

気液界面を利用した希少細胞の高速自己配列プラットフォーム



NAGOYA UNIVERSITY

○Song Woneui¹ 益田泰輔¹ 孫 逸齡¹ 中西速夫² 新井史人¹

¹名古屋大学大学院工学研究科 ²愛知県がんセンター研究所



新方式セルソーター：広げて,並べて,その場で回収

1. Background

CTC: Circulating tumor cell

CTC isolating only with microfluidic chip



- Recovering isolated CTCs is difficult (Only enrichment) ☹️
- Loss of CTCs can exist from connections

Answer) Microfluidics + Robotics

Purpose

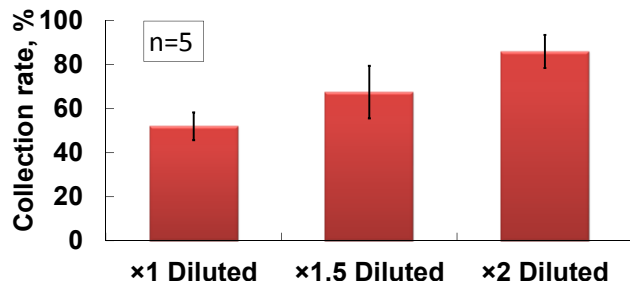
- Isolating CTCs from many blood cells
- Aspirate the isolated CTC as a single cell

3. Result

CGIY: Human gastric cancer cell line

Rare Cell Isolation from blood

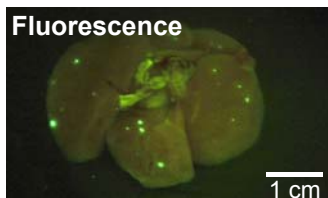
- Sample: Blood sample(diluted)+GCIY
- Blood sample is not pretreated
- Precounted GCIYs are spiked(15cells/sample)



- Collection rate: **86 %**(X2 diluted)
- High throughput: **3 mL/hr**



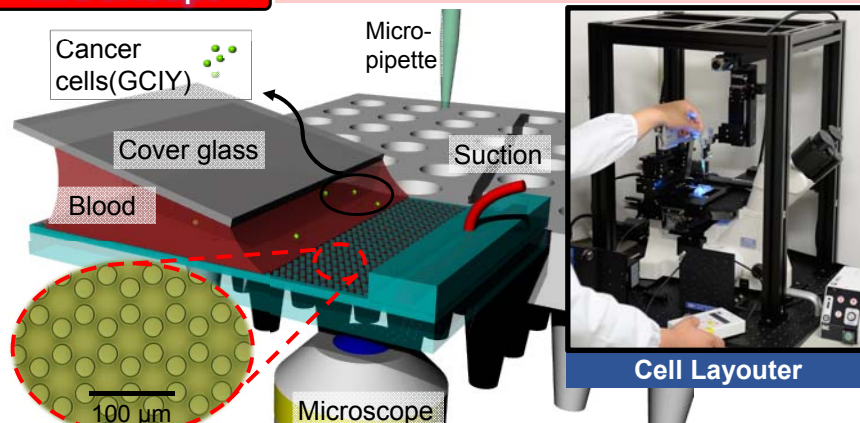
CTC Isolation from Mouse-CTC model
(Lung metastasis)



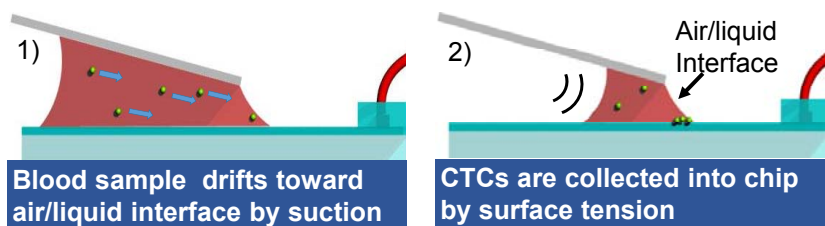
Succeeded in Isolating CTCs (13/15)

2. Concept

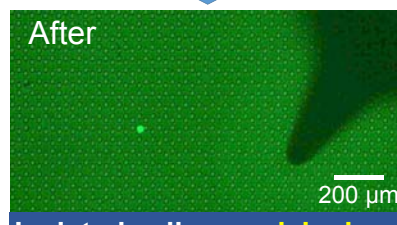
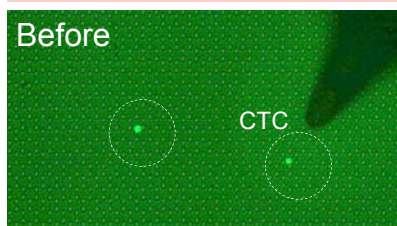
Cell Isolation using Air/Liquid interface



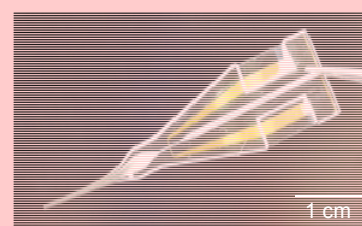
PCT/JP2013/077905, 特開 2012- 239449, 特願 2012-227717, 特願 2013-106824, 特願2014-81700



Single cell aspiration with micro-pipette



Isolated cells are **picked up** on open channel chip with fluorescence sensing



Capacitance sensor inside Micro-pipette prevents cell loss when pick up



4. Conclusion

- **CTC isolation** from blood by air-liquid interface
- Diluted blood sample provided a cancer cell **collection rate of about 90%**
- Our platform aims at achieving **liquid biopsy** to estimate the risk for metastatic relapse easily

Reference

- Woneui Song, et al, “気液界面を利用した希少細胞の高速自己配列プラットフォーム”, 2P25, 29th Cheminas