

## Engineering High-Throughput Brain Cancer Chip for Precision Medicine

Glioblastoma multiforme (GBM) is the most common and malignant primary brain tumor in adults because of its highly invasive behavior.

The existing treatment for GBM, which involves a combination of resection, chemotherapy and radiotherapy, has a very limited success rate with a median survival rate of less than 1 year. This is mainly because of the failure of early detection and effective treatment. To increase the chance of survival time of patients with malignant brain tumors, many novel therapeutics have been proposed and used in clinics including immunotherapy, stem cell therapy. In addition to these therapies, anti-angiogenic therapies have been explored as promising innovative therapeutic tool for the GBM tumors. However, existing drug discovery and development methods rely on the use of conventional two-dimensional (2D) cell cultures, which have been proven to be poor representatives of native physiology. Inspired by emerging tissue- and organ-on-chip platforms, we have developed a novel three-dimensional (3D) brain cancer chip for drug screening. This chip was composed of photo-polymerizable poly(ethylene) glycol diacrylate (PEGDA) hydrogel. We are currently using our platform to screen several FDA approved drugs to investigate the most effective GBM therapeutic options. We believe that *the brain chip* could help to reduce the time of the preclinical brain tumor growth studies. The proposed novel platform would also provide a novel approach to selectively suppress tumor growth and angiogenesis, paving the way for truly “personalized” cancer intervention.