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Dr. Nandita Singh, Senior Science Editor
Journal of Visualized Experiments

Dear Dr. Nandita Singh,

On behalf of our co-authors, we would like to thank you for offering the opportunity for us to submit our microfluidic cancer-on-chip technology for consideration for publication in JoVE.

Primary and metastatic cancers develop as complex, heterogeneous ecosystems that continue to defy cure through conventional medical therapies. For example, cancers universally defeat treatment by chemotherapy through the emergence of drug resistant cells. Current therapies are developed through in vitro drug screening and tissue culture techniques that can detect initial drug sensitivity but are not designed to detect and measure drug resistance. Similarly, in vivo experiments in mice are designed to study sensitivity to therapies and not mechanisms of resistance because the animals succumb to the cancer.

We have designed an in vitro, self-contained, microfluidic cell culture system that reproducibly creates complex microenvironments (ecologies) that allows the direct observation of the development of drug resistance in real time. The device also allows quantitative analyses of motility and proliferation of heterogeneous cell populations and has the capability for downstream analyses of metabolites and single cells.

We have previously demonstrated using our microfluidic system the long-term co-culture of epithelial and mesenchymal PC3 prostate cancer cells (Lin *et al., Convergent Science Physical Oncology*, 3(4): 045001 (2017)) as well as the emergence of drug-resistance polyploid giant cancer cells using the epithelial PC3 cell line (Lin *et al., Clinical & Experimental Metastasis*, 36: 97 (2019)). We hope that you find the potential of this work as exciting as we do!

Sincerely,

Ke-Chih Lin
Ph.D. student, Princeton University