Singapore scientists and clinicians have established one of the largest prospective cohorts for HCC known as the Precision Medicine in Liver Cancer across Asia-Pacific (PLANet). Funded by the Temasek Institute of Molecular and Cellular Biology (TICB), the Temasek Foundation and the Singapore National University of Singapore, the PLANet cohort has enrolled over 675 patients from 4 Asian countries across 11 institutions, including Duke-NUS Medical School, National University of Singapore, Duke Health, National University Health System from National University of Singapore, and National Cancer Center Singapore (NCCS). The current study is based on a cohort of 67 patients from 4 Asian countries (China, Japan, South Korea, and Singapore). The cohort includes both primary and secondary HCC patients from the Dual Planar Imaging Tumor-Immune Study (DPITIS) and the PLANet-PLANet (PLANet collaboration with the Asian-Pacific Hepatocellular Carcinoma (AHPCC) Trials Group across multiple Asian countries. This study aims to understand the molecular diversities within a tumour, i.e., intra-tumour heterogeneity (ITH), across genetic (DNA mutation) and transcriptomic (RNA expression) profiles. In particular, they found that the level of such variations differs across patients and over time. Using DPITIS, where a single tumour can contain multiple transcriptomic subtypes.

Such dynamic evolutionary process in HCC helps to explain the poor response to systemic therapies in HCC. In 2017, the group discovered that HCC has a wide range of genetic variants and that these variants are highly unstable, changing over time. This study depicted the first full landscape of tumour heterogeneity in HCC, highlighting the importance of studying the dynamic evolution for patient prognosis and treatment. GIS is honored to be part of the largest prospective cohorts for HCC known as the Precision Medicine in Liver Cancer across Asia-Pacific. This research comes from one of the largest prospective cohorts for HCC known as the Precision Medicine in Liver Cancer across Asia-Pacific (PLANet) and its findings have shed light on understanding how individual patients might respond differently to drug treatments, thus offering a precision medicine approach to treat patients differently in the future. Data from this study is now publicly available via the Singapore Oncology Data Portal (http://www.sgh.com.sg:80/news/awards/singhealth), enabling a precision medicine approach to treat patients differently in the future.


doi:10.1093/jnci/djz081


evolution for patient prognosis and treatment.

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Tumor Stages

Mutational heterogeneity

Gene expression heterogeneity

Pure subtype

Mixed subtype

References:


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It has been trending HCC for more than 10 years and has conducted multi-center clinical trials in this cancer, but HCC remains a very challenging malignancy. Significant scientific breakthroughs are required to further improve patient outcomes and our current findings provide an important step in this direction.

Dr. Peter Tan, Executive Director of GIS

"This study depicted the first full landscape of tumour heterogeneity in HCC, providing a solid basis harnessing tumour evolution for patient prognosis and treatment.

Dr. Zhai Weiwei, former principal investigator of GIS, who co-led this study."

"These findings offer novel scientific insights into the development of innovative therapies in HCC. In the near future, we look forward to see these findings impact clinical care and enable a precision medicine approach to treat patients differently in the future.

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