Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information for

Protein Corona Mitigates the Cytotoxicity of Graphene Oxide by Reducing its Physical Interaction with Cell Membrane

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Supplementary Information

Preparation of DPPC membrane

DPPC lipid (50 mg) was dissolved in 5ml chloroform. The resulting solution was evaporated and then dried for 2 h under vacuum. The dried thin film DPPC was hydrated with 10 mM sodium phosphate (pH=6.4) solution and the concentration of the lipid was 10mg/ml.

Measurement of association curves

Streptavidin (SA) sensor tips were pre-wetted in distilled water and then loaded on equal concentration of GO and BSA-coated GO. The sensor loaded with nothing was used as control. The SA sensors were equilibrated with PBS solution and subsequently dipped into DPPC membrane solution (200μg/ml) for 600s. Finally, the association between DPPC membrane and GO with or without BSA coating was detected by Octet®RED96 (ForteBio, USA).

Table S1. Physicochemical characterization of GO nanosheets.

purity	Thickness	Diameter	Layers
>99wt%	**0.55-1.2nm**	**0.5-3μm**	**1-10**

Figure S1. Characterization of DLS (a) and zeta potential (b) of GO and BSA-coated GO respectively dispersed in distilled water, F-12K medium with 0%, 1% and 10% FBS.

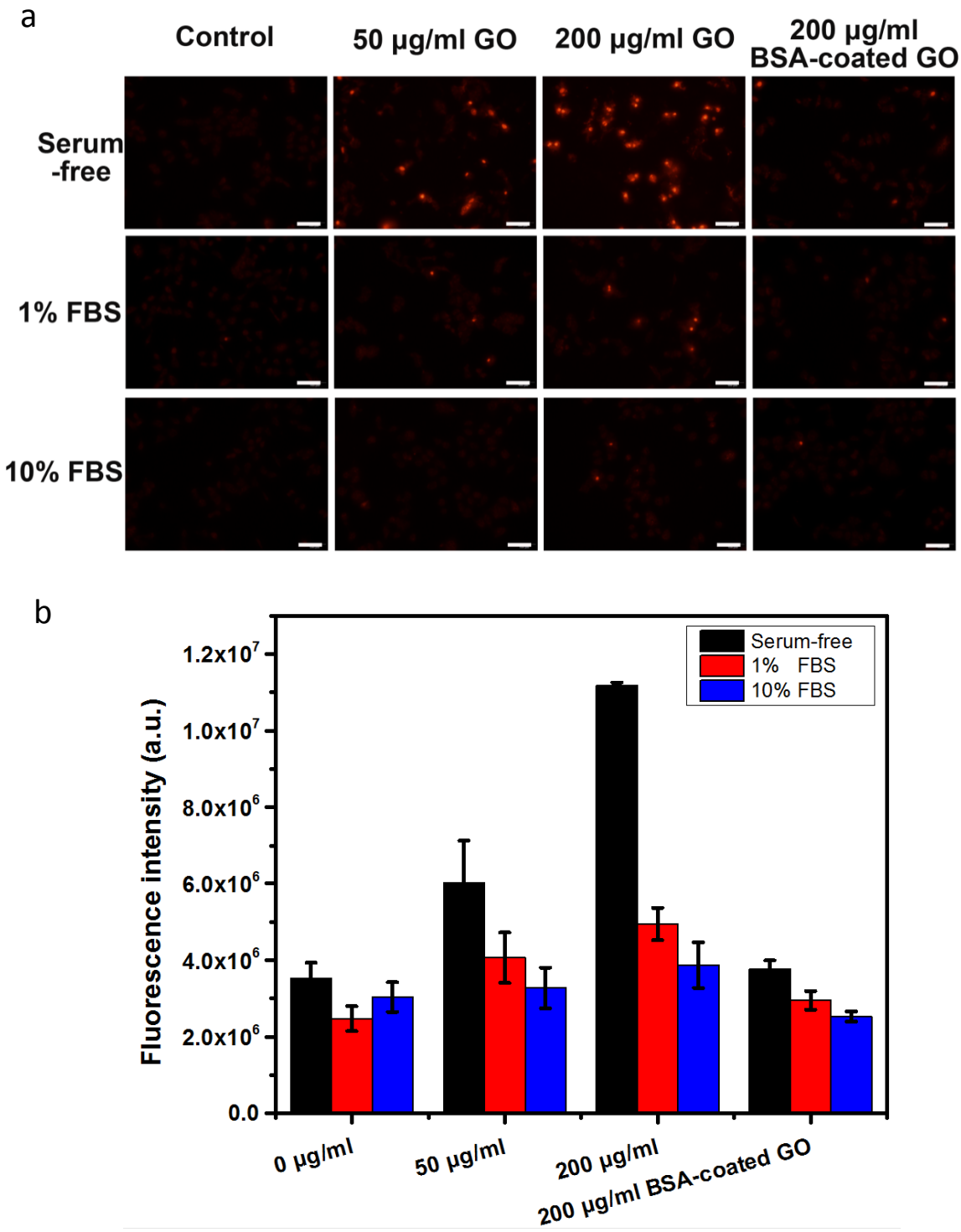

Figure S2. Fluorescence image (a) and fluorescence signal intensity (b) of the ROS generation in A549 cells. Cells were treated by DHE (Dihydroethidium) staining after treated with GO and BSA-coated GO respectively in serum-free condition, 1% FBS culture medium; 10% FBS culture medium. scale bar =100 μm.

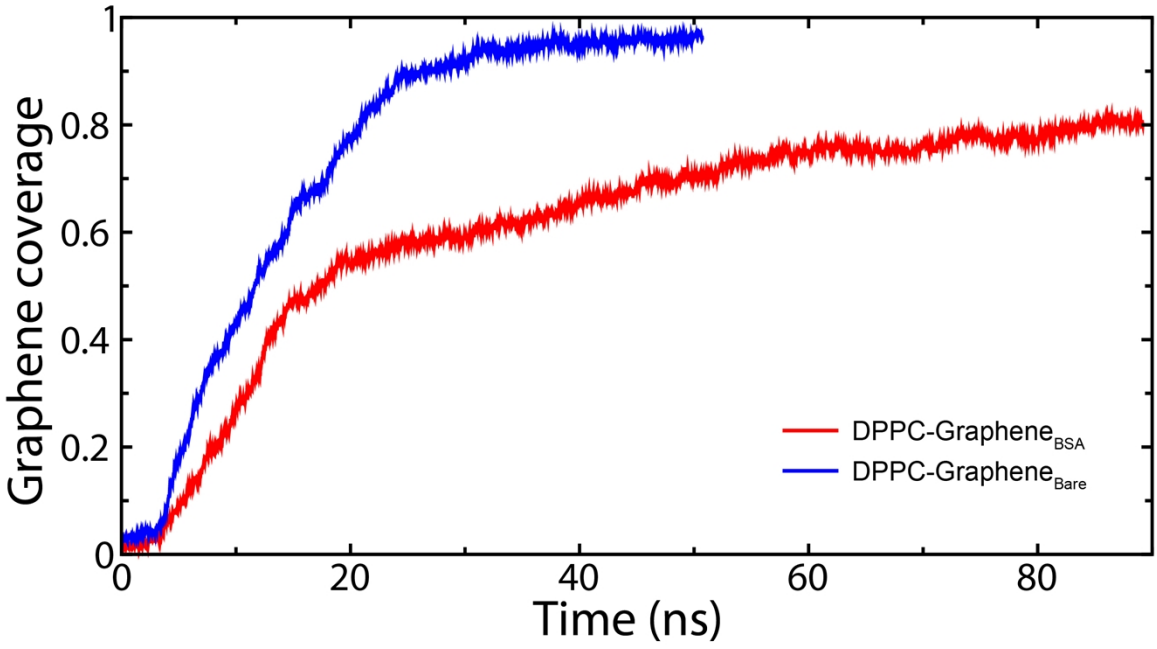

Figure S3. Time-profile of lipid coverage changes in bare and BSA-coated graphenes. The graphene coverage was calculated by normalizing the number of graphene carbon atoms in direct contact with lipids by the total number of carbons in our model graphene nanosheet.

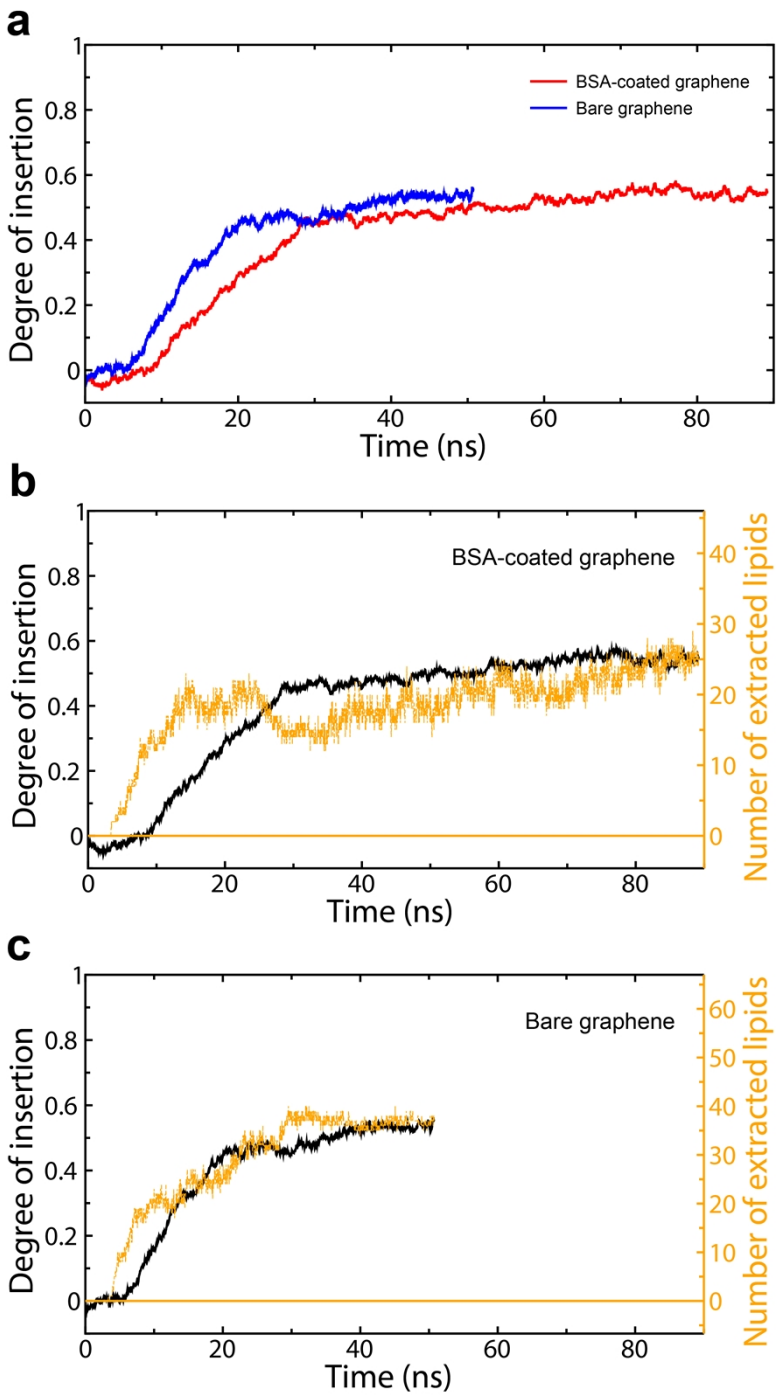

Figure S4. Time-profile of membrane insertion of graphenes. **a**, time-profile of degree of graphene insertion into membrane with or without BSA-coating. Degree of graphene insertion is defined as the separation (i.e., center-of-mass distance) between lipid bilayer and graphene normalized by the distance when they are barely touching each other. **b** and **c**, comparison

between lipid extraction and graphene insertion for graphenes with or without BSA-coating, respectively.

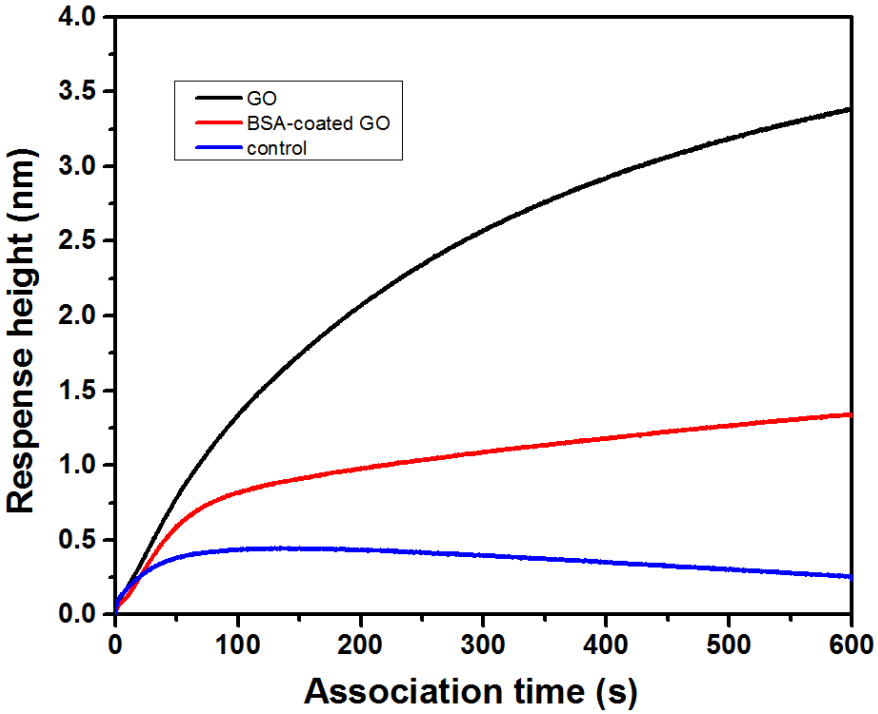

Figure S5. The association curves of DPPC membrane with GO (black line), BSA coated GO (red line), and control (blue line). A higher association signal was observed in the membrane interaction with GO than with BSA-coated GO, indicating a stronger interaction between membrane and GO (than BSA-coated GO).