

## 23 Life Sciences Trends to Watch for in 2023

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**BioSpectrum interacted with a few leaders from major market segments of the industry who provided their insights into what the coming year is likely to hold for their particular sphere. Below are the 23 predictions from across the sub-sectors of life sciences - pharma, biotech, medtech, healthcare, digital health and manufacturing that are expected to make a splash in the sector.**

Some of these are extensions of trends observed in 2022 that will continue into 2023; such as Artificial Intelligence (AI) assisted drug discovery, rise of mRNA therapies, and China's dominance in CAR-T therapy. Besides these, the industry will focus on climate change, digital therapeutics, ageing, mental health, and much more. Let's take a deep dive.

### Pharma

#### 1. **Robotics**

As companies continue to innovate the pipeline of drug discovery, design, and delivery, incorporating robotics is the logical next step.

"Robots are more precise than humans, they can perform validation experiments, and they can be run by an artificial intelligence (AI) platform. And in APAC, companies can tap into a wealth of robotics expertise. Insilico Medicine is opening a fully autonomous AI-run robotics lab in Suzhou in early 2023. This state-of-the-art lab will feature autonomous guided vehicles running experiments in place of human scientists. These robots will do cell culture, high throughput screening, next-generation sequencing, cell imaging, and genomics analysis and prediction. As the robots generate data, that data will feed directly into Insilico's Pharma.AI platform, improving the system's target hypotheses and ability to validate those hypotheses," said **Dr Alex Zhavoronkov, Founder and CEO of Insilico Medicine, China**. Insilico Medicine is an AI-driven drug discovery company.

Asia-Pacific is seeing a hiring boom for robotics roles in pharma in recent years, according to GlobalData. In May 2022, Australia's Monash University invested \$6.5 million in a new world-class robotics research facility to train the next generation of engineers and global innovators, and drive the emerging AI economy.

## **2. *Licensing to pharma companies outside APAC***

"There has been an exciting amount of growth and development in the biotech industry in APAC, but I predict that we will increasingly see assets developed in China, licensed to global pharmaceutical companies in 2023. We will likely see this in particular with cancer therapies, which APAC has invested in heavily, and APAC-based biotechs partnering with global pharmaceutical companies to bring their early-stage assets to more advanced stages and clinical trials," said Dr Zhavoronkov.

Sanofi, which recently signed a \$1.2 billion strategic research agreement with Insilico, is expanding the Sanofi Institute for Biomedical Research (SIBR), Sanofi's R&D centre in China, leading the way.

On December 23, American drug major Merck, and Chinese firm Kelun-Biotech inked a \$9.3 billion licensing pact for seven cancer candidates. Under the agreement, Kelun-Biotech has granted Merck exclusive global licences to research, develop, manufacture and commercialise multiple investigational preclinical antibody-drug conjugates (ADCs) therapies and exclusive options to obtain additional licences for ADC candidates. On the same day, South Korea-based LegoChem Biosciences, Inc. (LCB) entered into a research collaboration and licence agreement with US-based Amgen, whereby it has granted Amgen rights to research, develop, and commercialise ADCs directed against up to five targets selected by Amgen based on LCB's proprietary ConjuAll ADC technology. The deal is worth \$1.25 billion.

## **3. *China's expansion quest***

2023 will be the year when developments in the Chinese market will start having a significant impact on regional and global markets.

"One of the major trends is the rising impact of Chinese biotech companies in global markets. The combination of relatively low clinical development costs, coupled with a highly competitive domestic industry has resulted in a growing number of locally developed, innovative drugs – especially in attractive categories such as Programmed death-ligand 1(PD-L1) inhibitors. Many of these companies, such as Beigene and Legend, are actively seeking commercial opportunities in global markets, particularly in the US and other rich markets as lower-price alternatives to products from multinational companies. The Chinese players are also looking at emerging markets where their price points may help make newer therapies available to local patients for the first time," said **Jeff Weisel, Managing Director for PRMA Consulting APAC**. PRMA Consulting is a market access consultancy and part of Fishawack Health, UK.

In 2022, innovative Chinese drugs made great progress, especially in CAR-T therapies. China appears to have surpassed its western counterparts in building a robust research pipeline of specialised CAR-T therapies with a maximum number of clinical trials and drugs in the pipelines. China is set to take a bigger role in the world pharma stage in 2023.

## **4. *Climate Change connection***

The pharmaceutical industry is one of the largest contributors to global climate change. The industry has risen to the challenges, with a majority of big pharma firms aiming for carbon dioxide neutrality by 2030 and Asian firms are no different.

On December 22, 2022, Japanese firms Astellas, Eisai, Daiichi Sankyo and Takeda came together to promote the use of more environmentally friendly packaging for pharmaceutical products. In November 2022, CEOs from AstraZeneca, GSK, Merck KGaA, Novo Nordisk, Roche, Samsung Biologics and Sanofi announced joint action to achieve near-term emissions reduction targets and to accelerate the delivery of net zero health systems. For the first time, the global health sector has come together to reduce greenhouse gas emissions through the Sustainable Markets Initiative (SMI) Health Systems Task Force, a public-private partnership launched at COP26.

In 2023, we will see more firms joining the bandwagon, putting in more sustainable efforts.

## 5. *Versatile and efficient AI*

AI and big data are the top technologies currently deployed in drug discovery and development across the globe, which is expected to increase over the years in the APAC region. AI is versatile and efficient with wide ranging utility be it - genetic risk assessment, early and accurate screening and diagnosis of diseases, drug discovery and development, clinical trial design and analysis, precision medicine, and monitoring of treatment response. Pharma firms will, hence, continue to invest in this technology.

“Many pharmaceutical companies in APAC are leaning into AI, utilising it at various stages of pharmaceutical R&D. From hypothesis generation from literature and biological data, identification of new targets in a variety of diseases, generation of novel molecules with the desired properties, clinical pharmacology, clinical trials enrollment and analysis, personalised medicine, and even marketing. However, there are still very few companies linking these steps in early discovery into one seamless pipeline leading all the way to clinical trials,” said Dr Zhavoronkov.

## 6. *Digital technologies*

“Digital technologies have been quickly adopted in vast industries in APAC recently. This trend is also spread in the pharmaceutical industry to speed up and save costs during the R&D process of novel drugs. Using these technologies will gain advantages for APAC's small-mid-size companies,” said **Tsz-Yin Chang, Deputy General Director, ITRI's Industry, Science and Technology International Strategy Center (ISTI), Taiwan**. The Industrial Technology Research Institute (ITRI) is a leading technology research and development institution in Taiwan.

## Biotech

## 7. *The growing ageing population*

“By 2050, one in four people in APAC will be over 60 years old, according to UNFPA (United Nations Population Fund). This will pose a high demand for ageing-related healthcare measures, such as degenerative therapy, regenerative medicine, etc,” said Tsz-Yin Chang.

Asian biotech firms are investing in research to develop novel therapies that could prevent and reverse the ageing process in humans. In October 2022, Australia pledged \$25 million for dementia, ageing and aged care research. Earlier in March 2022, Australia opened a new national academic centre for healthy ageing research. In September 2022, Singapore set up the world's first integrated pre-clinical and clinical ageing research institute.

This will open up new vistas in longevity research and boost developments in the region.

## 8. *Increased clinical testing*

In the past five years, the APAC region emerged as the largest contributor to global clinical trial activities and this trend is expected to continue in the future as well because of its population, cost-effectiveness and advancement in the healthcare infrastructure. The region registered higher growth than the US and the EU across the majority of therapeutic areas.

“The Asia Pacific region is home to 60 per cent of the world's population and consists of many countries that lead in technologic and manufacturing capabilities and include multiple advanced centres of science, education and research. I see increased research and development in the life sciences in many of these countries—in terms of basic science, pharmaceutical drug discovery, and the capacity to rapidly test for effectiveness and safety within large populations,” said **Dr Wui-Jin Koh, Senior Vice President and Chief Medical Officer, National Comprehensive Cancer Network (NCCN), USA**. The NCCN is a not-for-profit alliance of 32 leading cancer centres devoted to patient care, research, and education.

“At the same time, patients' needs are driving innovations. There's a growing focus on health equity and personalised medicines. This goes hand in hand with diversified recruitment efforts for clinical studies. Targeting wider racial and gender demographics is paramount to developing drugs and products that can effectively treat the global population,” said

**Raman Singh, CEO and Founder of Juniper Biologics, Singapore.** Juniper Biologics is a science-led healthcare company delivering novel therapies to improve the quality of life of patients everywhere.

## 9. *Specialised treatments*

“APAC headquartered companies have increased their footprints in the research and development (R&D) of specialised treatment modalities such as Chimeric Antigen Receptor T-Cell Immunotherapy (CAR-T), Natural Killer (NK) Cell Immunotherapy, and Dendritic Cell Immunotherapy (DC Vaccine). We expect investments in these areas that will continue to increase in the coming years,” said **Yogesh Rai, Practice Head (Pharma Drugs Database), GlobalData, UK.** GlobalData Plc is a data analytics and consulting company.

Some of the firms leading the development of next-gen CAR-NK cell therapy include Korea-based GI Cell, HK inno.N's and China's Antengene.

## 10. *Improved prevention of HPV-related malignancies*

“While it is important to focus on technical advances and promises, it is also critical to optimise utilisation of the effective tools that we already have in hand. An example of this is through improvements in human papillomavirus (HPV) vaccination and cervical cancer screening, which are highlighted in 2020 WHO global strategy for cervical cancer elimination, and is highly relevant to many countries in the Asia Pacific region,” said Dr Wui-Jin Koh.

On December 20, 2022, Bio Farma and Merck signed a framework agreement related to technology transfer cooperation to produce the HPV vaccine locally in Indonesia. In September 2022, India launched its first locally produced version of the HPV vaccine made by the country's largest vaccine maker, Serum Institute of India (SII).

## 11. *Gene Therapy*

This is another trend that will be deployed even more in 2023. The incorporation of gene technology and genetic information in treatments is projected to soar.

“This is particularly important in the field of oncology as 1 in 6 global deaths are caused by cancer. The advancements in gene technology allow health professionals to predict and trace disorders, enabling them to create more effective and efficient treatment plans for patients,” said Singh.

The APAC region has taken the lead in cell and gene clinical trials, accounting for the largest share of new trials during the first half of 2022, according to the Alliance of Regenerative Medicine's report mapping the sector's progress. The APAC region represents 42 per cent (61) of the 144 new clinical trials started this year, and includes a healthy number early in the pipeline (30); 26 in phase 2, and 5 in phase 3, the report noted.

It has already been a record year for the approval of new gene therapies to treat rare diseases, as the United States Food and Drug Administration (USFDA) approved the first haemophilia B gene therapy, from Australian behemoth CSL's HEMGENIX (etranacogene dezaparvovec-drlb). It is the fifth gene therapy for a rare genetic disease to secure FDA approval. At present 16 therapies are on track for regulatory decisions in 2023 indicating an active late-stage pipeline.

## 12. *Microbiome medicines*

There has been a flurry of activities in microbiome drug space in 2022. In September 2022, Singapore opened the Centre for Microbiome Medicine to improve human health. In June 2022, Cordlife Group, a Singapore Exchange mainboard-listed consumer healthcare company, and AMILI, launched the first-ever gut microbiome banking service in Southeast Asia.

On November 9, 2022, Australia announced the world's first regulatory approval for a donor-derived microbiome drug developed by the Australian startup BiomeBank, setting the stage for others. Earlier in January 2022, the firm partnered with the Hudson Institute of Medical Research for the development of life-saving microbial therapies. In the same month, on November 30, the US FDA also approved the first faecal microbiota drug, Rebyota by Ferring Pharmaceuticals, USA.

## MedTech

### 13. *3D Printing*

3D printing allows the targeted creation of more complex geometries that mimic the shape and function of natural bone, and also the efficient production of customised implants.

"It is more important for us to understand that 3D printing is existentially reshaping what implants can do, how patients can be treated, patient comfort and experience during recovery, as well as the efficiency during operations that involve implants. As an add-on to creating implants, 3D printed products are a game-changer for surgical procedures and have enabled surgeons to minimise the time during operations – this makes the procedure shorter, safer, and also provides better management of hospital resources, especially during the pandemic when manpower is scarce," said **Goh Khoon Seng, Chief Executive Officer, Osteopore International, Singapore**. Osteopore is a global leader in regenerative solutions. Its bioresorbable implant is the first of its kind to be successfully developed and commercialised for surgical use.

## Healthcare

### 14. *The booming of emerging companies*

"The life sciences industry is experiencing several major shifts. For example, a growing number of innovative startups are entering the market right now. Many of these focus on personalised and value-based medicines, putting patients' needs first," said Singh.

M&A is also set to remain a major theme. We've had a few good examples of this in APAC through 2022 where distressed assets were available at attractive valuations, and market capitalisations overall have been affected by volatility.

"In 2023, I would expect to see life science companies that have been holding off on public market secondary raises come out of the woodwork to shore up their balance sheets. It feels like the market is starting to become more receptive to these raises, while the IPO market remains soft," said **Jane Lowe, Managing Director, IR Department, Australia**

### 15. *Closing the access gaps*

The challenge facing pharma companies across both developed and emerging markets is the 'access gap' where products are launched in the region often much later than in the US and Europe.

"Closing this gap will require addressing barriers relating to healthcare financing, availability of healthcare services, supply, and distribution of products, and developing enablers such as strategic partnerships and trust among the stakeholders in the healthcare system. We see awareness and actions in this direction taking hold in the region in 2023, ranging from new manufacturing capabilities such as the BioNTech and GSK facilities in Singapore to the many initiatives around alternative funding models seen across the region," said Weisel.

### 16. *Information sharing and collaboration*

Collaborations of different bioscience companies, both with each other, and also with health science organisations and governments, will have a big impact in 2023.

“These collaborations are advancing developments and causing a shift in the pricing of products. More regulations are being passed that are reducing the cost of medications and products from pharma companies. Making medicine more accessible will consequently result in more equity in the health industry,” said Raman Singh.

Echoing similar sentiments, Dr Wui-Jin Koh said “Collaborative, transparent, timely, and easily-accessible sharing of information to assist all clinicians in providing optimal healthcare to everyone. An example is NCCN's new collaboration with Medlive in China to make gold-standard clinical practice guidelines for cancer care more accessible across Asia. This is intended to enable more people with cancer to live better lives through access to the very latest in evidence-based expert consensus treatment recommendations.”

There has been a notable increase in the number of collaborations between different stakeholders in the sector.

## **Digital Health**

### **17. *The rise of DTx***

A new class of drugs called digital therapeutics (DTx) is on the rise. There are currently 5533 studies registered in digital therapeutics on clinicaltrials.gov as of December 28, 2022. The majority of these are for psychiatric indications followed by diabetes and respiratory health. Changing medical protocols, alongside the need to bring down the cost of care is driving an upsurge in investments in digital therapeutics, which is projected to grow at the rate of 26.7 per cent to reach \$6.9 billion for the period 2020-2025, according to MarketsandMarkets. In May 2022, Japan clears CureApp's DTx app for hypertension. This is the world's first regulatory approval of a DTx app for hypertension treatment.

On December 1, 2022, Moderna partnered with Japanese startup Allm for building a digital therapeutics (DX) against infectious diseases that aims to revitalise activities. In March 2022, Happify Health and Zuellig Pharma partnered to commercialise prescription DTx in Asia. The activities in this space are expected to leap forward in 2023.

### **18. *Tech solutions for mental health***

Mental health tech scene is rapidly picking up in APAC and we're on the cusp of seeing a major boom in the region this year.

In July 2022, Singapore-based Intellect raised \$20 million in its Series A funding, the largest amount raised by a mental health startup in Asia. Singapore's Ami, and ThoughtFull are some other digital health firms making end-to-end mental healthcare seamless and affordable in Asia.

Leading pharmaceutical companies like Pfizer, Johnson & Johnson, and Sanofi are also developing new tech solutions and novel drugs to improve mental health conditions.

### **19. *Smart hospitals***

Growing government initiatives in healthcare digitalisation activities in several countries will accelerate the rise of smart hospitals.

“Rapid technological advancements in AI, automation, smart sensors, cloud IT and etc. not only facilitate physicians to analyse critical clinical data and their decision making, but also improve the hospital operational efficiency. Health IT and medical devices with intelligent technologies embedded such as computer-assisted diagnosis or predictive analysis will see market growth opportunities,” said Tsz-Yin Chang.

In 2022, Thailand launched ASEAN's first 5G smart hospital. South Korea's KT Corporation and the Samsung Medical Center (SMC) are working to build a smart hospital. They have jointly developed an innovative, 5G-powered medical service as an

initial step to establishing a 5G smart hospital.

"The digital architecture of hospitals will in fact change significantly, adopting wireless technologies, interoperability, and a seamless shift of monitoring from hospital to home. This will in turn enable more meaningful innovations, such as continuous monitoring using wearable or implanted medical devices, incorporating smart cameras for vital sign measurements, or linking to contextual information from non-medical consumer devices such as voice interfaces, fitness trackers, smart phones etc. The capabilities in India around healthcare informatics will be crucial as it will underpin the fusion of healthcare, IT, and business administration, seamlessly guiding all aspects of the care continuum. This will further help the healthcare industry realise the quadruple aim of improving patient experience, achieving better health outcomes, reducing the cost of care, and improving staff experience, said **Arvind Vaishnav, Vice President, Head of Philips Innovation Campus (PIC)**.

## 20. *Digital home care*

Developed countries such as Japan, Korea, and Taiwan are facing the challenges of ageing population and labour force shortage.

"As the geriatric population are prone to several old age disorders, digital home care solutions and remote patient monitoring are expected to ease these issues. Internet of medical things, smart medical devices, medical AI, cloud ERH, AI chatbots, homecare robots and digital platforms for coordinating all stakeholders would be keys to shape the future ecosystem of the care continuum," said Tsz-Yin Chang.

## 21. *Patient empowerment*

Digitalisation of healthcare solutions is a powerful tool to advance patient empowerment.

"With many healthcare providers investing in technology to ensure patient engagement and healthcare provision during the COVID-19 crisis, technology-enabled patient empowerment will continue as an influential trend in the APAC region," said Rai.

## Manufacturing

## 22. *Singapore powering Asia's biopharma boom*

Singapore has emerged as a hotbed for biopharma manufacturing. In 2022, almost all the major pharma firms announced plans to advance biologics manufacturing in the region. On December 12, 2022, Moderna announced its plans to expand its Asia-Pacific presence with a new Singapore subsidiary. A week before that, on December 2, 2022, GSK, Sanofi and Takeda partnered with research communities from the Agency for Science, Technology and Research (A\*STAR); National University of Singapore (NUS); Nanyang Technological University, Singapore (NTU Singapore) and its innovation and enterprise company, NTUitive; and Singapore Institute of Technology (SIT) to boost Singapore's biologics manufacturing capabilities. On November 21, 2022, RVAC Medicines and A\*STAR came together to build capabilities for mRNA production in Singapore. On November 16, 2022, ResMed unveiled a digital health solutions manufacturing centre in Singapore. On November 17, 2022, GSK opened a S\$44 million manufacturing facility in Singapore for cancer treatment. In July 2022, China's WuXi announced plans to invest \$1.4 billion for a production and R&D centre in Singapore.

## 23. *Digital transformation of CDMOs*

Pharma and Contract Development and Manufacturing Organisations (CDMOs) could weather the storm caused by COVID-19 pandemic because of the technology and digitisation of the development and manufacturing process, and moving forward technology will play an even more important role in the functioning of the CDMOs.

"Digital transformation is another trend. AI, ML, automation and robotics will all aid in CDMO operations. CDMOs are expected to answer the strong demand for technically high, sophisticated manufacturing support for complex molecules. As a reliable partner, we have to find answers and prepare for further upcoming trends like cell and gene therapies and DNA-based molecules. They have made the leap from scientific innovation throughout to groundbreaking medications. This will be part of

our future business,” said **Carsten Press, Senior Vice President Key Account Management, Supply Chain Management and Marketing at Vetter, Germany.** Vetter offers comprehensive fill-and-finish services from clinical development to the product's market launch and beyond.

Technological advancements and innovations have been at an all time high across industries and geographies, bringing with it new and efficacious solutions and resilience. Whatever might be the next, new man-made or natural crisis, the industry and the minds involved, are ready to fight it tooth and nail. With that firm resolution and hope, we welcome 2023.

**Ayesha Siddiqui**