

## Supplementary Data

### A Portable Chromium Ion Detection System based on a Smart Phone

#### Readout Device

Shiting Yu<sup>a,1</sup>, Wei Xiao<sup>a,1</sup>, Qiangqiang Fu<sup>a</sup>, Ze Wu<sup>a</sup>, Cuize Yao<sup>a</sup>, Haicong Shen<sup>a</sup>, Yong Tang<sup>a, b, c\*</sup>

a. Department of Bioengineering, Guangdong Province Key Laboratory of Molecular Immunology and Antibody Engineering, Jinan University, Guangzhou 510632, PR China.

b. Institute of food safety and nutrition, Jinan University, Guangzhou, 510632, PR China

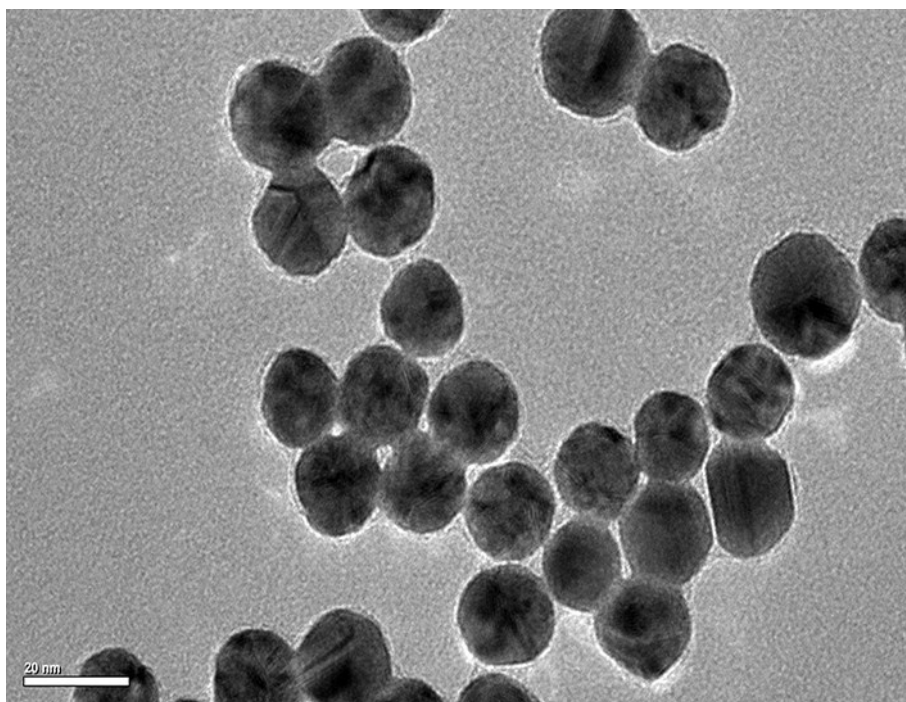
c. Institute of bio-translational Medicine, Jinan University, Guangzhou, 510632, PR China.

† Corresponding authors: Fax: (+86)-20-85227003;

Tel: (+86)-20-85227003; E-mail: [tyjaq7926@163.com](mailto:tyjaq7926@163.com).

#### 1. Characterization of the gold nanoparticles (AuNPs)

To measure the size and size distribution of these particles, the AuNPs were scanned under a TEM, and the results showed that the average diameter of these particles was approximately 14nm with a good size distribution.



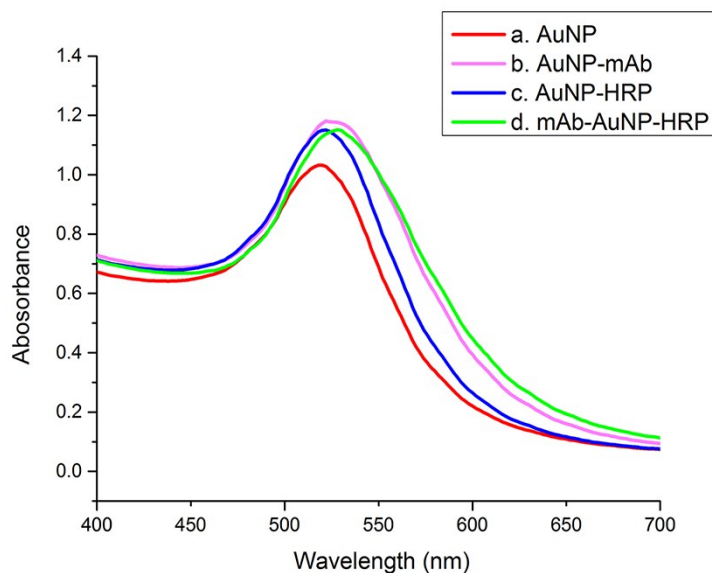
**Fig.S1** The sizes of naked gold nanoparticles were observed by TEM.

The gold nanoparticles were scanned under a TEM (93,000 $\times$ ) to measure the size.

## **2. Characterization of the mAb–AuNP-HRP.**

To confirm the mAb against anti-Cr-EDTA and HRP had been absorbed on the AuNP successfully, absorption spectrum of bare gold nanoparticle (AuNP), mAb–AuNP, AuNP-HRP and mAb–AuNP-HRP were scanned by UV–vis spectroscopy. A peak at 518 nm in curve ‘a’ is due to the surface plasmon resonance of AuNP. When conjugated with antibody, the absorption spectrum of AuNP red shift to 520 nm as shown in curve “b”. When conjugated with HRP, the absorption spectrum of AuNP red shift to 521 nm as shown in curve “c”. When conjugated with mAb against anti-Cr-EDTA and HRP, the absorption spectrum of mAb–AuNP-HRP red shift to 523 nm as shown in curve “d”.

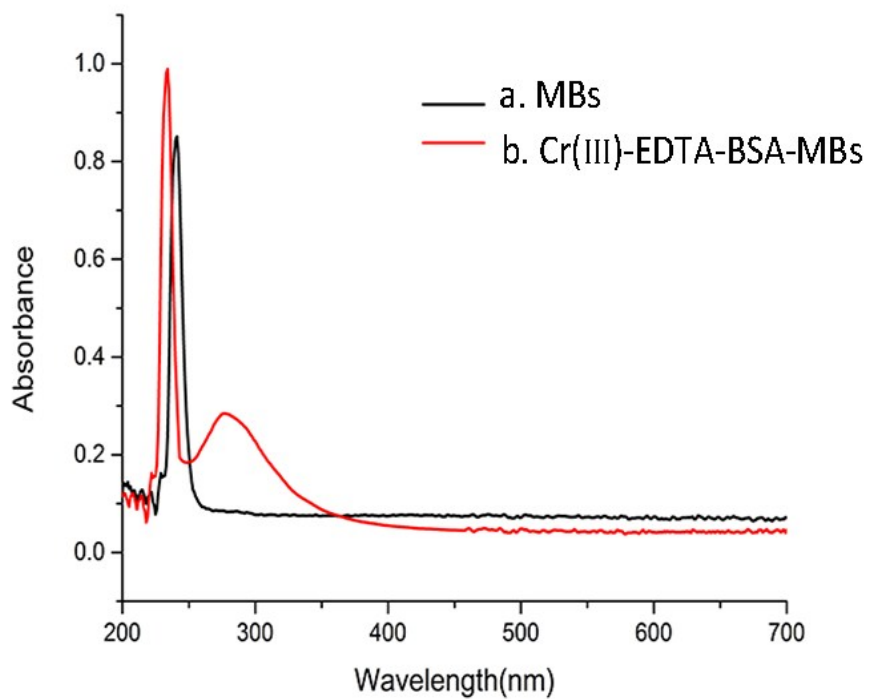
The red shift of maximum absorption wavelength demonstrated that mAb against anti-Cr-EDTA and HRP had been labeled on the AuNP successfully.



**Fig.S2** The absorption spectrum of bare gold nanoparticle (AuNP) (a), mAb–AuNP (b), AuNP-HRP (c) and mAb–AuNP-HRP (d) were observed by UV-Vis spectroscopy.

### 3. Preparation Cr(III)-EDTA-BSA Coated MBs

MB has been reported as an excellent carrier that can load many kinds of molecules. Cr(III)-EDTA-BSA-MBs were prepared through the amidation reaction between carbonyl moieties of MBs and amino of Cr(III)-EDTA-BSA. When conjugated with Cr(III)-EDTA-BSA, the absorption spectrum of MB has a new absorbance at 280 nm as shown in curve “b”. The absorption wavelength demonstrated that Cr(III)-EDTA-BSA had been labeled on the MB successfully.



**Fig.S3** The absorption spectrum of MBs (a), Cr(III)-EDTA-BSA-MBs (b) were observed by UV-Vis spectroscopy.