A Novel Multi-Parametric Drug Scoring Method for High-Throughput Screening of 3D Multicellular Tumor Spheroids using Image Cytometry

Technical Presentation

Location: 1103 KCBD, 900E. 57th Street, Chicago, IL 60637

Time: 10:00 am – 11:30 am on Friday, January 20, 2017

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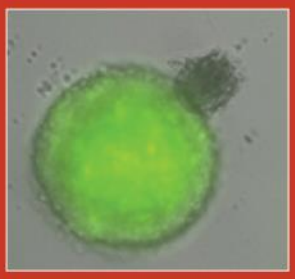

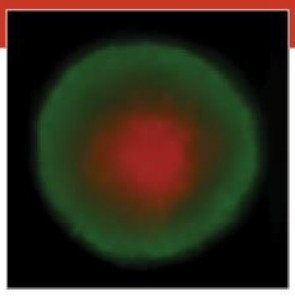

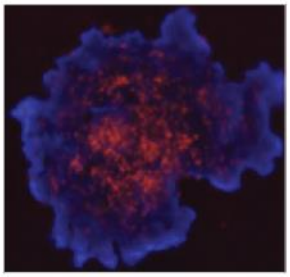

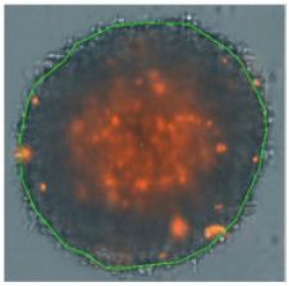

Abstract: Three-dimensional tumor models have been increasingly utilized to investigate and characterize cancer drug compounds. The ability to perform high-throughput screening of 3D multicellular tumor spheroids (MCTS) can highly improve the efficiency and cost-effectiveness of discovering potential cancer drug candidates. Previously, it has been demonstrated image cytometry provides a novel method for high-throughput screening of 3D multicellular tumor spheroids. In this work, we employed the image cytometry technique to examine the effects of 14 cancer drug compounds on 3D MCTS of glioblastoma cell line U87MG in 384-well plates. Using parameters such as MCTS diameter and invasion area, growth and invasion were monitored for 9 and 3 days, respectively. Furthermore, fluorescent staining with calcein AM, propidium iodide, Hoechst 33342, and caspase 3/7 were performed at day 9 post-treatment to measure viability and apoptosis. Using the kinetic and end point data generated, we have created a novel multi-parametric drug scoring system for 3D MCTS that can be used to identify and classify potential drug candidates earlier in the drug discovery process. Furthermore, the combination of quantitative and qualitative image data can be used to delineate differences between drugs that induce cytotoxic and cytostatic effects. The 3D MCTS-based multi-parametric scoring method described here can provide an alternative screening method to better qualify tested drug compounds.