

## Supporting information

# Microvesicles Detection by Reduced Graphene Oxide Field Effect Transistor Biosensor Based on a Membrane Biotinylation Strategy

Ding Wu<sup>a,ξ</sup>, Hong Zhang<sup>b,ξ</sup>, Dan Jin<sup>a</sup>, Yi Yu<sup>a</sup>, Dai-Wen Pang<sup>c</sup>, Meng-Meng Xiao<sup>d</sup>,  
Zhi-Ling Zhang<sup>c,\*</sup>, Zhi-Yong Zhang<sup>d,\*</sup>, Guo-Jun Zhang<sup>a,\*</sup>

<sup>a</sup>School of Laboratory Medicine, Hubei University of Chinese Medicine, 16 Huangjia  
Lake West Road, Wuhan 430065, P.R. China

<sup>b</sup>Teaching and Research Office of Forensic Medicine, Hubei University of Chinese  
Medicine, 16 Huangjia Lake West Road, Wuhan 430065, P.R.China

<sup>c</sup>Key Laboratory of Analytical Chemistry for Biology and Medicine (Ministry of Educ  
ation), College of Chemistry and Molecular Sciences, Wuhan University,  
Wuhan 430072, P.R.China

<sup>d</sup>Hunan Institute of Advanced Sensing and Information Technology, Xiangtan  
University, Hunan 411105, P. R. China

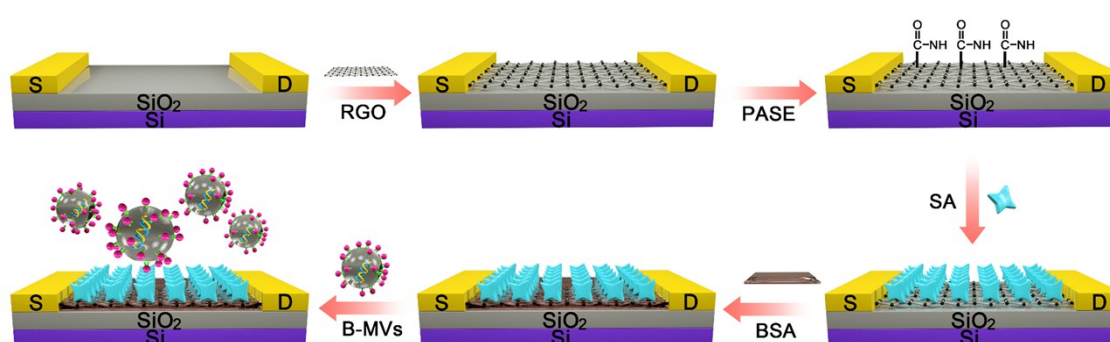
<sup>ξ</sup>These authors contributed equally to this work

\*Corresponding author: Tel: +86-27-68890259, Fax: +86-27-68890259

E-mail: zhanggj@hbtcu.edu.cn; zlzhang@whu.edu.cn; zyzzhang@pku.edu.cn

**TABLE S1. Performance Comparison of Various MVs Biosensors**

Device	Probe	LOD (particles/ $\mu\text{L}$ )	Reference
Magnetoresistive Sensors	Anti-CD31 antibody	$10^5$	22
Electrochemical Sensors	Anti-PAC1 antibody	$10^2$	23
Electrochemical Sensors	Anti-PAC1 and P-selectin antibodies	96	24
Fluorescence Sensors	Anti-CD45 antibody	-	21
<b>RGO FET Sensors</b>	<b>SA</b>	<b>20</b>	<b>This work</b>



**Figure S1.** The fabrication process of the SA-functionalized FET biosensor for monitoring B-MVs derived from cultured cells.

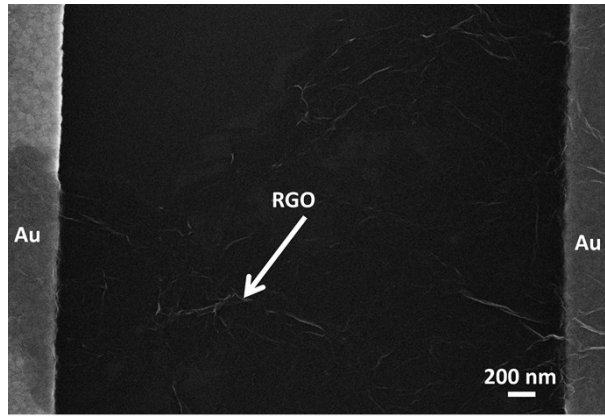


Figure S2. The SEM image of RGO deposited onto the FET channel surface.

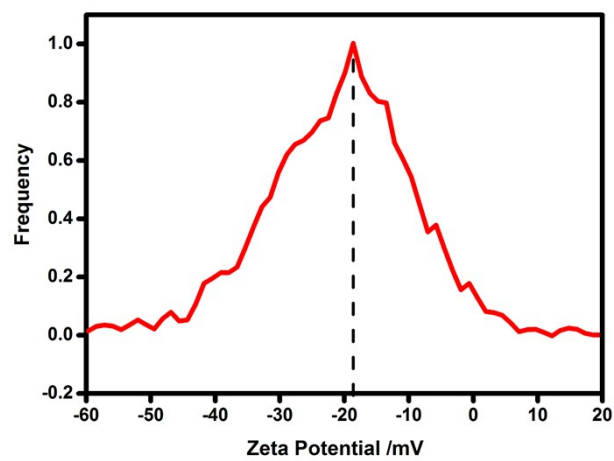
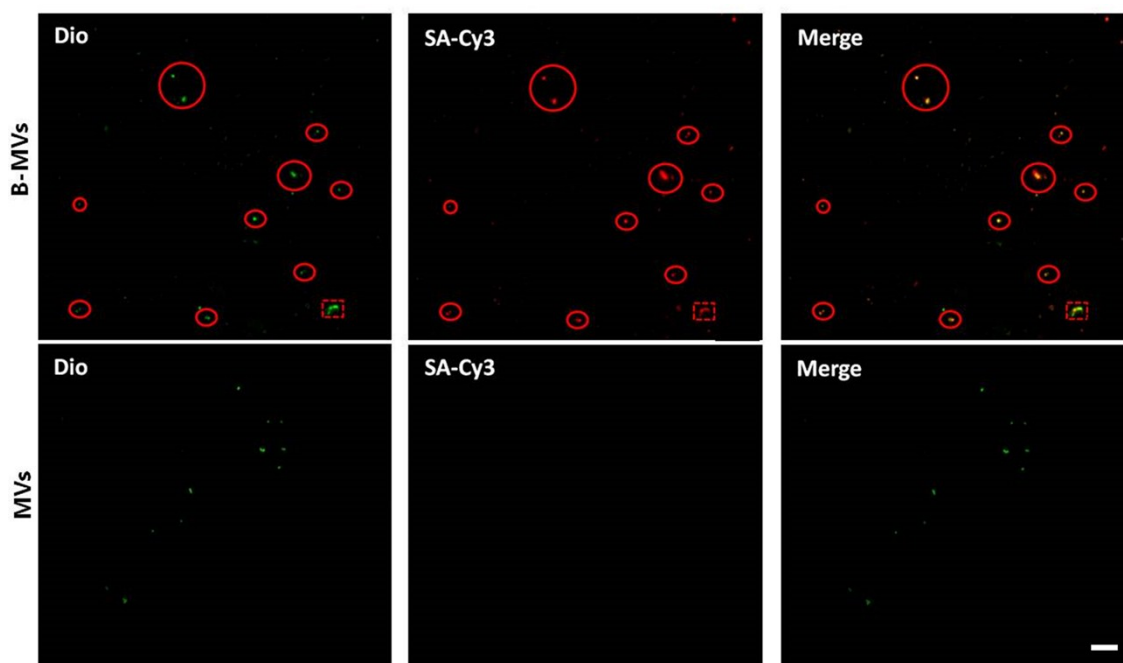
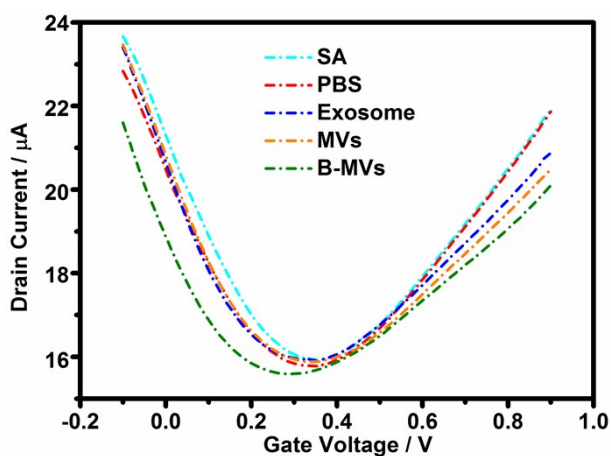


Figure S3. Zeta potential of HepG2-derived B-MVs analyzed by the nanoparticle tracking analyzer.



**Figure S4.** Fluorescence microscope images of HepG2-derived B-MVs and control MVs dyed with Dio and SA-Cy3. (Dio: excitation 484nm, emission at 501nm; SA-Cy3: excitation 550nm, emission at 570 nm; Merge: merge of Dio and SA-Cy3). Scale bars, 1  $\mu\text{m}$ .



**Figure S5.** The transfer curves of the SA-functionalized RGO-FET biosensor incubated with 0.01 $\times$ PBS, MVs ( $10^9$  particles/mL), exosomes ( $10^9$  particles/mL) and B-MVs ( $10^5$  particles/mL).