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ASIA EDITION

Scientists assemble world's first immune cell atlas from diverse Asian populations

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Reflecting the urgent need to expand biomedical research beyond traditionally studied populations



Researchers from the A*STAR Genome Institute of Singapore (A*STAR GIS), together with collaborators from South Korea, Japan, Thailand, and India, have assembled the world's first Asian Immune Diversity Atlas (AIDA)—a multi national survey of human blood at single-cell resolution.

The landmark study, published in the scientific journal Cell in March 2025, has the potential to advance Precision Medicine and empower the development of next-generation diagnostics and therapeutics tailored specifically for Asian populations.

The A*STAR GIS-led AIDA consortium profiled the healthy immune systems of diverse Asian populations. Using advanced single-cell genomics methods, the researchers analysed over 1.2 million immune cells from blood samples of 625 healthy donors across five Asian countries. AIDA is a flagship project of the Asia network of the international Human Cell Atlas (HCA) consortium, which aims to create comprehensive reference maps of human cells to enhance disease diagnosis, monitoring, and treatment.

The results revealed that self-reported ethnicity contributes nearly as much as sex to variation in blood cell proportions, with significant differences also observed across ethnicities in age-related and sex-related cellular changes. Additionally, certain cell states and gene products showed 2- to 8-fold higher abundance in specific populations, providing insights which may help refine biomarkers for diagnosing diseases and predicting disease risks.

Dr Shyam Prabhakar, Associate Director at A*STAR GIS and senior author of the study, shared, "In the next phase of research, we are scaling up the AIDA resource, and extending our single-cell genomics analysis to Asian patients, including those in Singapore. We foresee that AIDA will empower the development of Precision Medicine efforts in Singapore, Asia, and beyond."