

# Capture and lyase-triggered release of circulating tumor cells using a disposable microfluidic chip embedded core/shell nylon-6/Ca(II)-alginate immunofiber mats

*Hung-Yen Ke<sup>a,b,c</sup>, Chi-Jung Chang<sup>d</sup>, Shih-Ying Sung<sup>a</sup>, Chien-Sung Tsai<sup>a,b</sup>, Feng-Yen Lin<sup>e,f,g</sup>, Jem-Kun Chen<sup>c\*</sup>*

<sup>a</sup>Division of Cardiovascular Surgery, Tri-Service General Hospital, National Defense Medical Center, Taipei 115, Taiwan

<sup>b</sup>Department and Graduate Institute of Pharmacology, National Defense Medical Center, Taipei 115, Taiwan

<sup>c</sup>Department of Materials Science and Engineering, National Taiwan University of Science and Technology, 43, Sec. 4, Keelung Road, Taipei 106, Taiwan

<sup>d</sup>Department of Chemical Engineering, Feng Chia University, 100, Wenhwa Road, Seatwen, Taichung 40724, Taiwan, ROC

<sup>e</sup>Department of Obstetrics and Gynecology, Taichung Veterans General Hospital, Taichung, 40705 Taiwan, ROC

<sup>f</sup>Institute of Biomedical Sciences, Ph.D. Program in Translational Medicine, and Rong-Hsing Research Center for Translational Medicine, National Chung-Hsing University, Taichung 940227, Taiwan, ROC

<sup>g</sup>Division of Cardiology, Departments of Internal Medicine, College of Medicine, School of Medicine, Taipei Medical University, Taipei 110, Taiwan

\*To whom correspondence should be addressed.

Tel.: +886-2-27376523; Fax: +886-2-27376544

E-mail: chlu@vghtc.gov.tw (C.-H.Lu); jkchen@mail.ntust.edu.tw (J.-K. Chen)

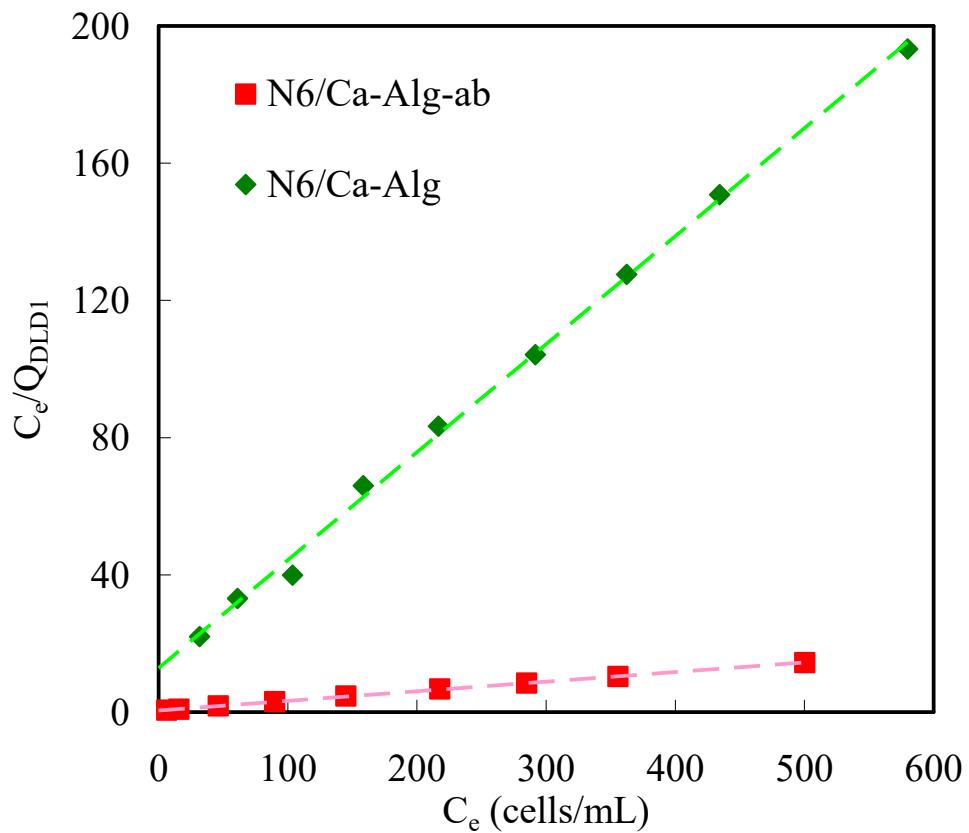
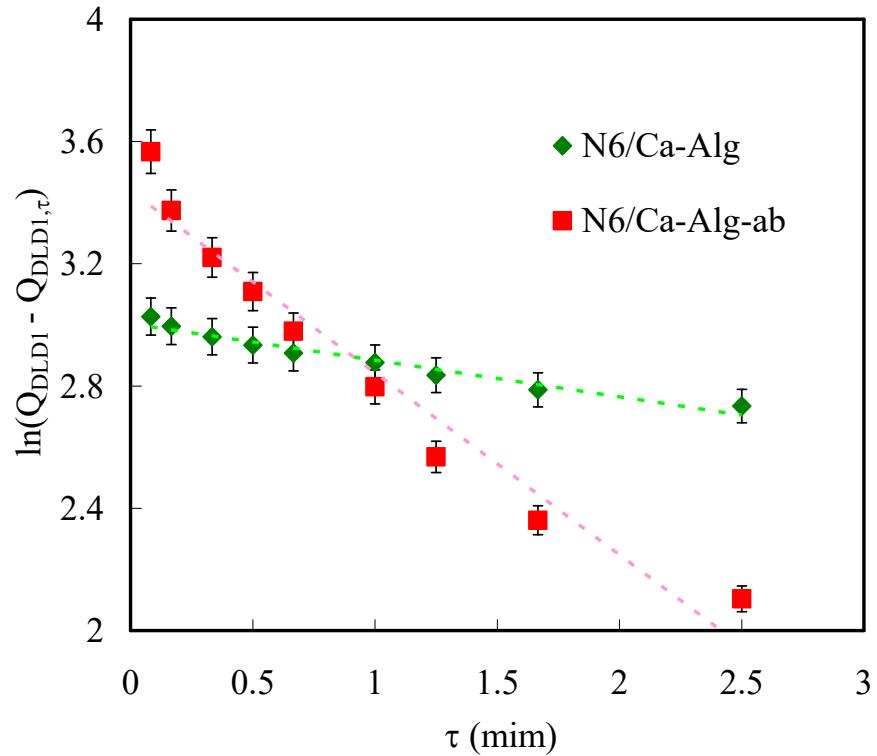


Figure S1 Linear Langmuir isotherm plots for the CTC capture by N6/Ca-Alg and N6/Ca-Alg-ab.

(a)



(b)

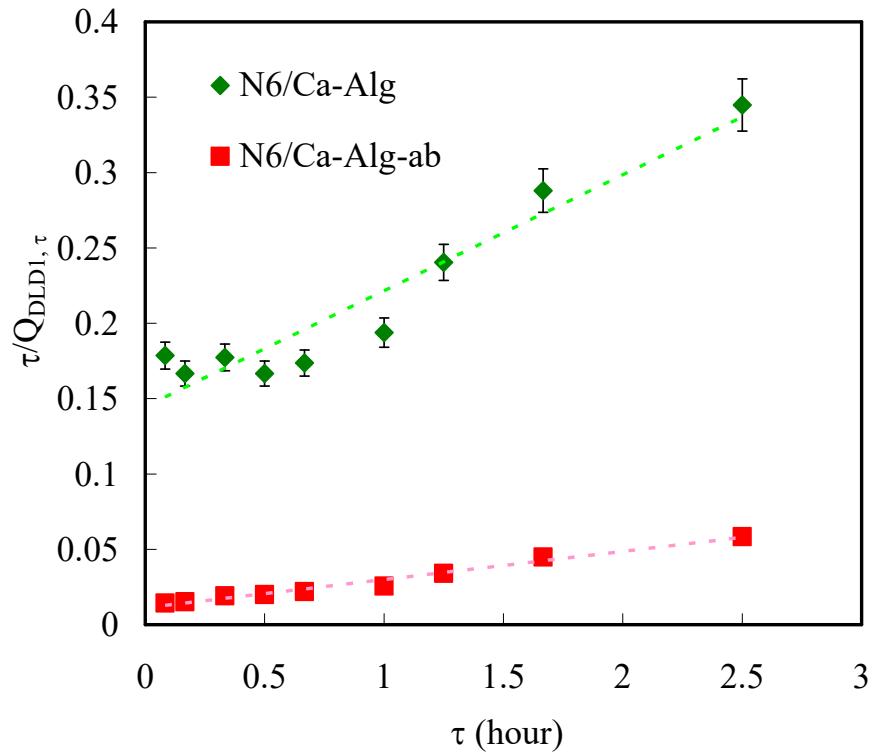
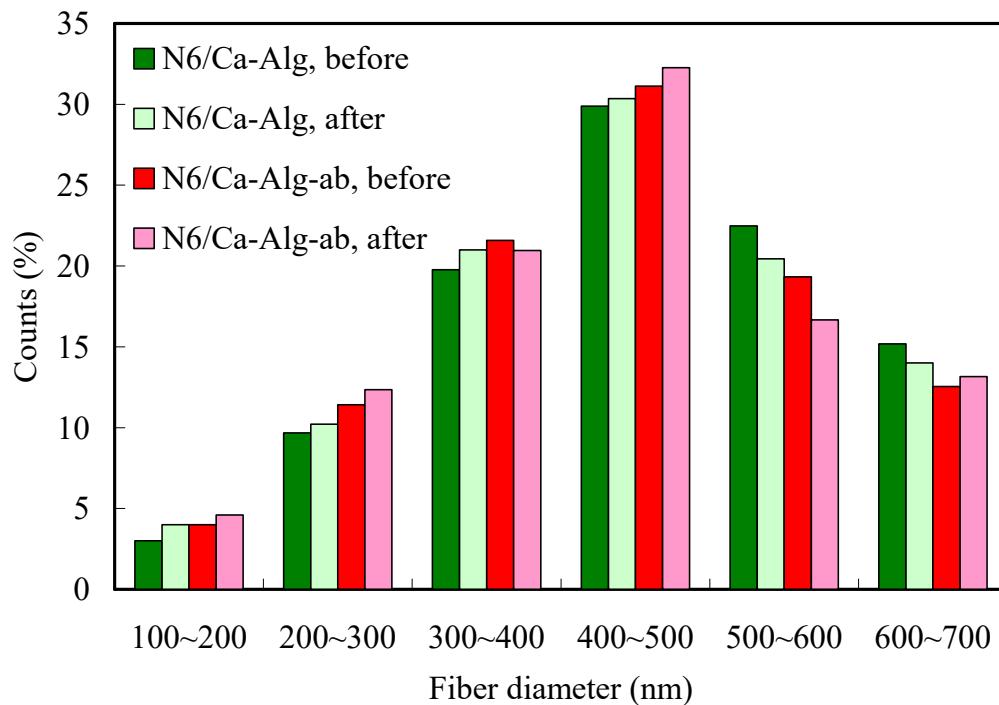
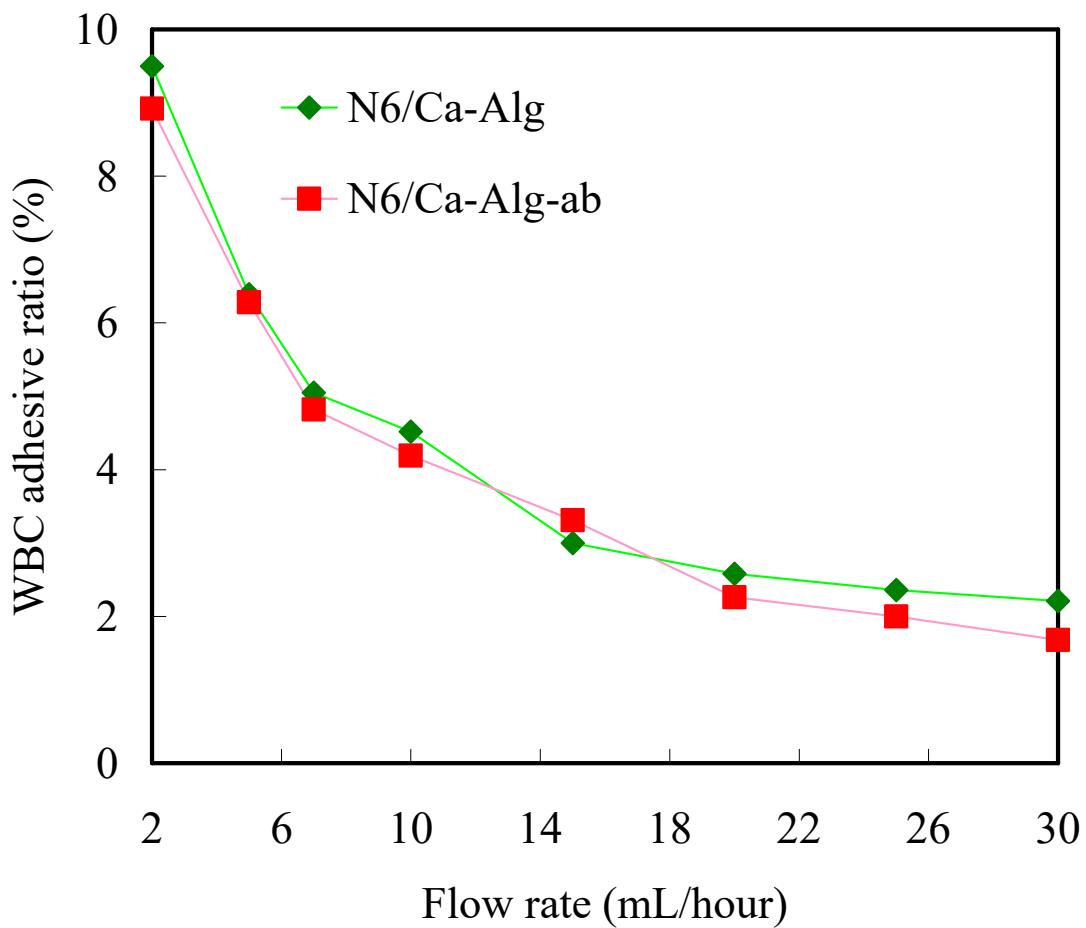


Figure S2 Fit of kinetic data to (a) PFO and (b) PSO model for CTC capture by N6/Ca-Alg and N6/Ca-Alg-ab.

(a)



(b)



(c)

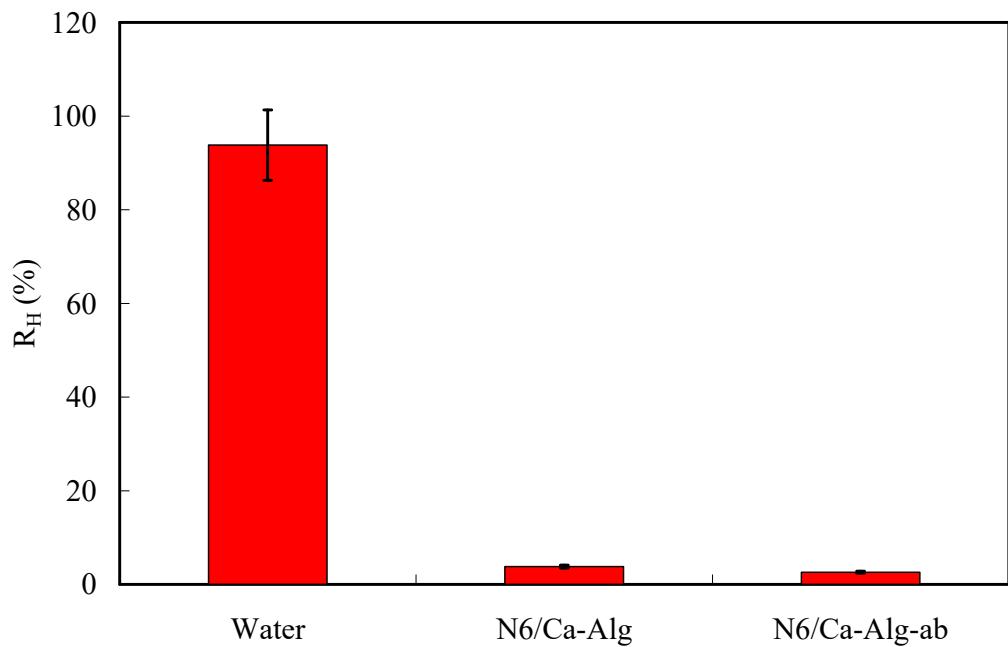


Figure S3 (a) (a) Fiber diameter distribution of N6/Ca-Alg and N6/Ca-Alg-ab before and after the antibiofouling experiments. (b) WBC adhesive ratios on N6/Ca-Alg and N6/Ca-Alg-ab plotted as a function of flow rate through the microfluidic chip. (c)  $R_H$  of N6/Ca-Alg and N6/Ca-Alg-ab with the control.