

Electronic Supplementary Material

Ultrasensitive and point-of-care detection of plasma phosphorylated tau in Alzheimer's disease using colorimetric and surface-enhanced Raman scattering dual-readout lateral flow assay

Liding Zhang^{1,2,§}, Ying Su^{3,§}, Xiaohan Liang^{1,2}, Kai Cao^{1,2}, Qingming Luo^{4,5}, and Haiming Luo^{1,2,5} (✉)

¹ Britton Chance Center for Biomedical Photonics, Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology (HUST), Wuhan 430074, China

² MoE Key Laboratory for Biomedical Photonics, School of Engineering Sciences, Huazhong University of Science and Technology, Wuhan 430074, China

³ Department of Neurology, Union Hospital, Tongji Medical College, Huazhong University of Science and Technology, Wuhan 430074, China

⁴ Key Laboratory of Biomedical Engineering of Hainan Province, School of Biomedical Engineering, Hainan University, Haikou 570228, China

⁵ Research Unit of Multimodal Cross Scale Neural Signal Detection and Imaging, Chinese Academy of Medical Sciences, HUST-Suzhou Institute for Brainmatics, Jiangsu Industrial Technology Research Institute (JITRI), Suzhou 215123, China

[§] Liding Zhang and Ying Su contributed equally to this work.

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Figure S6 OD₅₂₅ value and absorption spectrum of 4-MBA@AuNP-3G5 conjugates loading at different concentrations of NaCl.

Figure S7 The log-linear curve of T-line color and SERS intensity versus different p-tau^{396,404} concentrations.

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Figure S10 Colorimetric intensity of dual-readout LFA detecting different concentrations of p-tau^{396,404} protein.

Supplementary Tables

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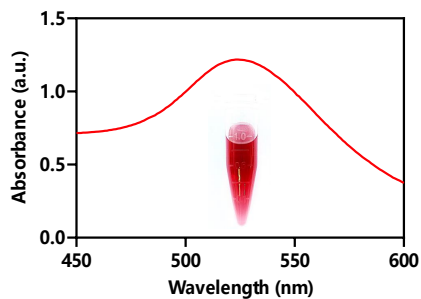


Fig. S1 The color and UV-Vis absorption spectra of AuNPs.

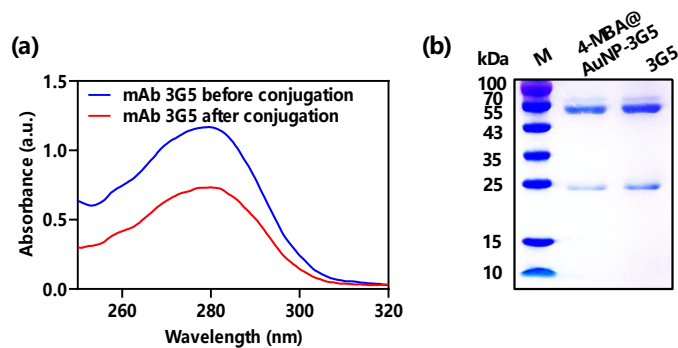


Fig. S2 (a) The UV-Vis absorption spectra of supernatant liquor (3G5) before and after conjugation. (b) Reduced SDS-PAGE analysis of the 4-MBA@AuNP-3G5.

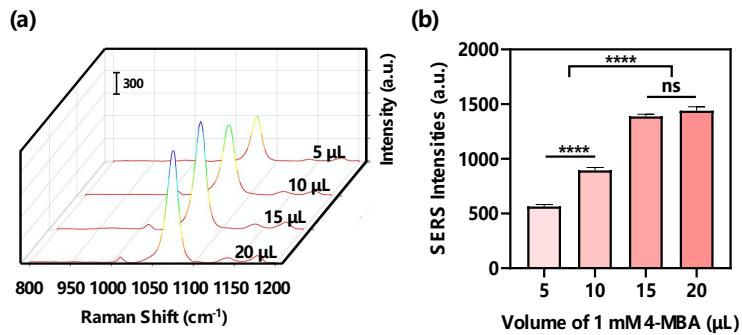


Fig. S3 The Raman spectra (a) and intensity (b) of 4-MBA@AuNP-3G5 at different volumes of 1 mM 4-MBA. Data are presented as means \pm SD, $n = 3$. Statistical significance is indicated in figures by **** $p < 0.0001$ and ns (indicating no significance).

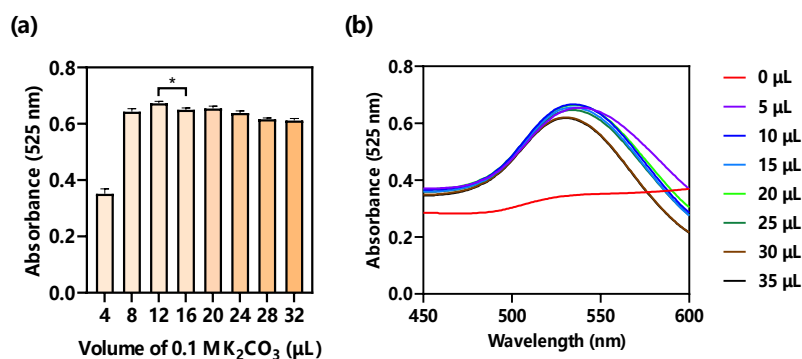


Fig. S4 OD₅₂₅ value (a) and absorption spectrum (b) of 4-MBA@AuNP-3G5 conjugates loading at different volumes of 0.1 M K₂CO₃. Data are presented as means ± SD, n = 3. Statistical significance is indicated in the figures by **p* < 0.05.

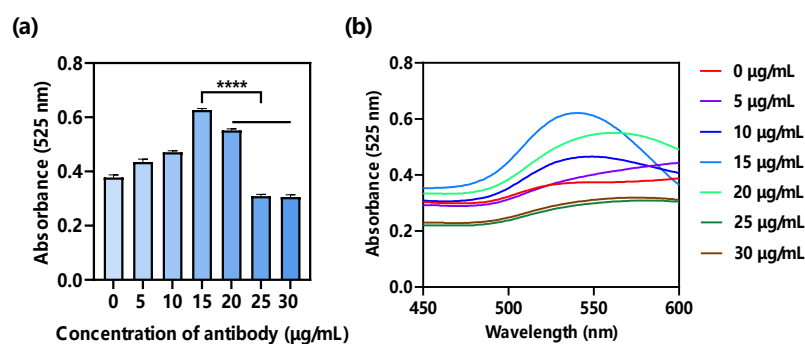


Fig. S5 OD₅₂₅ value (a) and absorption spectrum (b) of 4-MBA@AuNP loading different concentrations of 3G5. Data are presented as means ± SD, n = 3. Statistical significance is indicated in figures by *****p* < 0.0001.

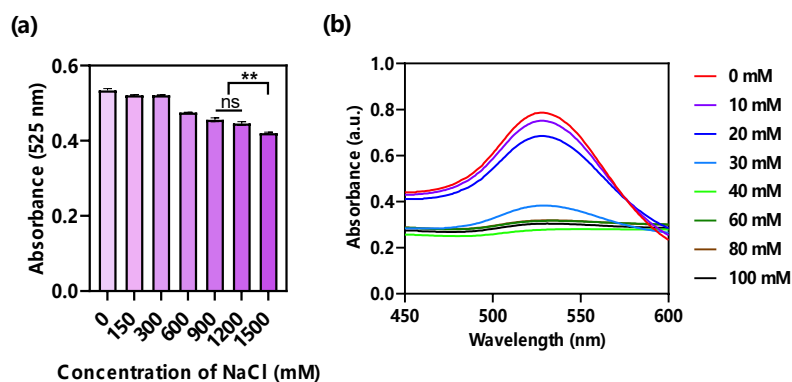


Fig. S6 OD₅₂₅ value (a) and absorption spectrum (b) of 4-MBA@AuNP-3G5 conjugates loading at different concentrations of NaCl. Data are presented as means ± SD, n = 3. Statistical significance is indicated in figures by ***p* < 0.01 and ns (indicating no significance).

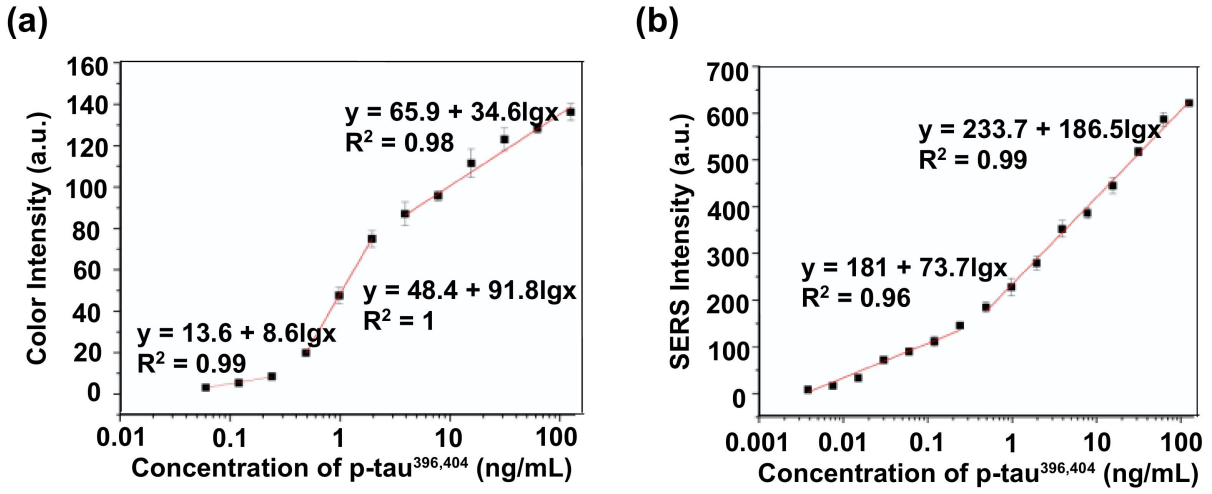


Fig. S7 (a) The linear curve of T-line color intensity versus p-tau^{396,404} concentrations ranging from 60 pg/mL to 125 ng/mL. (b) The linear curve of SERS intensity on the T-line versus p-tau^{396,404} concentration ranged from 3.8 pg/mL to 125 ng/mL.

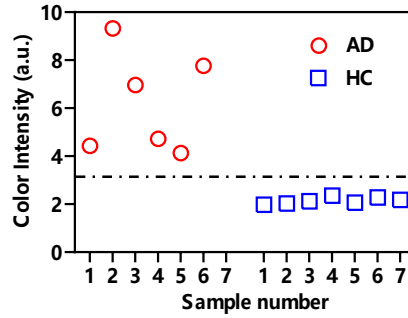


Fig. S8 The comparison of colorimetric-based LFA test results and the diagnosis results.

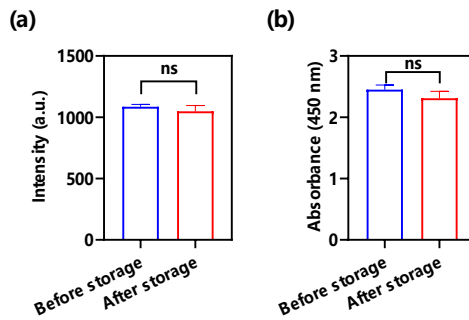


Fig. S9 Raman intensities (a) and antibody activity (b) of 4-MBA@AuNP-3G5 before and after storage. Data are presented as means \pm SD, n = 3.

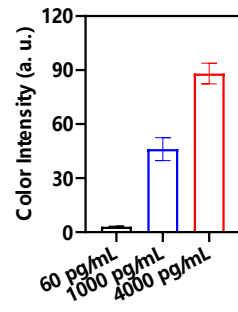


Fig. S10 Colorimetric intensity of dual-readout LFA detecting different concentrations of p-tau^{396,404} protein. Data are presented as means \pm SD, n = 3.

Supplementary Tables

Table S1 The sequence of synthesized peptides used in this study

p-tau ^{396,404}	RENAKAKTDHGAEIVYK[Ser(P)]PVVSGDT[Ser(P)]PRHL
p-tau ³⁹⁶	TDHGAEIVYK[Ser(P)]PVVSGDTSRHL
p-tau ⁴⁰⁴	TDHGAEIVYKSPVVSGDT[Ser(P)]PRHL
p-tau ²³¹	CKKVAVVR[Thr(P)]PPKSPSSAK
np-tau ²³¹	KVAVVRTPPKSPS
np-tau ³⁹⁶	TDHGAEIVYKSPVVSGDTSRHL
np-tau ⁴⁰⁴	TDHGAEIVYKSPVVSGDTSRHL
np-tau ^{396,404}	RENAKAKTDHGAEIVYKSPVVSGDTSRHL

Table S2 Information of the participants in this study

Participant	Sex	Age	Identification	Verification	MoCA score	p-tau ¹⁸¹ (pg/mL)	p-tau ²¹⁷ (pg/mL)
AD 9	M	62	AD	AD	8	13.37	32.83
AD 13	M	61	AD	AD	2	20.65	46.23
AD 7	F	74	AD	AD	5	22.58	34.84
AD 15	F	54	AD	AD	5	16.90	41.14
AD 16	F	70	AD	AD	10	12.89	47.22
AD 20	F	60	AD	AD	6	14.55	34.84
HC 1	F	53	HC	HC	27	5.29	7.71
HC 2	F	57	HC	HC	28	4.46	8.39
HC 3	F	55	HC	HC	27	3.97	5.84
HC 4	F	75	HC	HC	28	6.28	13.64
HC 5	F	65	HC	HC	29	4.08	9.14
HC 6	F	64	HC	HC	28	4.19	10.47
HC 7	F	55	HC	HC	28	4.77	12.48

Table S3 Information of antibodies used in this study

mAb	Isotype	IC50 Value	Titre
3G5	IgG1, κ chain	49 nM	10 ⁶
4B1	IgG2, κ chain	14 nM	10 ⁶