these medicines runs into lakhs of rupees, so further research is needed to develop local treatments that can substantially reduce the cost."

Dr Ranjana Sarma, Business Program Manager, Bharath Advanced Therapeutics holds a differing opinion and believes that this move might negatively impact the availability of these drugs, potentially leading to unintended consequences.

Bharath Advanced Therapeutics is at the forefront of developing innovative and affordable cancer therapies, focusing on addressing aggressive cancers like AML and CML.

She said, "In my opinion, the current tax cuts on cancer drugs will not improve affordability of treatments, as the availability of the drugs might get impacted. The tax cuts will also cut down on the revenue of the manufacturers and this would lead to a shortage of doses. The tax cuts might actually adversely impact the availability of the drugs, mitigating any advantage the affordability might have offered."

From a pharmaceutical industry perspective, the impact on profitability will depend on several factors.

"While reduced taxes may lower margins in the short term, the increased affordability could lead to higher demand, potentially compensating for any initial revenue loss," observed Jain.

It is worth noting that the majority of these

Most prevalent cancer India

S. No	Men	Women
1	LIP, ORAL CAVITY	BREAST
2	LUNG	CERVIX
3	STOMACH	COLORECTUM
4	COLORECTUM	OVARY
5	PHARYNX	LIP, ORAL CAVITY

Source: ICMR

Cancer Research India

1. India's First Indigenous CAR-T Cell Therapy

In April 2024, India achieved a historic milestone in cancer care with the launch of NexCAR19, the nation's first indigenously developed CAR-T cell therapy, created through a groundbreaking collaboration between IIT Bombay, Tata Memorial Centre, and ImmunoACT. This cutting-edge innovation offers a highly effective, next-generation treatment for blood cancers, bringing hope to thousands of patients. Designed to be affordable and accessible, NexCAR19 marks a critical step towards self-reliance in oncology care, reducing dependence on expensive imported therapies and strengthening India's position in advanced cancer treatment and biotechnology research.

2. Quad Cancer Moonshot Initiative

In September 2024, India, in partnership with the US, Australia, and Japan, launched the Quad Cancer Moonshot to eliminate cervical cancer across the Indo-Pacific region. This initiative aims to scale up screening and vaccination programs, advance cutting-edge research, and strengthen global collaboration to ensure early detection, effective treatment, and improved survival rates.

3. Expansion of ACTREC

In January 2025, the Advanced Centre for Treatment, Research, and Education in Cancer (ACTREC), a key arm of Tata Memorial Centre (TMC), embarked on a major expansion to revolutionize cancer research, treatment, and patient care. This initiative aims to accelerate clinical breakthroughs, enhance oncology care, and establish cutting-edge therapeutic facilities, reinforcing India's leadership in advanced cancer treatment and innovation.

List of medicines exempted from custom duty

No	Company	Disease
1	Onasemnogene abeparvovec	Spinal muscular atrophy (SMA
2	Mepolizumab	Asthma
3	Pegylated Liposomal Irinotecan	Cancer
4	Daratumumab	Cancer
5	Daratumumab subcutaneous	Cancer
6	Teclistamab	Cancer
7	Amivantamab	Cancer
8	Alectinib	Cancer
9	Risdiplam	SMA
10	Obinutuzumab	Cancer
11	Polatuzumab vedotin	Cancer
12	Entrectinib	Cancer
13	Atezolizumab	Cancer
14	Spesolimab	Psoriasis
15	Velaglucerase Alpha	Gaucher disease
16	Agalsidase Alfa	Fabry disease
17	Rurioctocog Alpha Pegol	Haemophilia A
18	Idursulphatase	Hunter syndrome
19	Alglucosidase Alfa	Pompe disease
20	Laronidase	Hurler and Hurler-Schele syndrome
21	Olipudase Alfa	Acid Sphingomyelinase Deficiency (ASMD)
22	Tepotinib	Cancer
23	Avelumab	Cancer
24	Emicizumab	Haemophilia A
25	Belumosudil	Chronic graft versus host disease
26	Miglustat	Gaucher disease type 1
27	Velmanase Alfa	Alpha-mannosidosis
28	Alirocumab	Cholestrol
29	Evolocumab	Hyperlipidemia
30	Cystamine Bitartrate	Nephropathic cystinosis
31	CI-Inhibitor injection	Hereditary angioedema
32	Inclisiran	Cholesterol
33	Agalsidase Beta	Fabry disease
34	Imiglucerase	Gaucher disease.
35	Eptacog alfa activated recombinant coagulation factor VIIa	Hemophilia
36	Asciminib	Cancer

drugs are bestsellers for their respective companies, with revenues running into billions. Despite India's large population, these treatments remain out of reach for many patients. Most of these drugs are protected by patents, and several Indian companies are waiting for patent expirations before launching biosimilars. In fact, many Indian firms are already in the process of developing biosimilars for these drugs.

It must be pointed out that most of the drugs exempted from customs duties are targeted therapies. While these therapies offer distinct benefits and cater to personalised care, they do not address the needs of the majority of cancer patients who rely on more commonly used, affordable treatments.

Chemotherapy starts from Rs 12,000 for a day care old generation drugs such as paclitaxel combinations and it can cost a patient up to Rs 40,000 according to Cancer Rounds. Thus it is essential to exempt these as well from the tax.

Impact on local players

There is potential for increased competition in the cancer drug market; however, this will likely be limited in the short term. Most of the drugs on the list are patented and exclusively manufactured by multinational corporations (MNCs), which prevents generic competition. As a result, the impact on the local market may be limited.

Some of these drugs are approaching patent expiry, and several Indian firms are actively developing biosimilars. For instance, Darzalex generated net sales of $11.67 billion in 2024, making it one of the best-selling anti-cancer drugs. The composition of matter patents for daratumumab in the U.S., Europe, and Japan are set to expire in March 2026. As a result, several companies are working on biosimilars for Darzalex. One such biosimilar, HLX 15, is being developed by Shanghai Henlius Biotech and licensed to Dr. Reddy's Laboratories.

With patent expirations approaching, many original manufacturers are seeking partnerships with biosimilar companies to preserve their market share and adapt to the changing market dynamics.

"Reducing cancer drug prices could influence the competitive landscape between domestic and international pharmaceutical manufacturers. Indian companies, known for their affordable generics, may see increased demand if lower prices make locally produced alternatives more accessible to hospitals and patients. At the same time, global pharmaceutical firms, particularly those specialising in patented drugs, might explore

List of cancer medication exempted from custom duty

S.No	Drug	Tyoe of Cancer	Company	Imported by
1	Asciminib	Philadelphia chromosome-positive chronic myeloid leukemia	Novartis	Novartis India
2	Pegylated Liposomal Irinotecan	pancreatic cancer.	Ipsen Biopharma	Servier India
3	Daratumumab	Multiple Myeloma	Johnson & Johnson	Johnson & Johnson
4	Daratumumab subcutaneous	Multiple Myeloma	Johnson & Johnson	Johnson & Johnson
5	Teclistamab	Mulitple Myeloma	Johnson & Johnson	Johnson & Johnson
6	Amivantamab	Non-small cell lung cancer (NSCLC)	Johnson & Johnson	Johnson & Johnson
7	Alectinib	NSCLC	Roche	Roche India
8	Obinutuzumab	Chronic lymphocytic leukemia	Roche	Roche India
9	Polatuzumab vedotin	B-cell lymphoma	Roche	Roche India
10	Entrectinib	NSCLC	Roche	Roche India
11	Atezolizumab	Urothelial carcinoma, non-small cell lung cancer, small cell lung cancer, breast cancer	Roche	Roche India
12	Tepotinib	NSCLC	Merck	Merck Specialities PVt Ltd Inida
13	Avelumab	Merkel cell carcinoma, urothelial carcinoma, and renal cell carcinoma.	Merck	Merck Specialities PVt Ltd Inida

strategic pricing adjustments or collaborations with Indian manufacturers to maintain their presence in the market. Overall, this move will benefit patients the most while shaping the dynamics of the pharmaceutical industry in India," said Jain.

"I see the price reduction as more of a competition among the investors, wanting to invest in profitable pharma ventures, than the drug manufacturers," says Dr Ranjana Sarma.

"Since two of the drugs are already manufactured in India, they already have the supply chain sorted, However, if the revenues drop, the generic manufacturers might have an advantage of pricing, In my opinion, this divide can be easily bridged if the manufacturing is supported under the BioE3 scheme with special allowances," she added.

Inacccessibility to cancer drugs remains a global crisis. While tax cuts are a welcome step, making cancer drugs affordable requires a multifaceted approach that includes increased R&D investment, local manufacturing, and more effective cost containment strategies.

Studies confirm the ineffectiveness of price control measures under the current market-based pricing policy and highlight the inadequacy of existing risk protection measures in India. This calls for the adoption of comprehensive cost containment strategies, such as expanding health insurance coverage to include all forms, types, and stages of cancer treatments, as well as establishing uniform treatment protocols across both private and public sectors, suggested a paper in Sage Journal.

The financial strain caused by cancer treatment on patients and their families remains high. Nevertheless, strategies such as expanding cancer services under public health insurance programmes, implementing prepayment models for outpatient diagnostic and staging services, and enhancing public hospital capacities have the potential to substantially alleviate this burden, as highlighted in a study published in Frontiers in Public Health. These measures are crucial for reducing the economic challenges faced by cancer patients and achieving universal access to cancer care. BS

Ayesha Siddiqui

Industry Leaders Drive CRDMO Reform, Unite Under IPSO for a Transformational Leap

Due to lack of a clear and unified industry definition and slowing progress, the CRDMO industry leaders joined hands and formed Innovative Pharmaceutical Services Organization (IPSO) at the recently concluded BioAsia-2025 to create a strategic blueprint—a roadmap to define the CRDMO sector and position India as a global leader in biopharma outsourcing.

India's Contract Research, Development, and Manufacturing Organization (CRDMO) sector is at a turning point. With immense potential for growth, it is emerging as a hub of innovation and opportunity. However, one major challenge persists—a lack of a clear and unified industry definition. This ambiguity is slowing progress, prompting industry leaders to push for decisive action. Recognising this need, experts are advocating for a dedicated industry panel to address key challenges and shape policies that will drive the sector forward. During a recent panel discussion, leaders emphasised the urgency of creating a strategic blueprint—a roadmap to define the CRDMO sector and position India as a global leader in biopharma outsourcing. Seizing the moment at BioAsia-2025, industry leaders announced the formation of the Innovative Pharmaceutical Services Organization (IPSO)—a dedicated industry body uniting 11 leading CRDMO companies. This strategic alliance is set to accelerate India's dominance in biopharma innovation, ensuring a stronger, more structured future for the sector.

Role of IPSO

With expertise spanning drug discovery, development, bio-manufacturing, and process innovation, IPSO aims to foster industry collaboration, strengthen policy advocacy, and enhance India's regulatory and supply chain infrastructure. Industry leaders emphasize that India's CRDMO sector, currently valued at $3-3.5 billion, has the potential to scale up to $22-25 billion by 2035, driven by the global shift in pharma outsourcing, rising demand for biologics, and India's established strengths in chemistry and process innovation. However, industry leaders felt that achieving this ambitious growth requires overcoming key challenges, including streamlining regulatory pathways, improving access to capital, developing a specialised talent pool, and strengthening supply chain resilience. In view of all these challenges, IPSO is set to play a pivotal role in addressing the gaps, ensuring India emerges as a preferred global destination for pharmaceutical R&D and advanced manufacturing.

Collective action

Industry experts revealed that IPSO will serve as a platform for advocacy, policy engagement, and industry collaboration, driving the next wave of biotech and pharmaceutical growth. "The Indian CRDMO sector is positioned for major transformation, with the potential to become a leader in serving the global biopharma and wider life sciences outsourcing market models. Realising this opportunity will require change and collaboration among all stakeholders in the Indian CRDMO ecosystem," stated ***Peter Bains, CEO Designate, Syngene International Ltd.***

Manni Kantipudi, CEO and Whole Time Director, Aragen Life Sciences Ltd., echoed this sentiment, emphasising the need to scale capabilities in new modalities and build a resilient supply chain.

The Boston Consulting Group (BCG)'s Managing Director & Partner in the Healthcare practice, Vikash Agarwalla emphasised the importance of collective action from both industry and policymakers, stating that unlocking the sector's full potential will require a combined effort.

Smruthi Suryaprakash, a partner from BCG, added

that Indian CRDMOs must aggressively expand capabilities in high-growth areas like biologics and gene therapies, while addressing regulatory bottlenecks and scaling talent development.

Stress on Policy

Many industry leaders, including Peter Bains (Syngene), Manni Kantipudi (Aragen), Krishna Kanumuri (Sai Lifesciences), Nandini Piramal (Piramal Pharma), and Ramesh Subramaniam (PI Health Sciences), Guilano Perfetti (Jubilant Biosys), and Akhil Ravi (Aurigene Pharmaceutical Services) among others who were part of a panel discussion stressed on a unified industry definition, strategic workforce development, and a policy-driven roadmap to unlock the full potential of India's CRDMO sector.

As IPSO takes charge, the industry is now positioned to drive breakthrough innovations in emerging modalities like ADCs, RNA therapeutics, and cell & gene therapies, paving the way for India's rise as a global life sciences powerhouse.

India's CRDMO Sector Poised to grow at $25 Billion by 2035

During a panel discussion industry experts revealed that India is witnessing a transformative era for the CRDMO sector, with projections indicating a potential surge to $22-25 billion by 2035.

Revealing details from a recent report, "Unleashing the Tiger: Indian CRDMO Sector 2025," published by BCG noted that India is strategically positioned to become a global leader in pharmaceutical innovation. This report reveals that India's established prowess in small molecule capabilities coupled with its sustainable cost advantages and burgeoning expertise in biologics, is attracting significant attention from global pharmaceutical giants seeking to diversify and secure their supply chains. The report also revealed that India's CRDMO market is experiencing a remarkable 15 per cent compound annual growth rate (CAGR), significantly outpacing global industry averages. This robust growth is fueled by several key factors. Notably, India maintains a significant cost advantage over Western nations, which enables faster project startup times and reduced overall development expenses. Furthermore, it also highlighted that the global supply chain realignments, driven by geopolitical uncertainties and the desire for resilience, are unlocking a substantial $10 billion opportunity for Indian CRDMOs.

Adding to this, the Western pharmaceutical companies which are actively seeking alternative destinations and hubs to mitigate risks and ensure uninterrupted supply, India is rightly positioned to capitalise on their requirements.

Moreover, the rapid growth of new modalities, such as Antibody Drug Conjugates (ADCs), DNA & RNA therapeutics, and cell and gene therapies, presents a significant opportunity for India to leapfrog in innovation, as these advanced modalities are witnessing annual growth rates of 25-35 per cent, demanding specialised CRDMO services that India is increasingly equipped to provide. The Indian government's commitment to fostering a self-sufficient, innovation-driven ecosystem is evident in substantial funding initiatives, with over Rs 25,000 crore allocated to support biotech and pharmaceutical innovation. While India currently holds a 2-3 per cent share of the $140-145 billion global CRDMO market, its potential for growth is immense, as the confluence of favourable factors positions India to become a dominant player. Global pricing pressures and policies like the US Inflation Reduction Act are accelerating off-shoring, further driving demand for cost-effective CRDMO services. Additionally, growing investments in research and development, coupled with infrastructure enhancements, are strengthening India's innovation capabilities.

Talent Gap and Fostering Scientific Curiosity

Industry leaders voiced concerns over talent acquisition in the CRDMO sector, despite India's abundant knowledge pool. The industry requires 12,000–15,000 additional chemists in the next five years, highlighting an urgent talent gap. "Quality is as crucial as quantity. Though India produces 50,000 chemistry postgraduates annually, they need proper training," said ***Dr Ramesh Subramaniam, Global CEO of PI Health Sciences Ltd, United States.***

Akhil Ravi, CEO of Aurigene Pharmaceutical Services (a fully owned subsidiary of Dr. Reddy's Laboratories) emphasised immediate strategic intervention. He advocated industry-government collaboration to establish finishing schools for industry-specific training. Some firms have also launched in-house training universities to ensure a skilled workforce.

Krishna Kanumuri, MD & CEO of Sai Lifesciences India, stressed the need to revive scientific curiosity, hindered by an execution-focused industry. Encouraging innovation, techniques like flow

chemistry, and promoting research careers from the 12th grade were seen as crucial long-term solutions, including attracting Indian scholars back from abroad.

Strengthening International Partnerships

Giuliano Perfetti, CEO & MD, Jubilant Biosys Ltd, Italy emphasised the importance of international collaboration, particularly with Europe. "European companies are actively seeking alternatives to China, presenting an opportunity for deeper engagement with India's CRDMO sector." However, he stressed the need for India to "ensure compliance with global quality and Health, Safety, and Environment (HSE) standards." Regulatory alignment between India and Europe was deemed essential for fostering long-term investment and collaboration.

Capital Deployment

India's CRDMO sector faces a significant capital deployment gap compared to China. Dr Ramesh Subramaniam emphasised the urgent need for increased investment, highlighting that a single CRDMO in China deploys more capital annually than most of the Indian industry combined. To unlock its full potential, India's capital deployment must increase 4-5 times over the next decade. For the industry to scale in line with market opportunities, it must grow 5-10 times its current size. Given the capital-intensive nature and long life cycles of pharmaceutical development, investors must adjust their return expectations. However, India's high cost of capital remains a challenge, necessitating financial innovations to improve capital efficiency. Beyond capital, the sector faces multiple hurdles that must be addressed for sustainable growth. By 2035, India requires a 6-7 times expansion of its talent pool, necessitating industry-ready curricula and upskilling initiatives. Streamlining regulatory approvals and establishing a CRDMO-focused framework are crucial to accelerating drug development and attracting investments. Strengthening the supplier ecosystem by incentivizing local manufacturers and setting up Innovation Parks can reduce import reliance. Industry experts suggest that designating CRDMO as a "sunrise sector" would improve capital access and attract private investment. Coupled with strategic investments, policy interventions, and global partnerships, India can emerge as a global CRDMO hub, driving economic growth, job creation, and pharmaceutical leadership.

Raw Material Divide

Another critical challenge lies in raw material sourcing. Akhil Ravi pointed out, "Due to regulatory challenges and historical limitations, India lacks certain critical raw materials." Overcoming this requires developing safe and efficient processes for hazardous chemistry and leveraging the country's robust oil and gas sector. "Government support in the form of grants and incentives, similar to China's biotech funding, could accelerate progress," he suggests. This call for strategic government intervention highlights the need for a collaborative approach to enhance domestic manufacturing. Underscoring the proactive stance of industry leaders in tackling critical issues, he said, "We've recognised the challenges faced by the CRDMO sector and have come together independently to address them by taking it to the government and the policy makers."

Road Ahead

Industry leaders highlighted that academia plays a crucial role in addressing the talent shortage in India's CRDMO sector, with nearly 70 per cent of professionals holding PhDs. However, private universities remain underutilised. Dr Subramaniam highlights the need for stronger industry-academia collaboration to integrate graduates into the workforce. Salary expectations remain a challenge, requiring competitive entry-level packages and hands-on training initiatives to attract top talent. It was also stressed that government policies also play a key role in accelerating growth. Peter Bains stresses the need for regulatory reforms to reduce bureaucratic hurdles and improve business efficiency. Establishing a CRDMO park, similar to SEZs (Special Economic Zones), could streamline approvals and facilitate global trade. Attracting international talent and re-shoring critical technologies remain key concerns.

Industry leaders also discussed investment trends and supply chain diversification. ***Nandini Piramal, Chairperson of Piramal Pharma Ltd,*** noted the uncertainty surrounding the Biosecure Act, while Krishna Kanumuri highlighted differing investor expectations. Peter Bains revealed that Rs 2,000 crore has been invested in the sector over three years, emphasising the need for continued funding to attract global customers.

Despite geopolitical challenges, India's emerging supply chains present a sustainable opportunity. Overall, the experts agree that industry collaboration, policy reforms, and talent development are critical to positioning India as a global CRDMO hub. BS

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How Indian Pharma Prepared to Mitigate US Tariffs...!

India, known as the pharmacy of the world, has an upper hand when it comes to facing the US tariff war. Indian pharmaceutical companies supply nearly 47 per cent of the generic medicines for the American patients and contribute significantly to the country's healthcare savings. Imposing a 25 per cent or more tariff on Indian pharma companies can be detrimental for the US administration. More so, a reciprocal tariff by the Indian government can add to the woes of the US. However, Indian companies should take a note of the tariff and take proactive steps to be safe from high tariffs.

The much fanfare and sober meeting between the Indian Prime Minister Narendra Modi and the US President Donald Trump had one critical discussion about the US imposing reciprocal tariffs on certain products. Though the meeting generated high hopes among Indian industrialists, it was short-lived with the Trump administration likely to announce reciprocal tariffs on April 2, 2025.

The US administration's tariff on China, Mexico and Canada is a wake up call for India too. And some countries have reciprocated on the US tariff too.

India's pharma sector may not be an exception to the tariff war that just started. A hush hush atmosphere about what will entail the future of the pharma sector is currently prevailing.

Sudarshan Jain, Secretary General, Indian Pharmaceutical Alliance (IPA), "The Indian pharmaceutical industry plays a vital role in ensuring access to affordable, quality-assured medicines in the US, supplying nearly 47 per cent of the generic medicines for the American patients and contributing significantly to the country's healthcare savings. The proposal regarding reciprocal tariffs is currently under talks and is being examined. This matter will be discussed through bilateral engagements between the two countries, and further steps will be determined accordingly. India and the US share a long-standing, collaborative partnership in healthcare. We are confident that continued dialogue among stakeholders will help address the subject. Ensuring the continued availability of affordable medicines remains a shared priority for both nations."

Delegates at the recently held 10th Global Pharma Quality Summit by Indian Pharmaceutical Alliance seemed to shrug off the fear of tariff imposition by the US, however, a sense of insecurity prevailed. Even so, the McKinsey-IPA report mentioned that the Indian pharma sector over the next decade could redefine operational strategies to tap the potential opportunities unlocking the next level of performance as a global leader. This amidst the tension that prevailed on what percentage of tariff will be imposed on Indian pharma companies and what will be in store for future.

Umang Vohra, MD and Global CEO, Cipla while speaking at the IPA event mentioned, "If you have a very big brand medicine that sells at a very high price, a large section of our society cannot afford it. So the tariff is not limiting the amount that the product can sell. The US actually needs much lower tariffs from Indian companies because the generics industry is the only industry that probably reduces the healthcare spend. Both countries have very different perspectives. I'm not sure firstly that a 20, 25, 30 type of tariff will come on pharmaceutical products. I'm not sure tariffs should dictate what we should be doing as players because you know there is a risk that four years later those tariffs may go away. So by the time you build a plant, right, tariffs have gone away. Now you have a plant sitting there. So I just think we should take a more holistic view and maybe just let, just see how this plays out."

The export-import story

India largely exports an approx. 47 per cent of the generic drugs to the US. This helps to bring the cost of drugs down for the US consumers. The US largely exports patented and innovative drugs to India that values around $800 million. These are already being imported at nil or concessional import duties.

The Trump Administration has announced

a potential imposition of 25 per cent tariffs on pharmaceutical imports from India. Presently, there is no import duty levied on Indian drugs supplied to the US. India imposes about 5-10 per cent import duty on pharma imports from the US.

In the recent Union Budget, the government fully exempted 36 life-saving drugs from basic customs duty. In addition, customs duty for six additional drugs has been reduced to 5 per cent. Further, 37 additional drugs will be fully exempt from customs duty under patient assistance programmes.

If higher tariffs!

The US is a major market for Indian generics. Higher tariffs could make Indian drugs less competitive in the US. The Indian pharma sector is already a strong player in emerging markets due to the affordability and quality of generics.

Girdhar Balwani, Director, Cadila Pharmaceuticals and Hypothalamus, cited two scenarios. One is where India moves to nil import duty on pharmaceuticals – positive / minimal / no impact on India. In the case of the second scenario, if the US imposes 10 to 25 per cent import duty on pharmaceuticals from India – it may have a minimal impact on Indian companies and will increase the burden on the US healthcare system.

Balwani mentioned, "If India was to move towards no import duty on US pharma imports the impact of lower customs duties would be to the tune of less than $50 million. If India decides to maintain its current custom duty structure, it will be status quo. I feel that it would be in India's interest to move to nil import duty on imports of pharmaceuticals."

Innovation holds the key for Indian players

Companies like Cipla, Dr. Reddy's Laboratories, Sun Pharma, and others have already expanded globally. These companies might further pursue strategic acquisitions or set up more global operations to compensate for potential revenue losses in the US.

It may be noted that Asian countries are much more advanced in innovation. Indian companies to mitigate the effects of US tariffs, need to invest more in innovation - to diversify their product offerings, find new niches and of course novel drug discovery. Pharma companies should also put a greater emphasis on producing innovative generics, biosimilars, and even branded drugs, catering to markets beyond the US. Besides, Indian companies need to implement novel technologies and digital technologies both in production, QC and distribution of products.

Dr Ranjan Chakrabarti, Advisor-Drug Discovery and Biopharma, Ex VP-Drug Discovery, Dr. Reddy's Laboratories and US Pharmacopeia mentioned, "Indian pharmaceutical companies would likely increase their focus on diversifying their markets. Countries and regions such as the European Union, Southeast Asia, Africa, and Latin America could emerge as key markets for Indian drug exports. An intensified focus on these markets could provide growth opportunities, especially in countries where the healthcare infrastructure is expanding rapidly and there is a rising demand for cost-effective medicines. In the face of high US tariffs, pharmaceutical companies could direct more resources toward strengthening their presence in the domestic market. This would involve increasing production for local consumption, as well as expanding the availability of affordable generic medicines.

Sharing his views ***Hari Kiran Chereddi, MD and CEO, HRV Global LifeSciences and NHG Pharma*** said, "Indian pharma must not regard tariffs as a

stumbling block but as an impetus towards strategic reinvention. These tariff measures could be short lived and both sides will definitely find an amicable solution to keep healthcare affordable. By ascending the value chain, pursuing international partnerships, fortifying regulatory lobbying, and exploiting digital supply chain technologies, we can overcome the tariffs and have Indian pharma be a continued global powerhouse of affordable healthcare."

Careful considerations

The proposed US tariffs are likely to pose considerable challenges to the Indian pharmaceutical sector. The adaptability and inherent competitiveness of the industry is bound to help mitigate some of the potential negative effects. It is imperative to recognise that Indian companies supply nearly half of all generic prescriptions in the US contributing significantly to healthcare savings. These proposed tariffs could have unintended consequences on affordability and availability of drugs in the US, needing careful considerations and dialogue between both countries.

The imposition of tariffs could lead to increased drug prices, which would directly affect American consumers, particularly those who rely on low-cost medications for chronic conditions. This could also lead to potential drug shortages if Indian manufacturers decide to reduce their exports due to the increased costs.

According to ***Aarti Siddhesh Chitale, Senior Industry Analyst, Healthcare & Life Sciences Growth Analytics Practice, Frost & Sullivan,*** the imposition of tariffs on Indian pharmaceutical imports by the Trump administration is a complex issue with significant economic, political, and strategic implications. While it aims to boost domestic manufacturing in the US, it could lead to higher drug prices and potential shortages, affecting both Indian pharma companies and American consumers. Therefore, the situation underscores the interconnected nature of global trade and the need for careful consideration of the broader impacts of protectionist policies.

To succumb to tariff or not

Considering the heavy reliance of the US on generics, the country has been increasingly outsourcing generic manufacturing to nations including India and China. As geopolitical tensions with China prevail, it is imperative for the US to rely on India for its majority generics supply.

Therefore, in case of growing tariffs from the US, there is a possibility of India imposing reciprocal tariffs, which will directly impact the cost of these generics in the US and would impact the overall increased burden on the patients. Therefore, although the tariffs will have an impact on the Indian pharma sector the overall impact may not be too pronounced considering US' dependence on Indian pharma suppliers.

Ravi Uday Bhaskar, Former Pharmexcil Director General (DG), currently serving as Honorary DG for All India Drugs Control Officers' Confederation (AIDCOC) being critical about the tariff saga insisted that India must not succumb to tariff threats and should instead focus on strengthening domestic API production, securing global market share, and maintaining its leadership in affordable medicine exports. Indian medicines exports to the US may not suffer even after imposition of reciprocal tariffs. Given that 90 per cent of doctor prescriptions in the US include generics, any additional tariff burden could impact American patients more than Indian exporters.

Ajay Srivastava, Founder, Global Trade Research Initiative, mentioned, "The US has limited alternative sources for high-quality generics. India's pharmaceutical companies operate US Food and Drug Administration (US FDA)-approved facilities, ensuring the highest safety and efficacy standards. Given this, the US will continue to rely on India for a significant share of its generic medicine supply, and any tariff increase would primarily burden American healthcare consumers rather than disrupt India's pharmaceutical exports."

Amidst this tariff debate, Sun Pharma announced that the company has acquired Nasdaq-listed immunotherapy and targeted US-based oncology company Checkpoint Therapeutics for $355 million. This agreement points to one thing that big pharma companies are busy conducting their business and must have better strategies in place in case of any harsh announcements.

Both the US and India need to relook into how to avoid reciprocal tariffs for a better understanding about the future of both the nations. Not only India, but too much tariff on China will derail negotiations on active pharmaceutical ingredients, with China being the largest producer. Currently discussions are going on between both the US and India to overcome the tariff crises. BS

Sanjiv Das

“CSIR's strategic priorities will focus on indigenisation, healthcare innovation, and bio-based economic growth”

Dr N Kalaiselvi,
Director General, Council of Scientific & Industrial Research (CSIR); and Secretary, Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India

National Science Day is celebrated every year on February 28 to spread the message of the importance of science and its application in the country. Over the years, the Council of Scientific and Industrial Research (CSIR) has been playing a critical role by actively pursuing international collaborations to strengthen India's science and technology (S&T) capabilities and support developing nations through capacity building and technology partnerships. In an exclusive conversation with BioSpectrum, Dr N Kalaiselvi, Director General, CSIR; and Secretary, Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Government of India elaborates upon the future of scientific growth in India. ***Edited excerpts:***

What are your priorities for CSIR in 2025, particularly in the realms of life sciences research? Are you considering partnerships with other countries to promote research?

In 2025, CSIR's strategic priorities will focus on indigenisation, healthcare innovation, sustainable energy, waste-to-wealth solutions, and bio-based economic growth. Efforts in healthcare include developing an indigenous paracetamol process line and commercialising a sickle cell anaemia diagnostic kit. In energy, CSIR is advancing hydrogen storage technologies and carbon fibre composites. Waste-to wealth innovations will see wider implementation of eco-friendly construction, road laying and road repair materials, biodegradable plastics, and kitchen-to-kitchen biogas systems. Additionally, CSIR is promoting aroma, floriculture, seaweed, and essential oil-based industries to enhance sustainability and rural livelihoods. CSIR has bilateral agreements with leading institutions in France (CNRS, Institut Pasteur), Germany (DAAD, Fraunhofer), Norway (SINTEF), USA (NIH, Mayo Clinic, St. Jude Hospital), Russia (Skoltech, Russian Academy of Science), Israel (DDR&D), and others. Multilaterally, CSIR engages in Horizon Europe's MSCA SE programme and is expanding ties with Norway, Russia, and BRICS nations. CSIR also supports research in developing countries through doctoral and postdoctoral fellowships with The World Academy of Sciences (TWAS) (30 slots annually) and technology partnerships with Ethiopia, Nepal, Bhutan, Guyana, and the Dominican Republic.

Union Budget 2025 has significantly increased funding for science and research. How is CSIR leveraging this opportunity?

The increased funding in Union Budget 2025 is an opportunity for CSIR to strengthen mission-driven research in critical areas such as biopharmaceuticals, green hydrogen, bio-based materials, and next-gen therapeutics. A major portion is being allocated to technology translation, ensuring that innovations move from labs to industry faster.

Would you like to highlight major research projects that are taking place within CSIR institutes that would lead to novel/innovative product developments in the coming times?

Some of our most promising projects include CSIR-Healthcare theme's RNA Therapeutics Platform, advancing RNA-based vaccines and personalised medicines; AI-driven Drug Discovery Programme, which is accelerating drug repurposing for neglected diseases; GM Cotton Initiative, a breakthrough in insect-resistant and climate-resilient cotton crops; Indigenous CAR-T Cell Therapy, aimed at making next gen cancer treatments affordable in India; and Herbal Biopharmaceuticals, developing plant-derived therapeutics for neurodegenerative diseases.

What are the key challenges facing life sciences research and innovation in India?

Life sciences research and innovation in India face several critical challenges, which need systematic and sustained efforts to overcome. One of the primary challenges is funding. Life sciences research is

capital-intensive, requiring significant investment in infrastructure, laboratory equipment, and long-term studies. Compared to fields like engineering or physical sciences, life sciences demand larger financial outlays for experimental research, clinical trials, and regulatory approvals. Enhancing public and private sector funding for biotechnology, drug discovery, and health sciences is crucial to fostering breakthrough innovations.

Another major challenge is the shortage of skilled professionals in emerging areas like synthetic biology, genomics, and bioinformatics. Despite India's strong talent pool in STEM, there is a gap in high-end expertise required for cutting-edge life sciences research. Strengthening graduate and doctoral training programmes, expanding interdisciplinary collaboration, and increasing industry-academia partnerships can help bridge this gap.

Additionally, the "Valley of Death" remains a persistent issue in life sciences, more so than in other fields. The transition from basic research to commercialisation is hindered by high R&D costs, long development timelines, regulatory complexities, risk of failure, and scalability challenges. Many promising innovations fail to secure investment beyond the proof-of-concept stage, limiting their journey to real-world applications. To address this, strengthening translational research support, expanding biotech incubators, & streamlining regulatory frameworks is essential. While it is difficult to resolve all these challenges immediately, the Government of India is actively working towards solutions. The recently introduced BIOE3 policy is a significant step in this direction.

How is CSIR supporting the growth of life sciences-based startups in India, especially in the unreached areas of the country?

CSIR plays a pivotal role in nurturing life sciences-based startups across India. Through its specialised incubation centres and innovation hubs, CSIR is facilitating cutting-edge biotech and life sciences entrepreneurship. The Atal Incubation Centre at CSIR-CCMB (AIC-CCMB) in Hyderabad, established under the Atal Innovation Mission (AIM), is one of India's premier life sciences incubators. It provides state-of-the-art laboratory facilities, mentorship, and funding support to biotech startups working in genomics, molecular diagnostics, regenerative medicine, and agriculture biotechnology. AIC-CCMB has incubated over 50 startups that are developing innovative solutions in healthcare, agriculture, and biotechnology, fostering a collaborative ecosystem that links startups with researchers, investors, and industry leaders.

Similarly, CSIR-IIIM Startup Centre in Jammu is promoting life sciences entrepreneurship in northern India, particularly in the field of medicinal plant research, phytopharmaceuticals, and Ayurvedic formulations. This initiative is instrumental in advancing drug discovery and biotechnology innovations suited to the regional ecosystem, thereby creating scientific entrepreneurship opportunities and driving economic growth in Jammu and Kashmir.

In addition, the recently established CSIR-Innovation Complex in Mumbai serves as a multidisciplinary innovation hub, providing high-end scientific infrastructure, including molecular biology labs, cell culture facilities, and advanced analytical tools. It supports biotech and healthcare startups through technology transfer, commercialisation assistance, and collaborations with hospitals and pharmaceutical industries, accelerating product development and regulatory approvals. Beyond these dedicated incubation centres, CSIR is actively fostering life sciences startups nationwide by offering technical training, industry-academia linkages, funding facilitation, and regional innovation ecosystems to ensure inclusive scientific entrepreneurship. Through these efforts, CSIR is empowering innovators, generating employment, and strengthening India's bioeconomy, making it a crucial player in India's growing startup ecosystem.

What is your vision for CSIR and its role in India's scientific and technological advancement over the next decade?

CSIR's vision for the next decade includes transforming CSIR into an Innovation Powerhouse, delivering globally competitive technologies, achieving self-reliance in critical sectors including biopharma, clean energy, and sustainable materials, and strengthening international collaborations to ensure India's leadership in emerging scientific domains. CSIR is committed to positioning India as a global leader in scientific innovation.

What advice would you give to young women aspiring for a career in scientific research?

My advice is to be fearless and ambitious as science thrives on curiosity and perseverance. Seek mentorship and collaborate, as building strong networks is essential. Embrace challenges because innovation often emerges from uncertainty, and believe in yourself, knowing your contributions can redefine the future of science. Women bring diverse perspectives and creativity to research, and I strongly encourage them to take leadership roles in STEM. BS

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“We aim to position India as a leader in personalised medicine and drive future innovations”

« **Priya G Hingorani,**
Managing Director,
Miltenyi Biotech India

The landscape of cell and gene therapy (CGT) in India is rapidly evolving, with significant advancements poised to revolutionise patient care. At the heart of this transformation is Miltenyi Biotech India, a pioneering force dedicated to bringing cutting-edge technologies and training to the region. In an interaction with BioSpecturm India, Priya G Hingorani, Managing Director of Miltenyi Biotech India, discussed the company's new state-of-the-art innovation and training centre in Genome Valley, Hyderabad, and explored the future of personalised medicine in India. ***Edited excerpts;***

Congratulations on the launch of the Miltenyi Innovation Technology Centre (MITC)! What inspired the creation of this facility at Genome Valley, Hyderabad?

Thank you. Miltenyi Biotech has been pioneering CGT for over 35 years, starting with a small cell separator and growing into a leader in innovation. Recognising India's potential in advanced medical treatments, we saw the need to educate researchers and partners on specialised equipment and evolving therapies.

This led to the establishment of a state-of-the-art training centre in Hyderabad, where scientists from India and beyond can gain hands-on experience. Our goal is to provide comprehensive training, enabling researchers to advance CGT. By offering access to cutting-edge equipment and expertise, we aim to position India as a leader in personalised medicine and drive future innovations in this field.

What new technologies are you bringing to India? Could you elaborate on some of the key technologies that make your centre a leader in CGT?

Our centre is equipped with the newest and most advanced machines for CGT. One of our key pieces of equipment is the Prodigy. It's the size of a large microwave; and it's a fully automated system that can take cells, process them, and create a new finished product or a new cell. Scientists can programme the machine with specific instructions and ingredients to make therapies like CAR T cells, T cells, or other cells that help patients fight cancer using this advanced technology. Right now, we're focused on cancers that affect the blood, like leukemia and lymphoma, but we're also exploring other possibilities.

We also have other machines that help scientists with specific tasks. For example, the CliniMACS Prodigy is excellent for separating cells, which is a very technical process. Once a scientist isolates a cell, they need to figure out what type of cell it is and how many they have. Our machines help them do this accurately and precisely.

We're also introducing new technologies like Taito and Blaze. Blaze is a revolutionary machine for spatial biology. Imagine being able to see inside a living organism, like a rat or mouse, as if you were walking through it. This machine allows scientists to see exactly how molecules work, which cells are affected, and what treatments might be effective. These machines will be available in India very soon, as we're committed to giving Indian scientists access to the latest global advancements.

You mentioned presenting CAR T-cell therapy at a medical conference. Beyond that, what are the primary research areas you're focusing on in India?

Currently, we haven't launched any CGTs for sale in India or anywhere else in the world. However, we are working on bringing CAR T-cell therapy to market, which we recently presented at a major medical conference. In India, we're working closely with universities and research institutions to help them develop cell therapies that are specifically designed to treat Indian patients.

Our research mainly involves partnering with academic and private organisations that are interested in pushing the boundaries of CGT. We're providing training to researchers and scientists to help them understand and use our technologies effectively. We are focused on providing them with the tools and knowledge to advance their own research and develop new treatments. We are dedicated to supporting the development of innovative therapies that can improve the lives of patients in India and around the world.

How do you foresee the future of CGT in India?

The future of CGT in India looks very promising. This field is expanding rapidly worldwide, and India is catching up quickly. Experts predict the global market for CGT will surpass $100 billion within the next three to four years. In India, which is a relatively new player in this area, the market is expected to reach around $600 to $700 million during the same period. We're seeing a lot of interest from pharmaceutical companies and academic institutions in India, all of whom are starting to explore personalised medicine. Places like Genome Valley in Hyderabad are clear examples of this growing interest. The Indian government, both at the state and central levels, is also actively supporting this growth through new policies. The progress we've seen in the last five years has been remarkable, and we anticipate even greater advancements in the next five years.

The cost of CGT is a concern. How is Miltenyi Biotech working to reduce costs and make it more accessible?

It's important to consider the value that CGTs provide, rather than just focusing on the cost in isolation. These therapies are often used to treat patients with very difficult conditions, like relapsed or refractory cancers, and research is expanding to cover solid tumors and neurological disorders. Our primary goal is to save lives. To make these therapies more accessible, we are exploring partnerships to develop appropriate pricing models. While our costs in India are lower compared to places like the US, Japan, and Europe, it's important to understand that these therapies won't be as inexpensive as generic medications. We are working to find a balance between providing value and ensuring accessibility.

CGT, as a new treatment segment, has regulatory challenges. How do you view these challenges?

The Indian government is being very proactive in creating regulations for CGT. Of course, there are challenges, as everyone is learning together, but we

are seeing strong support from both state and central governments. We are confident that the regulatory framework will become more established and solidified soon.

Boris Stoffel, Global CEO of Miltenyi Biotech, spoke about the "democratisation" of CGT. What does that mean?

Democratisation, in this context means making CGT accessible to more people. Our presence in India is focused on ensuring that these therapies are available to those who need them. We are creating an outreach programme to reach patients where they are, and we are partnering with academic institutions and hospitals to provide access to every deserving patient, regardless of their ability to pay.

What distinguishes Miltenyi Biotech India from other players in the CGT sector? What unique value does it bring to the Indian market?

Miltenyi Biotech India's unique selling proposition (USP) is deeply rooted in the cultivation of local expertise and the fostering of a collaborative ecosystem within the Indian CGT landscape. We recognise a remarkable abundance of skill and an insatiable thirst for knowledge across India's private, public, and academic institutions. This forms the bedrock of our strategy. Essentially, we are positioning ourselves as the premier partner in developing a highly skilled workforce within this specialised field. BS

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“It’s important for healthcare startups in India to recognise the price sensitiveness of the market”

« **Tanmaya Gulati,**
Co-Founder,
RNT Health Insights

Chandigarh-based startup RNT Health, recognised for its groundbreaking innovations, including the recent US FDA Breakthrough Device Designation for an oesophageal cancer detection tool, has launched its Automated Endoscopy Report Generation software to streamline manual reporting workflows in endoscopy suites. In an exclusive interview with BioSpectrum, Tanmaya Gulati, Co-Founder of RNT Health Insights, shares details of the company’s recent and upcoming innovations and a vision for transforming endoscopic procedures in India. ***Edited excerpts;***

Could you share some of 2024’s most impactful milestones for RNT Health Insights and key plans for 2025?

During 2024, RNT Health Insights achieved significant milestones, including receiving the US FDA Breakthrough Device Designation for two of our Medical Devices- one intended for Early Gastric Cancer detection and the other for detecting Early-stage Oesophageal Cancer. Oesophageal cancer is the fourth leading cause of cancer-related deaths in India and the sixth leading cause of cancer-related deaths worldwide, claiming over 540,000 lives annually. Its prognosis is notably poor, with a five-year survival rate of less than 20 per cent. This is primarily due to the associated high miss rate of detection during early stages and attributed to the fact that it is almost always detected at an advanced stage.

Likewise, despite gastrointestinal endoscopic procedures being the gold standard method for the diagnosis of gastric cancer, the current miss rate for the diagnosis of the disease during these procedures stands at 4.6-25.8 per cent, depending upon the endoscopists’ experience and visual observations. Recently, we have also secured the Central Drugs Standard Control Organisation (CDSCO) Test License in India, and were honoured with prestigious non-dilutive grants including the WTFund grant, as well as the Pfizer INDovation NIPER-A edition programme grant, conducted by Pfizer, Social Alpha, Department of Pharmaceuticals, and NITI Aayog and also a Research and Development grant from Emergent Ventures- Mercatus Center at George Mason University, USA. In 2025, we are focused on obtaining the necessary regulatory approvals and then commercialising our breakthrough medical devices in India, aiming to transform gastrointestinal diagnostics across all endoscopy suites nationwide.

How does the technology behind your AI-assisted detection tool improve real-time diagnostic precision?

The technology behind our artificial intelligence (AI)-assisted detection tool integrates advanced spatial and temporal computer vision algorithms. This allows for the meticulous analysis of every single video frame in real time, detecting subtle lesions while also understanding the dynamic relationships of various parameters over time. Our models are designed for optimal latency, processing data and delivering predictions within 25 milliseconds per frame to ensure smooth integration into existing endoscopy workflows. This unique combination of high accuracy and swift processing, along with a robust learning framework trained on a diverse and heterogenous dataset of cancerous as well as non-cancerous lesions, positions our medical devices as an essential tool in enhancing diagnostic accuracy during endoscopic procedures.

Are there any upcoming product launches or partnerships in the pipeline?

Our Automated Endoscopy Report Generation software was launched in February 2025. It is a tool designed to streamline and automate the labour-intensive manual reporting workflows in endoscopy suites. Our Automated Endoscopy Report Generation software, ReportGI, is available to use from March

15 onwards. Additionally, we are preparing for the launch of our esophageal and gastric cancer detection medical devices in India, after obtaining the CDSCO Manufacturing License and other necessary regulatory approvals, in the latter half of the year. This launch will be in collaboration with our pilot research hospital centres. We are also exploring opportunities to expand our product portfolio both horizontally and vertically, developing new algorithms in close collaboration with key opinion leaders in the field.

What are the key regulatory and market challenges you face in bringing AI-based diagnostic tools to broader markets?

Navigating the evolving landscape of regulatory standards for AI-driven Medical Devices presents significant challenges due to the nascent nature of this technology in healthcare. Our commitment to transparency and adherence to rigorous safety and efficacy standards are fundamental as we build our startup. Additionally, fostering stakeholder engagement, driving adoption, and aligning our developments with clinical practices and workflows are pivotal to our strategy, despite the inherent challenges in introducing novel diagnostic tools in the Indian healthcare market.

What are the current challenges and trends facing the medtech/ diagnostic startups in India?

The evolving landscape of medtech and diagnostic startups in India is characterised by a shift away from a one-size-fits-all approach in patient care towards personalised medicine. This is driven by the capability to analyse and interpret healthcare data with high accuracy and then provide actionable insights. Personalised diagnostics and the use of sophisticated algorithms, such as deep learning, are emerging as key trends and are shaping the future of healthcare technology. The primary challenges faced by startups in this sector include navigating the complex regulatory landscape, which is continuously adapting to such new technologies, and meeting the stringent requirements for clinical validation necessary to gain acceptance within the medical community.

To make a mark for themselves in the medtech sector, do Indian startups prefer getting global approvals first and then launching their products in India? Is there a trend, or are there challenges surrounding approvals in India for medtech startups? Or are there any quality constraints?

Indian medtech startups are increasingly focusing on capturing the domestic market before scaling globally, supported by the government's push for self-reliance in medical device manufacturing. Indian doctors have the finest training in the world and are adept at adopting and utilising new technology. However, a large portion of the cost of new medical technology is borne by the patients- and healthcare startups in India need to recognise the price sensitiveness of the Indian market. To build for the Indian medtech industry, and making a significant difference to the quality of Indian healthcare and then expanding globally is a fulfilling path, that startups like ours intend to undertake, and with initiatives like the Meditech Mitra scheme, the process of obtaining regulatory approvals in India has become more scientific and transparent and supportive for startups.

How has funding accelerated your growth, and are there any recent investments you'd like to highlight?

Our growth has been substantially accelerated by funding and support from organisations such as IKP Eden, WTFund, Social Alpha and Pfizer, Emergent Ventures, and the Department of Science and Technology (DST), Government of India. These partnerships have not only provided financial backing through grants and funding support but have also facilitated essential hospital and research collaborations, helped us expand our technical team, and supported our progress towards critical regulatory milestones, allowing us to broaden our scope of operations and impact within the healthcare sector. BS

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"We plan to establish a CoE in medtech and launch a bio-innovation acceleration programme in 2025"

Manesh Thomas,
Chief Executive Officer,
Manipal - Government
of Karnataka
Bioincubator

Karnataka State Cabinet has recently approved funding allocations of over Rs 350 crore for technology and innovation development across the state, which includes seed funding for startups. Amidst this development, the Manipal-Government of Karnataka Bioincubator is charting an ambitious course for 2025, solidifying its role as a catalyst for innovation in biomanufacturing and medtech. With strategic expansions, pioneering initiatives, and a commitment to fostering a robust startup ecosystem, the incubator is well-positioned to drive impactful advancements in the life sciences sector. To gain deeper insights into this dynamic growth trajectory, BioSpectrum engaged in an exclusive conversation with Manesh Thomas, Chief Executive Officer, Manipal - Government of Karnataka Bioincubator. ***Edited excerpts;***

What new initiatives are planned to attract more startups in the life sciences sector?

In 2024, the incubator onboarded 10 new startups and 38 existing startups, for a total of 48 startups in the life sciences, biosciences, and healthcare sectors. To attract more startups, we conducted around 57 programmes to build partnerships with innovators from universities and R&D organisations, as well as startups and MSMEs. The incubator is now focused on expanding and diversifying its incubation services and programmes to support innovators and startups. Plans include the augmentation of Bioincubator facilities with an additional 10,000 sq ft of space. A Clinical Validation Hub will be launched specifically for medtech startups at the bioincubator. The incubator also aims to establish a Centre of Excellence (CoE) in medtech with the support of the Government of Karnataka. Additionally, a GMP facility for small-scale bio-manufacturing will be set up. The incubator is also set to launch a bio-innovation acceleration programme for bio-medical startups and establish an advanced biomanufacturing facility for prototyping and scale-up. To further support the ecosystem, the incubator will host an International Bio-Innovation Summit to showcase opportunities and foster collaborations.

What role are startups expected to play in advancing biomanufacturing capabilities, and how is this anticipated to impact the industry?

In regulated sectors such as life sciences, biosciences, and healthcare, a significant challenge lies in bridging the gap between early-stage innovations, often culminating in patent filings, and their progression to biomanufacturing and market-ready products. Startups can play a crucial role in closing this gap by driving innovation in biomanufacturing. They can achieve this by developing cost-effective processes, scaling disruptive technologies, and addressing critical inefficiencies in production. These efforts are anticipated to enhance domestic manufacturing capacity, reduce reliance on imports, and position India as a leading global hub for biomanufacturing.

What are your plans for the year 2025 to foster entrepreneurship and innovation?

The incubator plans to expand wet lab and pilot-scale manufacturing facilities to accommodate diverse biotech startups, along with clean rooms for biomedical pilot productions. A certification programme for startups in the biomedical domain is also being planned. Additionally, a Social Bio-Innovation Initiative will be introduced to address rural and underserved healthcare challenges. The incubator aims to start a Biodesigning programme to address unmet medical needs and launch Entrepreneurial Training Modules focusing on regulatory pathways, IP management, and market strategy. Strengthening partnerships with global accelerators and research institutions will be a key focus to enhance startup support. Currently, the facility is DSIR SIRO recognised, and plans are underway to obtain ISO 9001 and NABL accreditation. Furthermore, the incubator plans to conduct 3 hackathons to scout innovations in the biomedical domains. By bridging the gap between research and commercialisation, and nurturing entrepreneurial talent, it aims to accelerate India's standing as a global leader in biotech innovation. BS

Vrushti Kothari
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"Only the anonymised summary of clinical variants in the BCGA is accessible to clinicians"

IIT-Madras embarked on an initiative to build India's Cancer Genome Database, which can completely transform cancer research in India. With the support of DBT, IIT-M kicked off the Indian breast cancer genome sequence generation a few years ago. In line with World Cancer Day, which falls on February 4 every year, IIT-M unveiled an open source database called the Bharat Cancer Genome Atlas (BCGA). So far, whole exome sequencing has been done on 958 tumour-normal samples from 479 breast cancer patients across India. BioSpectrum India spoke to Prof S Mahalingam, Faculty, Department of Biotechnology, IIT Madras to understand about BCGA and more. ***Edited excerpts:***

« **Prof S Mahalingam,** Faculty, Department of Biotechnology, IIT Madras

With the launch of the BCGA as open-source data, tools like AI/ML and data analytics software will be deployed. How will these technologies support informed decision-making in diagnosis and treatment?

BCGA contains whole-exome sequencing data from both tumour tissue and matched normal tissue samples. Researchers can leverage this data, along with Artificial Intelligence (AI) or other machine learning (ML) techniques, to explore various combinations and permutations of the genetic variants and extract the specific information they need. Integrating this data with the existing healthcare system is a top priority. BCGA is readily available for all young researchers who want to conduct cancer genomic research. Also, we want to make this genomic information readily accessible to clinicians across the country. This would greatly assist clinicians in making efficient decisions about the best course of treatment for each individual patient.

What significant trends or patterns have you observed in the cancer genomes of the 500 samples collected until now? Are they indicating the probable cause of cancer incidence in these patients?

We observed some unique mutations specific to the Indian population and noticed different frequencies of mutation profiles compared with Western counterparts. BCGA will be very helpful in identifying mutations involved in hereditary cancers.

What other cancers will be considered for building a genome database, and why?

We are in the process of sequencing other prevalent cancers (such as colorectal, head and neck, pancreatic, and leukaemia) in India.

Scaling up this database will call for more financial aid, and maintaining an open-source database will also require continuous monetary support. What sustainable plans are ahead for this scaleup?

We certainly need more funding support to scale up the genomic sequencing of other prevalent cancer types and also maintain BCGA. We are planning to approach the Department of Biotechnology (DBT), Department of Science & Technology (DST), and the Indian Council of Medical Research (ICMR) for support.

Will IIT-M partner with Tata Memorial Hospital and other large cancer care hospitals to build an extensive database?

We are currently collaborating with 10 different hospitals and are in the process of discussing this with other hospitals. We hope to get samples from across India very soon.

While the database does not reveal patient details, what measures have been taken to ensure data privacy?

We want to emphasise that all samples included in the database are collected and sequenced only after obtaining ethical clearance. So, there are absolutely no ethical concerns regarding the data in the BCGA. Only the anonymised summary of clinical variants in the BCGA is accessible to clinicians and other stakeholders. BCGA follows global best practices in data sharing and security. We have also implemented strict ethical review processes to ensure compliance with regulatory frameworks like the Personal Data Protection Bill of India. BS

Anusha Ashwin

Accelerating Pharma Innovation: Leveraging Virtualisation for Compliance and Efficiency in the Age of DPDP

« **Vijender Yadav,**
Co-founder,
MD & CEO,
Accops

The pharmaceutical sector is moving toward a digital-first future, and virtualisation will be the foundation of safe and legal operations. Recognising this change and acting now will give companies a competitive edge in pharmaceutical innovation as well as improved security and regulatory status.

The pharmaceutical industry is undergoing a profound digital transformation driven by artificial intelligence (AI), big data, and machine learning (ML) advancements. These technologies are reshaping drug discovery, clinical trials, and regulatory compliance, offering immense potential to accelerate innovation. However, this rapid shift presents critical challenges, particularly in securing sensitive data, maintaining regulatory compliance, and ensuring IT scalability. The recent enactment of the Digital Personal Data Protection (DPDP) Act in India has intensified these challenges, compelling pharmaceutical companies to rethink their data security and IT infrastructure approach.

Traditional IT systems, characterised by fragmented security measures, legacy on-premises servers, and decentralised data management, struggle to meet the stringent requirements of modern regulatory frameworks. In contrast, virtualisation has emerged as a superior solution in this evolving landscape. It offers a secure, scalable, and compliant IT environment that addresses regulatory requirements and cybersecurity threats while driving operational efficiency. Pharmaceutical organisations must modernise their IT infrastructure to protect intellectual property (IP), safeguard patient data, and optimise research efficiency while maintaining seamless collaboration across global teams. Virtualisation, with its clear advantages, is the way forward.

The DPDP Act introduces a rigorous framework for data protection, mandating strict data localisation, real-time monitoring, and granular access controls. Since pharmaceutical companies manage vast amounts of sensitive data, including patient records, proprietary drug research, and clinical trial results, compliance with these regulations is a non-negotiable priority. However, virtualisation empowers organisations to implement strict security controls, prevent unauthorised access, maintain detailed audit trails, and automate compliance reporting. The Act further emphasises data minimisation, requiring companies to collect and process only essential data for clearly defined purposes. Virtualisation enables a highly controlled IT environment where sensitive information remains protected and accessible only to authorised personnel.

Meeting these mandates presents significant challenges for organisations still dependent on traditional IT infrastructure. Regulatory scrutiny has increased, demanding comprehensive transparency in data handling, while outdated systems often cannot provide the necessary visibility and control. Companies that fail to implement secure access management and real-time compliance tracking risk financial penalties, reputational damage, and operational inefficiencies.

Virtualisation technologies, including Virtual Desktop Infrastructure (VDI), cloud computing, and server virtualisation, offer a robust solution to these challenges. By centralising data storage and processing, virtualisation reduces the risk of data breaches and unauthorised access while providing companies with enhanced control over compliance. VDI enables pharmaceutical companies to store and manage sensitive data in a secure, centralised environment rather than on individual workstations, significantly improving security and reducing exposure to cyber threats. This approach protects research data, preventing IP theft and unauthorised disclosures.

Cloud-based virtualisation further enhances agility and scalability, allowing organisations to allocate computing resources dynamically based on real-time research needs. The ability to scale computing power on demand is particularly beneficial for AI-

driven drug discovery, molecular simulations, and clinical trial data analysis, where IT requirements fluctuate frequently. By leveraging virtualisation, pharmaceutical firms eliminate the need for expensive on-premises hardware, optimising IT investments while maintaining flexibility and operational efficiency.

Beyond compliance, cybersecurity remains a growing concern for pharmaceutical organisations. Intellectual property theft, cyber espionage, and ransomware attacks targeting drug formulations, clinical trials, and research data pose serious threats to the industry. Virtualisation mitigates these risks by integrating with Zero Trust Network Access (ZTNA) frameworks, enforcing strict access controls, and verifying every access request before granting permissions. Multi-factor authentication (MFA), AI-driven anomaly detection, and encryption further strengthen security, ensuring that only authorised personnel can access critical systems and research environments, even when working remotely.

Furthermore, as global regulatory bodies tighten data security mandates, virtualisation provides the flexibility to adhere to multiple compliance frameworks, including HIPAA, GDPR, and the DPDP Act. By leveraging role-based access control (RBAC) and automated compliance enforcement mechanisms, organisations can maintain compliance effortlessly across multiple regions, reducing the risk of non-compliance penalties. Virtualisation also aids in disaster recovery and business continuity planning, ensuring uninterrupted operations even in the event of a cyberattack or system failure.

Virtualisation also drives efficiency by liberating from the inefficiencies associated with traditional IT operations. It reduces administrative overhead, enables centralised system management, and streamlines IT operations. Automated updates, security patches, and real-time monitoring eliminate the burden of traditional IT maintenance, allowing research teams to focus on innovation rather than IT management. In addition, virtualisation enables global research teams to collaborate securely in real-time. Researchers working across multiple geographic locations can access secure virtualised workspaces, facilitating seamless data sharing and collaborative analysis while ensuring compliance with data localisation mandates. This level of connectivity enhances productivity and accelerates the development of new drugs and treatments.

Another significant advantage of virtualisation is its ability to integrate seamlessly with emerging pharmaceutical technologies. AI and machine learning models require high-performance computing resources to process large datasets for drug discovery and predictive analytics. Virtualised environments can dynamically allocate these resources, ensuring that computational needs are met without excessive hardware investments. Additionally, blockchain technology, increasingly used for regulatory transparency and supply chain integrity, benefits from virtualised platforms that ensure secure data storage and distributed ledger access.

As pharmaceutical companies continue to embrace AI-powered drug discovery, blockchain for regulatory transparency, and hybrid cloud computing, virtualisation will be foundational in ensuring a secure and compliant IT infrastructure. The demand for real-time data accessibility, enhanced security, and regulatory compliance will continue to shape IT strategies in the pharmaceutical industry. Companies that invest in virtualisation today will be better equipped to handle evolving security threats, regulatory changes, and the increasing complexity of research and development operations.

Pharmaceutical companies can no longer afford to operate on outdated IT infrastructures. The combination of heightened compliance requirements, growing cybersecurity risks, and the increasing need for scalable IT environments makes virtualisation an essential component of modern pharmaceutical operations. Organisations adopting virtualised IT solutions will fully comply with the DPDP Act and other global data protection regulations, protect valuable research and IP, optimise IT costs while scaling computing power, and enable real-time collaboration across research teams.

Virtualisation will become the backbone of secure and compliant operations as the pharmaceutical industry moves toward a digital-first future. Companies that recognise this shift and take proactive measures today will strengthen their security and regulatory standing and gain a competitive edge in pharmaceutical innovation. By integrating virtualisation into their IT strategies, pharmaceutical firms can accelerate drug discovery, streamline regulatory processes, and bring life-saving treatments to patients more efficiently and securely. Ultimately, virtualisation is not just an IT investment; it is a strategic imperative that ensures the pharmaceutical industry remains at the forefront of scientific advancement and global healthcare transformation.

Virtualisation enables efficient data processing, ensuring seamless integration of genetic research, patient histories, and AI-driven predictive models. This capability significantly enhances pharmaceutical research, leading to faster and more targeted drug development. Companies that leverage virtualisation effectively will be better positioned to adapt to the ever-changing landscape of the pharmaceutical industry, ensuring sustained innovation and long-term success. BS

Creating a Future Ready Pharma QC and Microbiology Ecosystem

Salavadi Easwaran,
Academic Dean,
Biocon Academy

According to the India Skills Report, the pharma industry had a high skill gap in quality control (QC) and other critical areas, with an employability rate of 37 per cent, far lower than the 46 per cent national average. As automation reshapes the industry, addressing this talent shortage is key to sustaining India's global leadership in pharmaceuticals. Let's take a closer look at the QC talent gap, the function of upskilling, and potential solutions.

For decades, India's pharmaceutical industry has built its reputation on scale and speed, cementing its status as the "Pharmacy to the World." At the heart of this success lies stringent quality control (QC), ensuring drug safety, efficacy, and compliance with global standards, optimal patient outcomes and access to lifesaving drugs. However, as automation, AI, and rapid microbiological methods reshape QC, a growing challenge leads to slow progress—a shortage of skilled professionals who are adept at operating these evolving systems.

Fresh graduates have theoretical knowledge, might have the intent and interest, but hands-on expertise is missing, while experienced professionals, trained in manual QC methods, struggle to keep pace with rapid digitisation. The result? A widening gap between cutting-edge technology and a workforce unprepared to manage it. This isn't just about hiring—it's about redefining how talent is developed, trained, and retained. In an industry where precision is everything, a skill gap isn't just a workforce issue; it can pose a risk to public health.

Currently, India supplies over 60 per cent of global vaccine demand and 20 per cent of generic medicines worldwide. With the sector projected to reach a $130 billion valuation by 2030, maintaining strict safety and quality standards is more crucial than ever. As per the India Skills Report, the pharma sector had an employability rate of 37 per cent significantly below the national average of 46 per cent with a major skill gap in quality control and other key areas. As automation reshapes the industry, addressing this talent shortage is key to sustaining India's global leadership in pharmaceuticals. Let's dive deeper into the talent gap in quality control, the role of upskilling, and how we can address the same.

Evolving Skill Demands in Quality Control & Microbiology

For a long time, India's pharmaceutical microbiology has been a labour-intensive domain, with stringent sterility requirements relying heavily on manual intervention. But the landscape is rapidly evolving. Advanced detection, enumeration, and identification (DEI) techniques are transforming quality control. Additionally, Rapid Microbiological Methods (RMMs) are reducing turnaround times, automated sterility testing is minimising human error, and AI-driven predictive analytics is making quality control smarter and more precise.

Despite these advancements, industry adoption remains conservative and cautious. Regulatory compliance frameworks, and financial support systems designed around conventional QC methodologies, have not kept pace with technological innovation. Furthermore, many pharmaceutical companies hesitate to transition due to a shortage of skilled professionals capable of managing and integrating these advanced systems. While automation and digital transformation are inevitable, a paucity of trained personnel could stifle progress.

The key challenge lies in bridging this talent gap. Without a workforce proficient in digital QC and microbiology automation, even the most sophisticated technologies will remain underutilised. The industry must address this issue head-on, ensuring that both new and existing professionals are equipped with the skills required to keep pace with global pharmaceutical standards.

Addressing the Skill Gap: A Three-Tiered Approach

Bridging this talent gap requires a comprehensive strategy that prepares new graduates, upskills existing professionals, and fosters a cross-skilled, agile

workforce. We need a structured, forward-thinking approach that must focus on three key areas:

1. Developing Industry-Ready Graduates

A major challenge in talent acquisition is the disconnect between academic training and industry expectations. While fresh graduates often possess strong theoretical foundations, they frequently lack hands-on experience in modern QC processes. Universities must reframe their curricula, beyond basic principles, integrating real-world applications in QC and microbiology while prioritising practical exposure. Programmes like the six-month Student Training Programme in Quality Assurance & Quality Control at the National Institute of Pharmaceutical Education and Research (NIPER), Hyderabad, and the Biotech Finishing programmes by the Karnataka Government, and the Quality Control Analytical and Applied Industrial Microbiology programmes of Biocon Academy serve as essential models, equipping graduates with industry-relevant skills. Strengthening internship and apprenticeship opportunities will further ensure that newcomers can seamlessly transition into the workforce, contributing effectively from day one.

2. Upskilling the Existing Workforce in Digital & Automated QC

While experienced professionals bring domain expertise, many remain unfamiliar with new-age technologies in automation, AI-driven monitoring, and rapid microbiology techniques. This knowledge gap slows adoption rates, preventing companies from fully leveraging real-time digital monitoring and automated sterility testing. To bridge this divide, targeted upskilling programmes must focus on integrating automation and data analytics into QC workflows. By enhancing technical proficiency in these areas, companies can improve risk assessment, streamline process validation, and ensure higher-quality outcomes—enabling a smoother transition toward digital transformation.

3. Fostering a Cross-Skilled, Agile Workforce

Traditionally, the pharmaceutical industry has operated in silos, training and qualifying talents in particular domains and deliverables limiting workforce mobility and holistic understanding. As QC roles evolve to incorporate new technologies, a shift toward cross-skilling can build a more versatile and adaptable workforce. Manufacturing microbiologists, such as fermentation specialists, can transition into QC roles, utilising their expertise to strengthen sterility assurance. Similarly, training production teams in rapid microbiology techniques foster a culture of continuous learning and innovation. This multidisciplinary approach enhances operational efficiency, ensures long-term sustainability in talent development, and helps future-proof the workforce for seamless integration of technological advancements in microbiological QC.

Role of Industry & Academia in Skill Development

Bridging the talent gap in pharmaceutical QC isn't solely the responsibility of educational institutions. The industry must take an active role in nurturing a skilled workforce by investing in structured training programmes that go beyond standard operating procedures. Well-designed onboarding initiatives can significantly reduce the learning curve for new hires, accelerating their integration into highly regulated QC environments while ensuring competency in both traditional and emerging methodologies.

A stronger collaboration between academia and industry is essential to align curricula with evolving industry demands. As pharmaceutical microbiology rapidly advances, ensuring that graduates possess relevant, up-to-date knowledge is critical to maintaining quality and regulatory compliance. Establishing joint training programmes, industry-led workshops, and research partnerships can help bridge this gap, creating a workforce that is better prepared to navigate the complexities of modern QC.

Government initiatives also play a crucial role in bolstering industry capabilities and fostering self-reliance. Programmes such as the Production Linked Incentive (PLI) Scheme for Pharmaceuticals and the Scheme for Promotion of Bulk Drug Parks aim to strengthen infrastructure, drive domestic manufacturing, and enhance global competitiveness. Leveraging these initiatives for skill development can provide a much-needed boost to workforce readiness, ensuring that India remains at the forefront of pharmaceutical innovation and quality assurance.

Way Forward

Addressing the talent gap in QC and microbiology is imperative to sustain and strengthen India's leadership in the global pharmaceutical sector. These fields must be positioned as high-value career paths to attract skilled professionals and drive innovation. Industry-academia collaborations are crucial in bridging this gap by aligning educational curricula with evolving industry needs. A forward-thinking approach, one that prioritises skill development, embraces technological advancements, and fosters continuous learning will ensure that India not only meets current global standards but remains prepared for future challenges. By investing in talent today, the industry can solidify its reputation as the 'Pharmacy of the World' and continue to set new benchmarks in pharmaceutical excellence.

“Implementation of Rapid Microbiological Methods will play a vital role in contributing to the Global Health for drugs”

Dr Michael Miller,
President,
Microbiology
Consultants, LLC

The inaugural BioLuminescence 2025 event by Merck took place in Ahmedabad on February 20, serving as a pivotal platform to enhance engagement with regulatory bodies, key opinion leaders, and stakeholders in the pharmaceutical industry. An internationally recognised microbiologist and subject matter expert in pharmaceutical microbiology, contamination control, Dr Michael Miller, President - Microbiology Consultants, LLC spoke about the Future of Pharma QC and how Rapid Microbiological Method (RMM) play a key role there.

What are some of the developments you have seen in quality control (QC) Microbiology from the past 10 years, some trends that stood out for you in this space?

There are a number of startups that have been pushing the envelope in microbial detection, quantification and identification and newer technologies that are miniaturised, such as lab-on-a-chip platforms, and real-time detection of microorganisms. I expect to see this trend continue in the foreseeable future.

What are the latest RMM technologies being developed to support pharmaceutical companies?

The science of biofluorescent particle counters (BFPC) has been around for a number of years. However, sterile pharma manufacturers are now validating these for routine use. They produce an autofluorescent unit (AFU) in real-time, allowing manufacturers to immediately react to excursions or out-of-trend findings for viable microorganisms, rather than retrospectively addressing these issues once incubation on standard plates have completed, which could be as long as a week since the batch was manufactured. And many of these systems are designed to capture the sampled air flow onto conventional media in the hopes of growing these for subsequent studies, such as microbial identification, which may help with investigations associated with the original contamination event. I also manage a catalogue of existing and next generation RMMs that is constantly changing as new technologies are introduced.

What are the key advantages and challenges associated with adopting RMM in the future of pharmaceutical QC?

The key advantage of using rapid methods, especially for newer cell and gene therapies, or advanced therapy medicinal products (ATMPs), is that these medicines can be tested and released much faster than conventional methods. This is important for short-shelf life products and those medicines that have an immediate medical need. And many RMM’s are more sensitive, accurate and precise than conventional methods, making them a better choice for microbiology testing, in terms of assessing product quality, which is directly linked with patient safety.

The perceived challenges with implementing RMMs have been associated with regulatory understanding and approval, which has been debunked for many years (i.e., regulators around the world have already approved multiple types of RMMs), and the supposed difficulty in validating these new methods for their intended use. The latter has been addressed by many regulatory guidance documents and compendial chapters over the years, and will be specifically addressed with the 2025 revision to PDA Technical Report #33 (Evaluation, Validation and Implementation of Alternative and Rapid Microbiological Methods), of which I am a co-chair.

How can the microbiological industry contribute to the development of collaborative strategies to address regulatory challenges in QC?

With respect to RMMs, the industry should continue to be educated to realise its benefits of implementation for a wide variety of applications, including finished product release for sterile and nonsterile medicines, in-process testing and environmental monitoring, to name a few. These are not necessarily regulatory challenges, as I have mentioned above, but more aligned with continuous improvement and better understanding of one's processes and products. The more the companies embrace and implement RMMs, the easier it will be for the industry as a whole moving forward.

What regulatory considerations should pharmaceutical companies be aware of when selecting an RMM system for their applications?

The selection of RMMs should be based on a firm's user requirements for microbiology testing, which may include the type of test, an intended time-to-detection, sample size and sample composition, data management and validation considerations. There are specific regulatory expectations for RMM validation, and these have already been published in a variety of guidance documents. The global pharmacopeias have also revised or added new chapters providing guidance on RMM and alternative method validation. And the upcoming revision to PDA TR#33 will specifically address regulatory expectations as well. For firms that are considering RMMs, I would encourage them to review the guidance currently available, participate in user groups, RMM conferences and training programmes, and engage in the support of consultants who may assist in developing their validation and implementation strategies.

How does the Parenteral Drug Association (PDA) support industries with their Scientific Publications and Forums?

The PDA provides global support for the pharma industry in many ways. I already mentioned the work we are doing with the revision to PDA TR#33, but there are numerous conferences the industry can participate in where RMMs are discussed. The PDA Journal of Pharmaceutical Science and Technology is another resource for RMM implementation strategies and validation research.

What are some of the aspects that can lead to a drastic change in Sterile Manufacturing?

It is a well known fact that people are the number one source of microbial contamination in sterile manufacturing. So, if we can eliminate the bugs and confirm we are operating in a state of control, we can significantly reduce the risk of producing a contaminated batch of product. I have been involved with the implementation of real-time BFPC systems in gloveless, robotic isolators for sterile manufacturing. The two go hand-in-hand, as microbial contamination from people is no longer a threat to sterile manufacturing, and real-time AFU data confirms the absence of microorganisms in these well-controlled environments. I will be a co-author on one such isolator system in which we have incorporated BFPCs for continuous, real-time monitoring of microorganisms. Look for these publications in the PDA Journal and other pharmaceutical trade journals.

What are some of the Future Technologies in the pipeline and QC requirements?

The recent revision to the EU GMP Annex 1 is a perfect example of how future technologies, such as RMMs, can play a role in the newest quality control requirements. Annex 1 now supports the use of rapid and alternative methods and continuous monitoring systems to increase the protection of the product from microorganisms and to assist in the rapid detection of potential contaminants in the environment and the product. Annex 1 will allow changing the current microbiological acceptance levels for environmental monitoring based on the new RMM signal instead of the CFU, as long as the RMM has been adequately validated. For these reasons, it makes sense for the industry to explore the implementation of RMMs to meet these new regulatory expectations.

How do you see the future of 'Made in India' drugs in terms of contribution to Global Health? How will it strengthen microbial QC help India's progress as a global drug manufacturer?

As many know, there have been critical issues associated with the manufacturer of drugs, especially from a microbial contamination control standpoint. Numerous firms, within India and around the world, have been forced to recall products or shut down facilities as a result of poor manufacturing practices but also the inability to generate meaningful microbiology data that supports a well-controlled manufacturing process and environment. RMMs will help bridge the gap between not knowing how well controlled a manufacturing process is with a more robust understanding that their contamination control strategies are actually working. Therefore, I see the implementation of RMMs playing a vital role in contributing to Global Health for drugs that are 'Made in India' as well as around the world.

IIT-M Pravartak partners with Agilisium to accelerate research in life sciences and healthcare

The Indian Institute of Technology Madras (IIT-M) Pravartak Technologies Foundation has entered into a strategic partnership with Agilisium, a leading data innovation partner for life sciences companies, to accelerate research in life sciences and healthcare endeavours. With this move, the company aims to collaborate on joint research, social impact programmes, and innovative solutions. Agilisium, with its deep knowledge and on-ground expertise, will further develop data-focused solutions to create a strong ecosystem for the sectors in India. The MoU signed will also enable Agilisium and IIT-M Pravartak to synergise their offerings for the benefit of the industry while driving innovation and societal impact. Agilisium will leverage its technological expertise and resources to augment IIT Madras' Regional Interaction Centres (Kalvi Shakthi programme), which are village-based study hubs designed to connect rural students with qualified educators via technology.

IE University and IIT Bombay sign MoU to drive global education

In a significant step toward fostering global academic collaboration, IE University and the Indian Institute of Technology Bombay (IIT Bombay) have officially signed a Memorandum of Understanding (MoU) aimed at advancing education, research, and innovation. This partnership marks a new era of cross-border cooperation between one of Europe's top universities and India's leading technological institute. Under this agreement, IE University and IIT Bombay will jointly work on Student & Faculty Exchange Programmes, Joint Research Initiatives, Executive Education & Leadership Programmes among other initiatives. The collaboration will provide students and professionals with access to world-class resources, industry leaders, and transformative learning experiences. This MoU signifies a major advancement in India's education sector, fostering global mobility, skill development, and cutting-edge research.

Vydehi Institute of Medical Sciences and Research Centre to expand access to robotic-assisted surgery

Vydehi Institute of Medical Sciences and Research Centre, Bengaluru, a leading institution in multi-specialty tertiary care, has joined hands with Intuitive, a global technology leader in minimally invasive care and the pioneer of robotic-assisted surgery (RAS), to introduce resident surgeons to robotic-assisted surgical technology through the Intuitive Robotic Onboarding Programme and Education (I-ROPE). This initiative marks the introduction of I-ROPE in a private hospital in India, providing surgical oncology postgraduate trainees with exposure to RAS and its clinical applications. The I-ROPE programme is designed to introduce early-career surgeons to RAS through structured sessions that cover the technology, its applications across various surgical disciplines, and its potential role in modern clinical practice. At Vydehi Institute of Medical Sciences and Research Centre, the programme is being conducted using the state-of-the-art da Vinci surgical system, providing residents hands-on familiarity with one of the most advanced RAS platforms available today.

Eris Lifesciences appoints Murari Ranganathan to spearhead Cardiometabolic Business

Eris Lifesciences Limited, a leading Indian branded formulations manufacturing company has appointed Murari Ranganathan as President, Cardiometabolic Business. He will be based out of the company's Mumbai office and take charge of the company's Anti-Diabetes and Cardiology businesses. Prior to joining Eris, Ranganathan was Commercial Director, Women's Health, Metabolics, and International Business at Abbott India Limited. He joined Abbott in 2010 as Head Sales, Medical Nutrition and played a variety of roles in his 15-year stint with the company. Prior to Abbott, he has worked with organisations like Baxter, Novo Nordisk, and Torrent Pharma. He has a bachelor's in physics and mathematics from Bangalore University and has completed his Postgraduate Diploma in Marketing from St. Joseph College of Business Administration, Bengaluru.

OneSource Specialty Pharma strengthens Board by appointing 3 new Independent Directors

Bengaluru-based OneSource Specialty Pharma Limited, formerly known as Stelis Biopharma Limited, has announced the appointment of three new non-executive independent directors to its Board — Dr Claudio Albrecht, Debarati Sen and Vijay Karwal. Dr Claudio Albrecht is a pharmaceutical industry veteran with over 30 years of experience. He co-founded Albrecht, Prock & Partners and previously served as CEO of STADA AG, Actavis Group, and Ratiopharm Group. He serves as an Independent Director on the Board of Dr. Reddy's Laboratories. On the other hand, Debarati Sen is a seasoned global business leader with a track record of driving transformative business performance. Currently the Group President at HMTX Industries, she has led growth and strategic initiatives across industrial and consumer businesses, including heading the largest division in 3M's Consumer Business Group with brands like Filtrete, Command, and ScotchBlue. Vijay Karwal is a Managing Director at CBC Group, Asia's largest healthcare-dedicated asset management firm, where he is focused on capital deployment and portfolio management for the firm's private equity and royalty & private credit investment funds.

Paras Health elevates Vineet Aggarwal to Group COO

Paras Health, based in Gurugram, has announced the elevation of Vineet Aggarwal to Group Chief Operating Officer (GCOO), effective immediately. Previously serving as Chief Information Officer (CIO), he brings extensive experience and strong leadership to his new role. Since joining Paras Health in September 2021, Aggarwal has demonstrated exceptional leadership and played a crucial role in driving key operational and strategic initiatives across various departments. His innovative approach to digital transformation, patient engagement, and business process optimisation has significantly contributed to the company's growth. Aggarwal has consistently demonstrated visionary leadership in spearheading key initiatives that have driven both operational excellence and enhanced organisational outcomes. His strategic and visionary approach to leadership has been instrumental in advancing the company's broader goals and fosters a culture of innovation, collaboration, and continuous improvement, positioning the organisation for long-term success.


Bhargav Kotadia


Jose Calle Gordo

SMT names Bhargav Kotadia as CEO, and Jose Calle Gordo as Chairman

Sahajanand Medical Technologies (SMT), a global leader in cardiovascular medical devices, has announced the appointment of Bhargav Kotadia as its Chief Executive Officer (CEO) and Jose Calle Gordo as the Chairman effective April 1, 2025. Bhargav Kotadia succeeds Ganesh Sabat, who has played an instrumental role in SMT's growth journey over the past 12 years. Sabat's leadership has been pivotal in expanding SMT's global footprint, strengthening its innovation pipeline, and fostering a high-performance culture. Dhirajlal Kotadia, SMT's Founder and Chairman, will take on the role of Chairman Emeritus, continuing to provide strategic guidance while Jose Calle Gordo will assume the role of Chairman, working closely with Kotadia to drive SMT's next phase of growth.

Practo ropes in Jagnoor Singh as COO to drive strategic growth

Practo has announced the appointment of Jagnoor Singh as the Chief Operating Officer (COO). This appointment supports Practo's vision of improving health outcomes while building a profitable, innovative, and user-focused business. Singh will focus on building robust processes, relentless execution, and driving accelerated growth. He will spearhead go-to-market (GTM) strategies, driving deeper penetration into existing markets and entry into new markets. He brings deep expertise in sales, marketing and business development. He has a proven track record of implementing structured, scalable processes that enhance execution, optimise operations, and unlock exponential growth. In his new role, Singh will be working closely with Shashank ND, Co-founder & CEO at Practo, to expand Practo's footprint and accelerate its reach to drive impact in the healthcare sector.

Alvarez & Marsal strengthens healthcare & life sciences practice with appointment of Akash Kedia as MD

Leading global professional services firm Alvarez & Marsal (A&M) India has announced the appointment of Akash Kedia as Managing Director (MD) within its Life Sciences Business Transformation Services practice. This strategic appointment aligns with A&M India's continued expansion in the Healthcare and Life Sciences sector, reinforcing its commitment to providing end-to-end solutions for businesses in the sector. Kedia brings over 20 years of consulting and industry experience, specialising in large-scale business transformation, digital strategy, revenue growth, and operational excellence. Prior to joining A&M, he led the Life Sciences industry vertical at Accenture in India, where he was instrumental in expanding its consulting and digital business. His expertise spans pharmaceuticals, wellness, and consumer goods, with a proven track record of driving growth and efficiency for clients across India, the US, Southeast Asia, and the Middle East.

NIT Rourkela develops AI-powered model to improve blood sugar predictions for diabetes management

A research team at National Institute of Technology (NIT) Rourkela has developed a new artificial intelligence (AI)-driven approach to improve blood sugar predictions for people with diabetes. The research presents a machine-learning model that enhances the accuracy of blood glucose level prediction, helping individuals and healthcare providers make better and personalised treatment decisions.

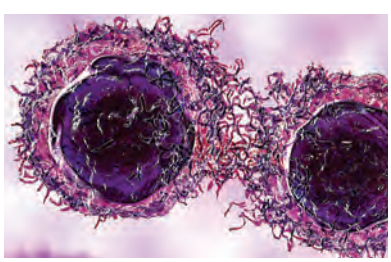
The researchers at NIT Rourkela focused on improving glucose forecasting using deep learning techniques. Their approach incorporates a specialised AI model that learns from past blood sugar trends and predicts future levels more accurately than existing methods. Unlike traditional forecasting models, which often struggle with long-term trends and require manual adjustments, this model processes glucose data automatically, identifying key patterns and making precise predictions. In the long run, this AI-driven approach has the potential to enhance diabetes care through various applications.

IIT-K unravels key drug target receptor for cancer and respiratory disease treatments

A team of researchers from the Department of Biological Sciences and Bioengineering at the Indian Institute of Technology, Kanpur (IIT-K) has successfully visualised the atomic structure of CXCR2, a key human receptor involved in cancer progression and respiratory disorders. Using advanced cryogenic-electron microscopy (cryo-EM), the IIT Kanpur research team has provided unprecedented insight into the lock-and-key mechanism that allows CXCR2 to recognise multiple chemokines. This breakthrough addresses a fundamental question in biomedical science regarding how multiple chemokines bind and activate a common receptor, while also opening up the possibility of using the structure as a template to design new molecules of therapeutic value. Following this breakthrough, the team has begun developing novel therapeutics, including small molecules and antibodies targeting this receptor.

Scientists at IISc tweak cancer cell response to ultrasound treatment

Cells have surface receptors called integrins that bind to repetitive domains present on the extracellular matrix (ECM) surrounding the cells, allowing them to grow and spread. A new study from the Department of Bioengineering (BE), Indian Institute of Science (IISc), Bengaluru and collaborators shows that tweaking the spacing between these binding domains on the ECM can boost the efficiency of ultrasound treatment applied to kill cancer cells. Low-frequency ultrasound waves



(39 kHz) can disrupt the cell membrane and trigger cell death in cancer cells. It is a relatively low-cost and non-invasive approach. Unlike normal cells, cancer cells do not have repair mechanisms that help them withstand the mechanical forces exerted by ultrasound waves.

To mimic the integrin-ECM binding, the team constructed an array of gold nanodots separated by different distances (35, 50 and 70 nm) and allowed highly invasive cancer cells to attach to them. Then, they applied pulsed ultrasound waves. When ultrasound was applied to cancer cells grown on the 50 nm and 70 nm platforms, their cell membranes were found to stretch due to forces exerted by a filament protein called myosin.

Parse Biosciences plans to release single cell chromatin accessibility products

The US-based Parse Biosciences, the leader in accessible and scalable single cell sequencing, has affirmed plans to proceed with development and future release of their Evercode single cell chromatin products. This comes on the heels of Parse invalidating the patents that 10x Genomics had asserted against Parse's Evercode Whole Transcriptome products and the subsequent cancellation of a trial on those patents. Parse's chromatin accessibility technology leverages a novel approach with advantages over existing methods such as ATAC-seq and will deliver higher quality, more uniform data. Parse plans to make their new solutions available for early access in late 2025. Parse's latest innovations include the recent launch of their Evercode Penta kit, the largest ever single cell sequencing kit that allows researchers to look at up to 5 million cells in a single experiment.

Thermo Fisher Scientific buys Solventum's purification and filtration biz for $4.1 B

American firm Thermo Fisher Scientific Inc. has entered into a definitive agreement with Solventum to acquire its Purification & Filtration business for approximately $4.1 billion in cash. Solventum's Purification & Filtration business is a leading provider of purification and filtration technologies used in the production of biologics as well as in medical technologies and industrial applications. The Solventum business operates globally with sites across the Americas, Europe, the Middle East, Africa, and the Asia-Pacific region, and has approximately 2,500 colleagues. In 2024, Solventum's Purification & Filtration business generated approximately $1 billion of revenue. Solventum's Purification & Filtration business is highly complementary to Thermo Fisher's bioproduction business. Thermo Fisher has a leading portfolio of offerings in cell culture media and single-use technologies. Solventum's innovative filtration portfolio broadens Thermo Fisher's capabilities in the development and manufacturing of biologics, spanning upstream and downstream workflows.

Bruker introduces X4 POSEIDON advanced X-ray microscope for scientific applications

American manufacturer of scientific instruments Bruker Corporation has announced the launch of the new X4 POSEIDON, a high-performance 3D X-ray microscope (XRM) using micro-Computed Tomography (microCT). This innovative benchtop XRM system offers advanced capabilities comparable to larger, floor-standing systems to make high-resolution 3D X-ray microscopy accessible for demanding XRM applications in industrial applications and scientific research.

The X4 POSEIDON features a high-end X-ray source that improves 3D resolution more than an order of magnitude compared to similar instruments. The system offers a large field-of-view high-efficiency detector, which optionally can be combined with a high-resolution scientific CMOS detector for multi-vision analytical flexibility.

It is powered by 3DxSUITE software, with automated protocols, an intuitive and customisable user interface, integrated database and user management, and multi-language support. Designed for low maintenance, the system enhances uptime and reduces cost of ownership.

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How Sci-tech Helps In Slowing Down Ageing

While developed countries have the highest share of older persons, developing countries are also witnessing a rapid rate of population ageing, leaving many ill-prepared for the new realities in the form of new diseases. It is estimated that by 2050, people aged 65 and above will surpass children under 5 years old worldwide for the first time in history. According to the World Health Organisation, the percentage of people globally over 60 years old in that same year will nearly double from 12 per cent to 22 per cent.

Ageing will eventually bring about an increased vulnerability to illnesses, disabilities, geriatric conditions, mental health challenges and other ailments that will necessitate enhanced medical care and long-term services and support. As a result, healthcare systems must be strengthened to address the increasing incidences of heart disease, cancer, diabetes, respiratory issues, cognitive decline, musculoskeletal disorders, frailty, incontinence and malnutrition.

For instance, chronic conditions contribute to over 75 per cent of healthcare expenditures for individuals aged 65 and above in the United States, amounting to over $1.5 trillion. This increasing healthcare expenditure for the ageing population calls for a strong focus on developing solutions for either a healthy ageing process or to slow down ageing altogether globally.

The landscape of ageing research, at present, is witnessing the deployment of science and technology to reverse ageing and restore cellular functions. As a recent development, the Indian Council of Medical Research (ICMR) has awarded support to the Longevity India Initiative at the Indian Institute of Science (IISc) in Bengaluru, to establish a Centre for Advanced Research in Ageing, marking a significant milestone in India's efforts to address the challenges of ageing and age-related diseases.

In addition, researchers at the Indraprastha Institute of Information Technology (IIIT) Delhi have developed AgeXtend, an artificial intelligence (AI)-powered platform designed to discover molecules that could slow down ageing and promote healthier lives.

On the global front, scientists at University of Edinburgh have developed an innovative method that employs AI to identify senolytic drugs, the agents that selectively induce apoptosis of cells responsible for ageing. By leveraging data from over 2,500 chemical structures extracted from past studies, the team has successfully trained a machine-learning model to recognise the essential characteristics associated with chemicals possessing senolytic activity.

Another example that can be quoted here is of researchers from the Massachusetts Institute of Technology (MIT) and Harvard University that have used AI to sort through hundreds of thousands of molecules in search of anti-ageing drugs. Using data from the screening of 2,352 compounds for senolytic activity, the ability to kill cells that no longer replicate and divide often due to ageing, the researchers are able to train a neural network to predict senolytic activity for over 800,000 molecules.

If these research initiatives eventually translate into successful outcomes, the question arises whether the drugs that could treat ageing might very soon be available on the pharmacy shelves. Experts at the Institute for Aging Research at the Albert Einstein College of Medicine, in the US, have predicted that it will take a few decades to see impactful gerotherapeutics, the drugs that counter the ageing process, for the average person. Because the key lies in discovering safe and effective drugs that target mechanisms, like inflammation and cellular damage, that lead to ageing.

Although geroscience has a long way to go, there are already four US FDA approved drugs (GLP-1, SGLT2 inhibitors, bisphosphonates and metformin) that have shown promise to target the process of ageing. While not approved as anti-ageing treatments, these drugs exhibit longevity potential, and their impact is yet to be seen.

And with technologies such as AI and machine learning taking the centre-stage in the life sciences sector, the future surely looks healthy and bright in this direction! BS

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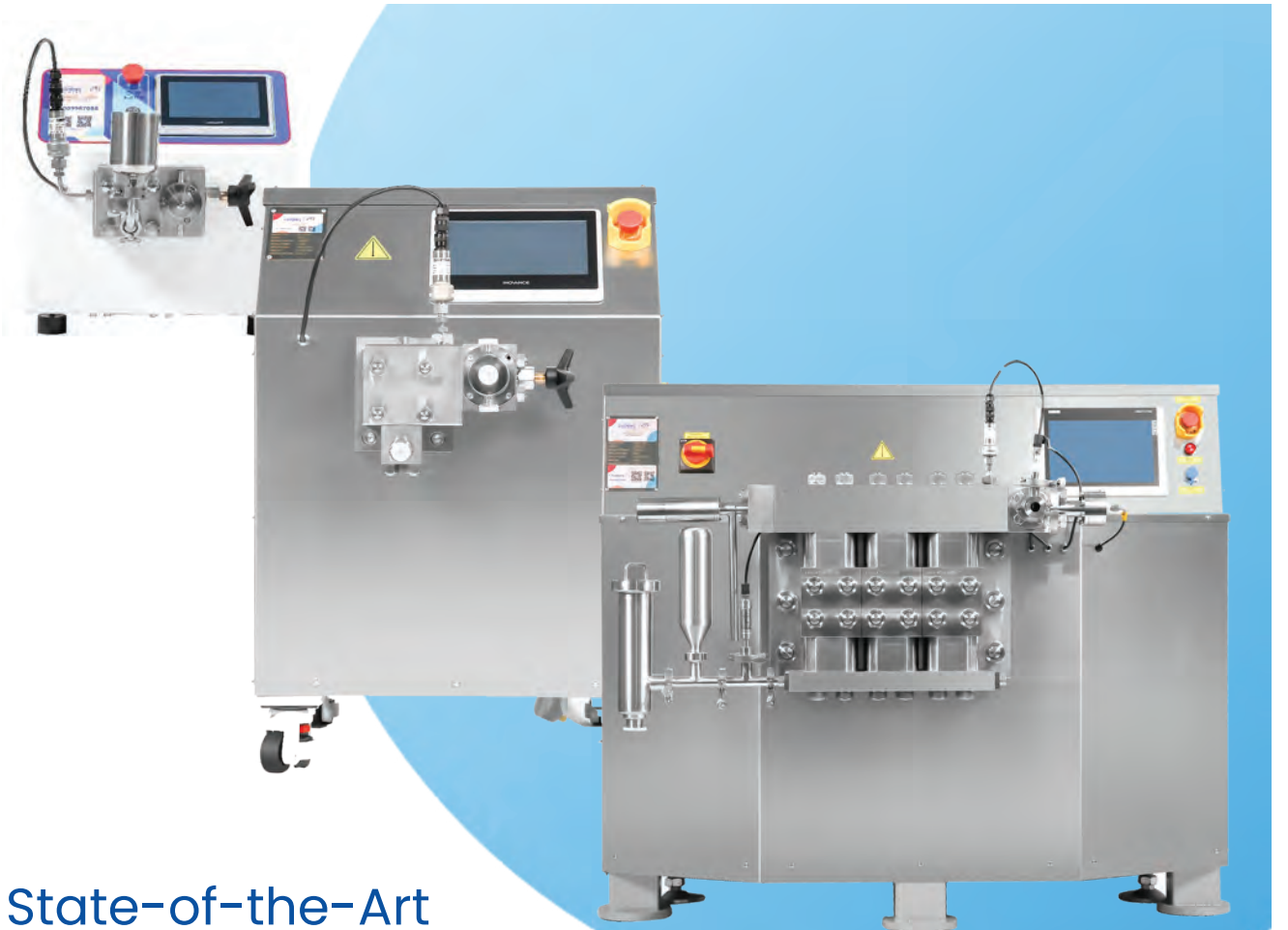

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