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Ã¢â?¬Å?By harnessing the power of single-cell analysis, we can gain deeper understanding of various NCDsÃ¢â?¬Â•

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Single cell analysis is revolutionising fundamental biological research, paving the way for effective personalised treatments and precise interventions. By systematically investigating cellular heterogeneity, researchers are gaining unprecedented insights into gene mutations, cellular interactions, regulatory mechanisms, and molecular pathways that drive disease progression. BioSpectrum Asia spoke to Tony Acciarito, President, Asia- Pacific & Japan, Thermo Fisher Scientific to gain more insights into the future of this promising technology.



How is the single cell analysis market evolving in the Asia Pacific (APAC) region and contributing to life sciences research there?

Within the Asia Pacific region, single cell analysis continues to make a profound impact, particularly in oncology, immunology, and stem cell research. In fact, the region accounted for 22.6 per cent of the global single cell analysis market in 2022 and is projected to grow at the highest CAGR of 17.5 per cent by 2028.

With one of the largest and most established pharma industries in the region, Japan presents tremendous opportunities for the adoption of single cell analysis in the development and manufacture of drugs and vaccines.

India on the other hand, is focusing on improving healthcare outcomes. Through strategic investments in basic and translational research, academia-industry collaboration, and providing regulatory frameworks, the government is committed to strengthen the pharma and biotech sectors, ushering avenues for adoption of single cell analysis.

Singapore, known as a prominent biotech R&D hub, is establishing itself as a leading centre for clinical research in cancer, neurological diseases, and infectious diseases. This ambitious goal will undoubtedly fuel the demand for single-cell analysis products in the market.

South Korea's ambitious target to triple exports and global market share of pharmaceuticals and medical instruments by 2030, is driving increased R&D investments, fostering innovation in therapeutics, and amplifying the adoption of single-cell analysis technologies.

In Australia, government-funded research activities in genomics, research translation, brain cancer, and clinical trials have gained momentum, and are expected to drive the growth of the single-cell analysis market.

Which single cell technologies are receiving most interest from the pharma/biopharma companies focusing on particularly in APAC?

A focal point of interest, particularly for pharma and biotech companies, revolves around single-cell RNA sequencing, single cell genomics and proteomics.

Genomics has played a pivotal role in the rapid development of COVID-19 vaccines. Advancements in genomics are forging pathways for targeted therapies and immunotherapies, ultimately enhancing patient outcomes.

Single cell proteomics presents a unique and granular understanding of the complexities underlying cellular diversity. Its encompassing scope yields advancements spanning cell signalling, gene regulatory networks and drug discovery. Moreover, proteomics has emerged as a valuable platform for identifying robust biomarkers to evaluate healthy and diseased cells, pathogen detection and monitoring response to therapeutic interventions.

Is single cell analysis being used mostly for cancer research? What is the scope of single cell analysis in other non-communicable diseases treatment, apart from cancer research?

Single cell analysis has undoubtedly yielded significant insights in uncovering critical aspects oftumour metastasis and aiding in the identification of cancer within constrained tissue samples. It is also important to recognise that the potential of single cell analysis encompasses a wide array of fields including prenatal diagnoses facilitated by maternal blood analysis.

In forensic and medical investigations, single cell analysis plays a significant role, particularly when working with limited or archived tissue samples.

Furthermore, stem cell research has greatly benefited from the implementation of single-cell analysis. Understanding the cellular heterogeneity of stem cell populations, has opened new avenues for regenerative medicine, personalised therapies and exploring the immune response to diseases, vaccination and autoimmunity.

Transcriptional profiling at the single-cell level is enabling detailed insights into infectious diseases, revealing nuances in viral gene expression and immune reactivity. In respiratory diseases like chronic obstructive pulmonary disease (COPD), single cell analysis is widely used to study the interplay between lung cell types, environmental factors, and disease progression.

Lastly, the prevalence of non-communicable diseases poses a significant threat to public health in the APAC region. A staggering 62 per cent of annual deaths in South Asia alone, are attributed to non-communicable diseases (NCDs) such as cardiovascular diseases and diabetes. By harnessing the power of single-cell analysis, we can gain a deeper understanding of various non-communicable diseases, thus advancing our capacity to address underlying complexities.

How is Thermo Fisher investing in these technologies? Are you planning to launch more related products?

We are committed to investing in advancements in single cell analysis, recognising its pivotal role as a catalyst to revolutionise disease prevention and therapeutic intervention.

Our wide and evolving portfolio of products and workflow solutions are designed to simplify and accelerate pathways from sample preparation, molecular biology, protein and cell analysis, cell sorting and amplification and cell and gene therapy.

By combining our PCR instruments and high-purity reagents with omics methods, we deliver the sensitivity and selectivity needed to amplify DNA or RNA from a single cell. This comprehensive approach enables cellular biologists and researchers to perform a wide spectrum of basic, translational, and clinical research projects.

In addition, our single-cell proteomics workflows provide sensitivity, quantitative accuracy and precision and high proteome coverage, for high-throughput characterisation of individual cells from phenotypically distinct and rare cells found in complex samples.

Thermo Fisher's Orbitrap mass spectrometers offer leading mass spectrometry technology for accurately identifying and quantifying thousands of proteins. This technology allows researchers to evaluate differences in proteins across individual cells, providing a meaningful view of their biological states. By combining our cell sorting and mass spectrometry techniques, researchers can better access cell-to-cell variability.

Across the APAC region, we collaborate closely with our customers to enable their research in cancer, immunology, regenerative medicine, cell and gene therapy and antibody drugs.

Our Customer Experience Centres serve as a hallmark for identifying and addressing our customers' challenges and providing reliable workflow solutions to address some of the world's greatest challenges.

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