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Single-cell molecular analysis reveals a novel molecular pathway in glioblastoma

John Zhong
University of Southern California, USA

Molecular analysis has transformed pathology from the morphological age into the molecular era. This transition is similar to the transition from analog to digital TV. With molecular profiling, pathology is more precise and quantitative. However, tumor heterogeneity remains a major hurdle for obtaining the molecular profile of cancer. In this study, we apply single-cell technology to overcome this hurdle and obtain a molecular profile of a tumor stem cell from a glioblastoma multiforme (GBM) patient. We obtain the initial diagnostic biopsy from a male patient and a relapse biopsy from the same patient. We first enriched tumor stem cells by organ slide culture with the diagnosis biopsy, and then perform single-cell RNA-seq on the cultured cells (enriched for tumor stem cells). The relapse tumor is generated from the tumor stem cells which is rare in the initial (diagnosis) tumor, but becomes majority in relapse. Therefore, single-cells carrying mutations detected in the relapse biopsy but not in the diagnosis biopsy (too rare to be detected) are the tumor initiation cells (tumor stem cells). With this approach, we reveal a novel molecule pathway in the GBM involving multiple member of the P53 pathway.

Biography

John Zhong completed his BS degree in Molecular Biology at California State University, San Jose and pursuing his PhD at University of Southern California. His study is focused on Cancer Biology, specifically molecular foundation of carcinogenesis.

jzhong@usc.edu

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