Abstract Submitted
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Study of breast cancer cell behavior under chemical stress using microfluidic gradient generator[1] AMY WU, KEVIN LOUTHERBACK, GUILLAUME LAMBERT, LIYU LIU, ROBERT AUSTIN, JAMES STURM, PRINCETON PSOC TEAM — Understanding the behavior of cancer cells in gradients of chemotherapeutic agents is important in studying the evolution of cancer drug resistance. Compared to traditional in-vitro methods, microfluidic gradient generators better control temporal and spatial profile of gradients. However, maintaining chemical gradients requires high flow rate of liquid (10ul/hr) in microfluidic chip while culturing mammalian cells demands slow flow rate of liquid (1ul/hr). In this paper, we modify a microfluidic gradient generator (Jeon et al, Langmuir, 2001) to overcome the challenge of maintaining slow flow rate and stable gradients simultaneously based on numerical simulations, and culture metastatic breast cancer cell line (MDA-MB-231) in the chip. To characterize the stability of gradients, we visualize the gradient profile by infusing fluorescein. Finally, we will report the response of the on-chip culture under the stress of chemical gradients, observing for cellular phenotypic changes including death, proliferation, morphology, and migration.

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