MICROFLUIDIC DEVICE FOR DNA AMPLIFICATION OF SINGLE CANCER CELLS ISOLATED FROM WHOLE BLOOD BY SELF-SEEDING MICRO-WELLS

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Introduction
Genetic characterization of Circulating Tumor Cells (CTC) offers the opportunity for a “real time liquid biopsy” [1, 2]. Heterogeneity and rarity of CTC command the need for individual cell characterization. Following an enrichment procedure of CTC from blood, the identification, isolation and manipulation of single cells for further analysis without cell loss remains challenging. Self-seeding microwell plate can sort single cells into 6400 wells based on cell size and their identity verified by immunofluorescence staining [3]. Here, we developed a microfluidic device in which these single cells can be placed, lysed and their DNA amplified for further genetic analysis. Reagents were introduced by peristaltic pumping of micro-valves. On-chip lysis and amplification was performed in 8 parallel chambers.

Self-seeding Microwell
Microwell Plate

Open-well Microfluidic Device
Pneumatic Valve

Validation of on-chip amplification
qPCR of 8 genes

References

Conclusions
We developed a microfluidic device to enrich and isolate individual tumor cells from whole blood and amplify its DNA for further characterization.