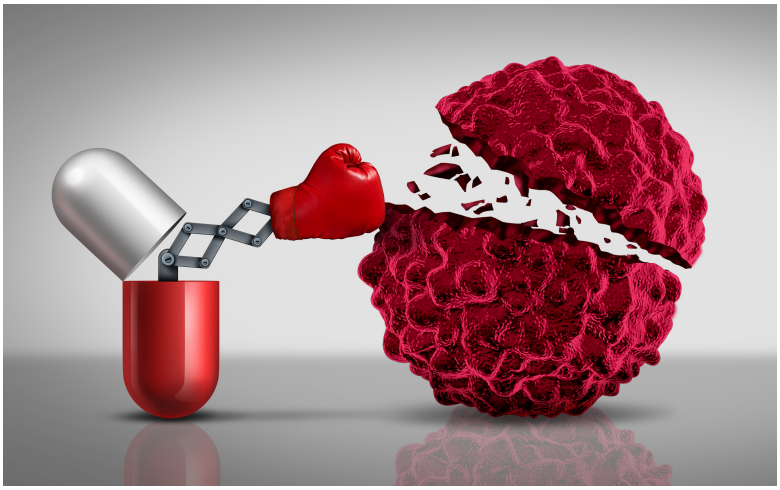
INNOVATION PARTNERSHIPS
UNIVERSITY OF MICHIGAN

Scalable Multiplexed Drug-Combination Screening Platform Using 3d Microtumor Model for Precision Medicine

TECHNOLOGY NUMBER: 7222



OVERVIEW

Drug combination in-vitro screening of both live cell and patient-derived-xenograft models

- Bias Tree mixing structure enables log scale dilutions
- Sudoku array enables the optimal number of inlets for large-scale system integration

BACKGROUND

Drug combinations have been an advantageous for the treatment of cancer as targeting two pathways can lead to an improvement in efficacy and has been shown to aid in overcoming resistance mechanisms. Clinical trials involving combinational therapies are very costly and time consuming, thus most pharmaceutical companies first assess drug combinations in-vitro. Current screening methods make the evaluating a large set of drug combinations very timely and expensive. Microfluidic techniques have attempted to increase the number of potential drug combinations. However, drug concentrations can only be diluted linearly, which prevents the full elucidation of IC50 values Multiplex Drug-Combination Screening Platform.

INNOVATION

Technology ID

7222

Category

Medical Devices

Engineering & Physical Sciences

Inventor

Euisik Yoon

Yu-Chih Chen

Zhixiong Zhang

Further information

Joohee Kim

jooheek@umich.edu

Learn more

Researchers have created a multiplexed drug combination-screening chip which enables the evaluation of effective drug combinations for in-vitro screening of both live cell and patient-derived-xenograft models. A Bias Tree mixing structure permits log scale dilutions for obtaining accurate IC50 parameters of the combinations, and Sudoku array inlets define the optimal number of inlets for large-scale system integration. Proof-of-concept design was implemented on an 8-drug combination chip utilizing MCF7, SUM159, and a pancreatic cancer PDX cell line. By combining 28 drug combinations, 5 mixing ratios, 2 sphere sizes, and 5 replicates, a total of 1,400 drug efficacy screening experiments was accomplished on a single chip.

PATENT APPLICATION

Number: 16/339,872