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The Editor

JoVE Journal

Dear Editor,

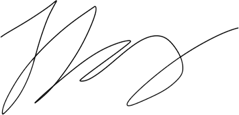
We are submitting our manuscript entitled "Using Microfluidic Device to Measure Cellular Phenotypes In Budding Yeast across Lifespan", for publication in JoVE. In this work, we demonstrate the protocol for producing microfluidic chip and setting up experiment for time-lapsed imaging of single yeast cells to observe various molecular and cellular phenotypes throughout their lifespan. Our microfluidic device and protocol can measure hundreds of cells in one experiment. The successful production of the microfluidic chip is an essential step, and we have demonstrated a protocol that is easy to follow by beginners. The design of our microfluidic chip simplifies the loading of the yeast cells, enabling faster experimental setup. A unique feature of our microfluidic device is that it is able to trap newborn daughter cells from already trapped mother cells. These daughter cells become fresh mother cells that can be tracked for downstream analysis. This allows us to measure more accurately the replicative lifespan of fresh mother cells, while other methods can only indirectly calculate the lifespan of fresh mother cells with adjustment (e.g, by counting the number of bud scars) that may vary from experiment to experiment. Using our chip and the experimental protocol, we can measure various cell parameters such as cell size and cell cycle time as well as any molecular (fluorescent) markers.

In this paper, DR, ZK, JZ and HL wrote the manuscript, ZK developed the protocol and performed experiments, ZK and JZ did the analysis. We received kind assistance from DR. Nandita Singh regarding the submission procedure.

We feel that our microfluidic device and protocol is generally useful for single cell time-lapse microscopic imaging throughout the lifespan of yeast cells. The protocol is simple to follow and easy to implement. Thus we believe that our protocol will be of general interest to JoVE's audience.

Thank you for your consideration.

Sincerely



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