

## Optimization of Microfluidic Immunomagnetic Chip for Circulating Tumor Cell Capture

Xiang Chen\*, Jinquan Liu, Jun Zhu, Yunfan Sun<sup>1</sup> and Jia Fan<sup>1</sup>

National Key Laboratory of Science and Technology on Micro/Nano Fabrication,  
Shanghai Jiaotong University, Dong Chuan Road 800, 200240, Shanghai, P.R. China

<sup>1</sup>Department of Liver Surgery, Liver Cancer Institute, Zhongshan Hospital, Fudan University,  
Key Laboratory of Carcinogenesis and Cancer Invasion, Ministry of Education,  
Shanghai 200032, P.R. China

(Received June 10, 2013; accepted September 9, 2013)

**Key words:** immunomagnetic, CTC, microfluidic

The enumeration of circulating tumor cells (CTCs) has proved valuable for early detection and prognosis in cancer treatment. In this work, an optimized design of a microfluid-based immunomagnetic chip is proposed to separate CTCs from whole blood. Unlike most reported immunomagnetic-based methods in which the magnetic field is applied perpendicular to the flow direction, here, the magnetic field is applied parallel to the flow direction, which makes the hydrodynamic force not the dominant force to hamper cell capture. Experimental validation showed that this novel chip can be operated at a flow rate of up to 6 ml/h with 90% CTC capture efficiency.

\*Corresponding author: e-mail: xiangchen@sjtu.edu.cn