

“Single cell analyses”

Dr Tim Huang
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Date : 9 November 2018

Time: 2:30pm to 4:00pm

Venue: Meeting Room 2-130, 1/F, Block 2, To Yuen Building

Abstract

Recent advances in single-cell transcriptomics, genomics, chromatinomics, proteomics, and biophysics enable us to study the dynamics of oncogenic ecosystem. We used these omics approaches to determine how tumor cells evolve from *in situ* proliferation to distant colonization through blood circulation. The combined single-cell analyses of diverse tumor cell subpopulations identified active signaling pathways that are crucial for disseminated cells to withstand hemodynamic stress of blood flow. Compared to primary and metastatic tumor cells that preferentially use glycolysis for Warburg metabolism, circulating tumor cells (CTCs) were compelled to exploit oxidative phosphorylation (OXPHOS) for alternative fuels. This metabolic rewiring appears to be a survival strategy to provide energy needed for mobility and migration of CTCs. In contrast to the notion that these cells undergo mesenchymal-to-epithelial transition, we found that CTCs have biphenotypic features with both epithelial (i.e., more adhesive) and mesenchymal (i.e., more elastic) traits. The hybrid characteristics greatly enhance their durability to tether to companion cells that support intercellular transfer of biomolecules to CTCs in unfavorable microenvironments. This single-cell finding, which is not evident through molecular analysis of bulk tumors, provides a window of therapeutic opportunity to target metabolic vulnerabilities of disseminated tumor cells when they enter the bloodstream.

Biography

Dr. Tim Huang received a bachelor's degree at Tunghai University, Taiwan in 1980 and his Ph.D. degree from UC Davis in 1989. From 1989 to 1991, he was trained as a clinical cytogenetics fellow at Baylor College of Medicine. He was previously a faculty member at the University of Missouri-Columbia (1991-2003) and at the Ohio State University (2003-2011). In 2006, Dr. Huang was named as a Fellow of AAAS. Presently, he is Alice P. McDermott Distinguished University Professor and Chairman in the Department of Molecular Medicine at the University of Texas Health Science Center – San Antonio. Dr. Huang has published more than 305 peer-reviewed papers related to cancer epigenetics and genetics and has mentored 100 pre- and post-doctoral trainees and junior faculty for the past 28 years.

Enquiry:

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All are welcome !