News & Views

Utilizing a microfluidic device to enrich and fluorescently detect circulating tumor cells

Ya-Nan Chang, Mingyi Zhang, Juan Li, Kui Chen, Weihong Gu, Gengmei Xing

PII: S2095-9273(17)30096-8
DOI: http://dx.doi.org/10.1016/j.scib.2017.02.005
Reference: SCIB 68

To appear in: *Science Bulletin*

Please cite this article as: Y-N. Chang, M. Zhang, J. Li, K. Chen, W. Gu, G. Xing, Utilizing a microfluidic device to enrich and fluorescently detect circulating tumor cells, *Science Bulletin* (2017), doi: http://dx.doi.org/10.1016/j.scib.2017.02.005

News&Views

Utilizing a microfluidic device to enrich and fluorescently detect circulating tumor cells

Ya-Nan Chang, Mingyi Zhang, Juan Li, Kui Chen, Weihong Gu, Gengmei Xing*

CAS Key Laboratory for Biomedical Effects of Nanomaterial & Nanosafety, Institute of High Energy Physics, Chinese Academy of Science, Beijing 100049, China

* Corresponding author

E-mail: xinggm@ihep.ac.cn,

Circulating tumor cells (CTCs) are cancer cells that have propagated from primary tumor sites, spreading into the bloodstream as the cellular origin of fatal metastasis, and to secondary tumor sites. Capturing and analyzing CTCs is a kind of "liquid biopsy" of the tumor that provides information about cancer changes over time and tailoring treatment [1]. CTC enrichment and detection remains technologically challenging due to their extremely low concentrations in blood (as few as 1 CTC per 1 billion blood cells), which hampers cellular and molecular typing [2]. To realize the capture and detection synchronously of CTCs faces greater challenges. Therefore, we need more high-throughput technique to capture and more sensitive method to test. Microfluidic devices with the advantages of small physical dimensions and low cost can be architected as a promising platforms for using to fast and high-throughput capture and detection of CTCs [3]. Using size- and shape-matched nanometer-scale topography can enhance interactions between the substrate and target cells [4]. However, direct CTC detection by antibody-nanoscale topography on microfluidic chip is severely hindered as most captured cells cannot be easily measured. In addition, combining sensitive techniques with a high-throughput system is difficult because the relatively low content of labeled cells in channel presents a weak signal, and complex washing steps were normally needed to improve the signal-to-background