

# Lateral Flow Immunoassay Coupled with Copper Enhancement for Rapid and Sensitive SARS-CoV-2 Nucleocapsid Protein Detection

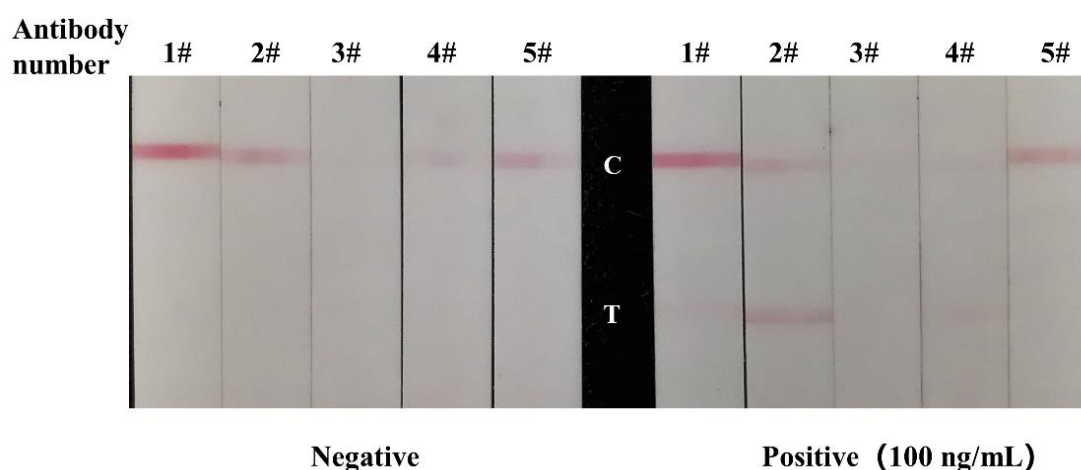
Tao Peng <sup>1</sup>, Xueshima Jiao <sup>1,2</sup>, Zhanwei Liang <sup>1,2</sup>, Hongwei Zhao <sup>3</sup>, Yang Zhao <sup>1</sup>, Jie Xie <sup>1</sup>, You Jiang <sup>1</sup>, Xiaoping Yu <sup>2</sup>, Xiang Fang <sup>1</sup> and Xinhua Dai <sup>1,\*</sup>

<sup>1</sup> Technology Innovation Center of Mass Spectrometry for State Market Regulation, Center for Advanced Measurement Science, National Institute of Metrology, Beijing 100029, China; pengtao@nim.ac.cn (T.P.); s20090710020@cjl.u.edu.cn (X.J.); s20090710033@cjl.u.edu.cn (Z.L.); zhaoy@nim.ac.cn (Y.Z.); xiejie@nim.ac.cn (J.X.); jiangyou@nim.ac.cn (Y.J.); fangxiaing@nim.ac.cn (X.F.)

<sup>2</sup> College of Life Sciences, China Jiliang University, Hangzhou 310018, China; yxp@cjl.u.edu.cn

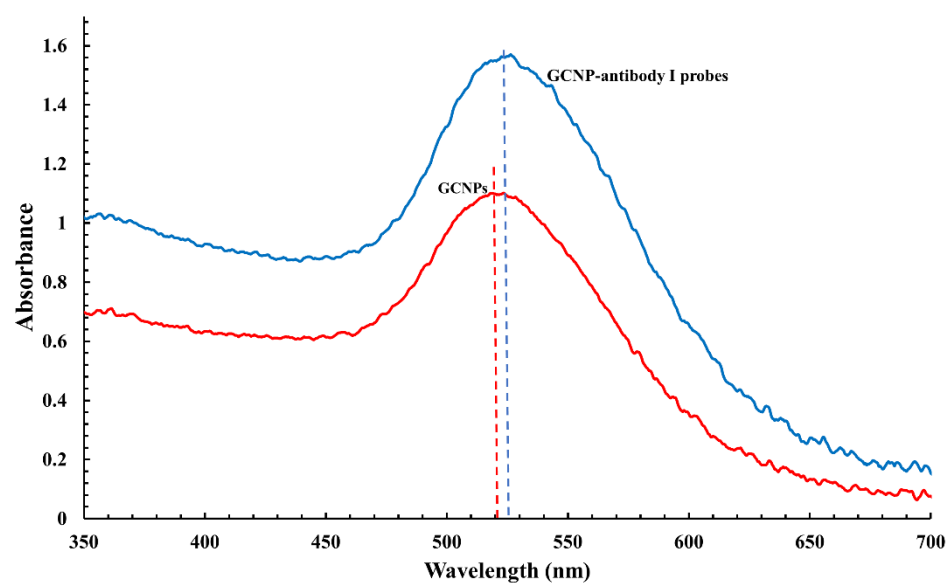
<sup>3</sup> College of Ecology and Environment, Hainan University, Haikou 570228, China; hwzhaoh@hainanu.edu.cn

\* Correspondence: [daixh@nim.ac.cn](mailto:daixh@nim.ac.cn); Tel.: +86-010-6452-4962; Fax: +86-010-6452-4962



**Figure S1.** The result of antibody pair optimization.

Six anti-NP antibodies were obtained from companies and numbered as 1#, 2#, 3#, 4#, 5#, 6#, which were primarily evaluated by the lateral flow immunoassay and some antibodies were screened. According to our primarily results, then 6# antibody was coated on the NC membrane, and 1-5# antibodies were conjugated with the GCNPs. The result indicated that 2# and 6# antibody were selected as the detection antibody and capture antibody, respectively.



**Figure S2.** UV-vis spectra of the GCNPs and GCNP-antibody I detection probes.

The UV-vis spectra were obtained by Nanodrop One<sup>c</sup> (Thermo Fisher Scientific). It indicated that the characteristic absorption peak red shifted (about from 521 nm to 523 nm), which demonstrated that the antibody I conjugated with GCNPs successfully.



**Figure S3.** Evaluation of the specificity of the proposed GCNP-LFIA.

The specificity of the proposed GCNP-LFIA has been evaluated with the recombinant protein of SARS and MERS, which indicated that it has high cross-reactivity with SARS, because SARS-CoV-2 and SARS virus have high homology.