

4. Lab-on-a-Chip

Kinetic Study of Autophagy Activation in Fibroblasts interacted with Single Tumor Cell in Microfluidic Platform

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Communication between tumor and carcinoma associated fibroblast cells (CAFs) become hot topic in cancer research recently because of their roles in tumor proliferation, metastasis and angiogenesis. Tumor cells interact with fibroblasts and make fibroblasts transdifferentiate to CAFs and autophagy in CAFs is induced. [1] To study mechanism of autophagy of CAFs by tumors, we try to develop a high throughput screening chip based on a single tumor cell-to-fibroblasts interaction.

Herein, we reports the interaction duration for selection of positive hole which has specific number of autophagy activated fibroblasts by single tumor cell. To screen and select the specific single tumor cell which can induce autophagy in fibroblasts, we need to decide this duration criterion. We compared the percentage of autophagy activated fibroblasts using various concentration of paracrine factor (0.1ng/mL ~ 10ng/mL) and various interaction durations (30min ~ 24 hours) in culture dish. In platform, we checked the kinetics of autophagy activation in fibroblasts interacted with single tumor cell using live cell imaging with confocal microscope. We compared the percentage of autophagy activation in fibroblasts in both holes, which has single tumor and is empty with various interaction duration. We can apply this specific interaction duration, which can have discriminated fibroblast autophagy activation percentage as positive holes determination criteria. Using this criterion, we can screen the positive holes exactly and isolate specific tumor cells to do further gene analysis and study autophagy mechanism between tumor cell and fibroblast.

References

[1] Bremnes et al., Journal of Thoracic Oncology **6**, 209-217 (2011)

Keywords

: Single cell, High throughput screening device, Autophagy, Tumor and Fibroblasts