

A Multicellular Tumor Spheroid-Based Screening Platform for Hepatocellular Carcinoma Therapy

Abstract

Hepatocellular carcinoma (HCC) is one of the most common malignant cancers worldwide, and is associated with substantial mortality. Because HCCs have strong resistance to conventional chemotherapeutic agents, novel therapeutic strategies are needed to improve survival in HCC patients. The multicellular tumor spheroid (MCTS) model is a powerful method for anticancer research because of its ability to mimic the complexity and heterogeneity of tumor tissue, the three-dimensional cellular context of tumor tissue, and the pathophysiological gradients of *in vivo* tumors. However, it is difficult to obtain meaningful results from the MCTS model without considering the conditions of clinical tumors. We therefore provided a proof of concept to determine whether spheroid models simulate *in vivo* tumor microenvironments. We then performed screening to identify compounds for HCC therapy using the MCTS model in a high-throughput screening system. The results showed that this model provides a new paradigm for high-throughput drug screening, which will significantly improve the efficiency of identifying new drugs for HCC treatment.

Keyword: Hepatocellular carcinoma (HCC), Multicellular Tumor Spheroids (MCTS), high throughput screening (HTS), drug discovery