Electronic supplementary information

Peptide-assembled WS₂ nanosheet as a A peptide-WS₂ nanosheet based biosensing platform for the determination of β-secretase and screening of its Inhibitors

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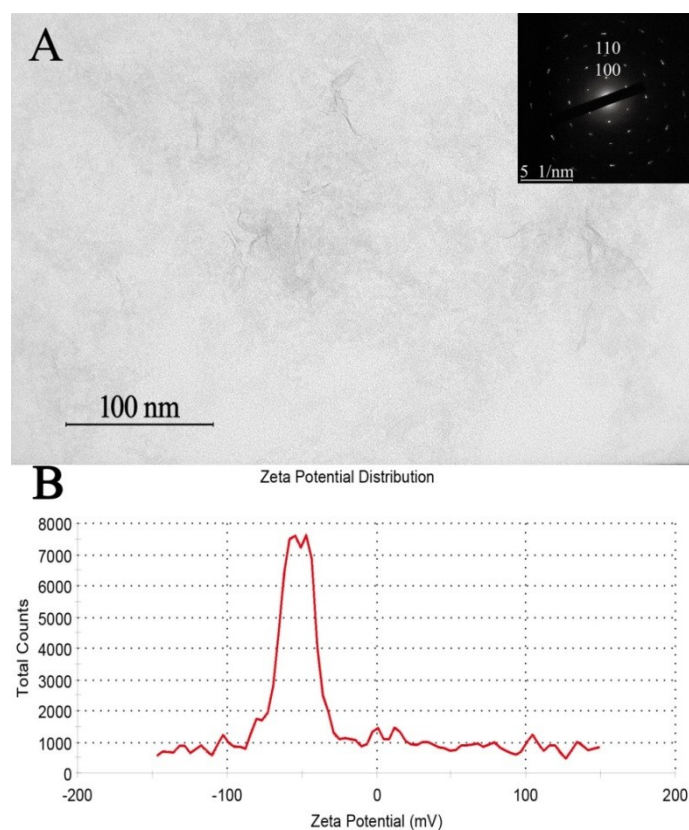Tel.: 86-931-8912763. Fax: 86-931-8912582. E-mail: chenxg@lzu.edu.cn

Fig. S1 (A) TEM image of WS$_2$ nanosheet, Inset: EDS spectrum of WS$_2$ nanosheet, (B) Values of the ζ potential for WS$_2$ nanosheet.
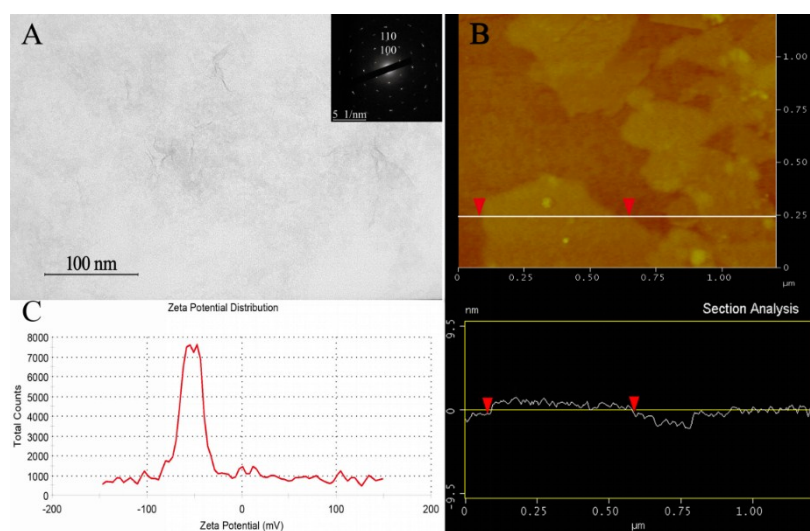

Fig. S1 (A) TEM image of WS$_2$ nanosheet, Inset: SAED pattern of WS$_2$ nanosheet, (B) AFM image and height profile of WS$_2$ nanosheet , (C) Values of the ζ potential for WS$_2$ nanosheet.
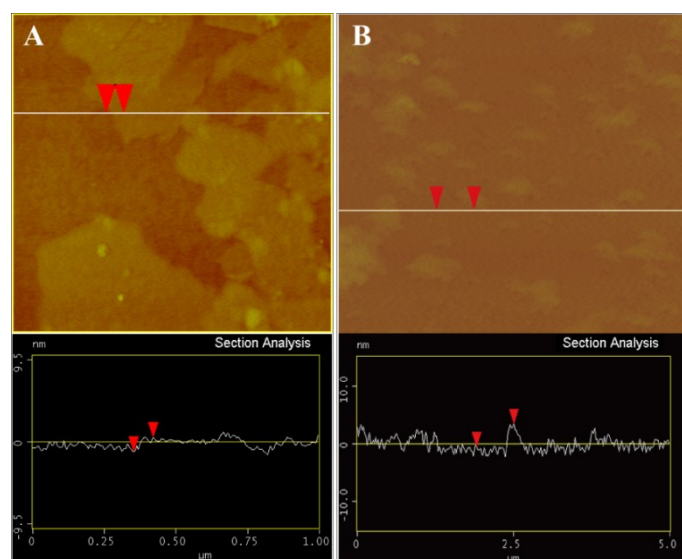
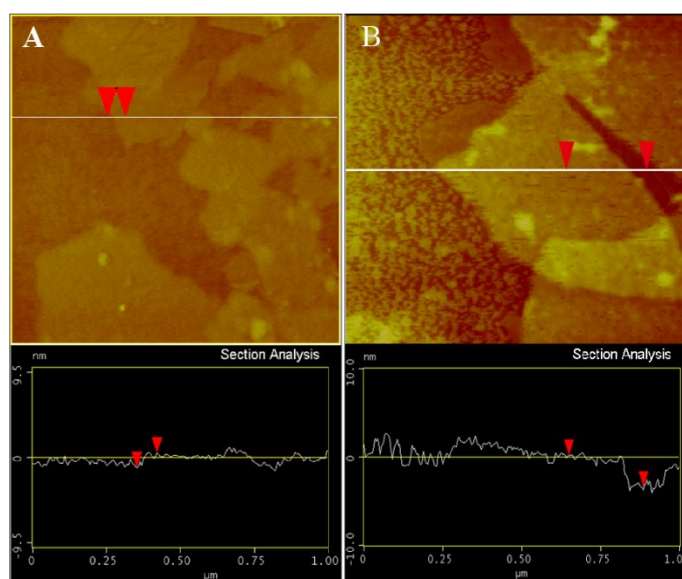**Fig. S2** AFM image and height profile of WS$_2$ nanosheet (A) and peptide-WS$_2$ complex (B).

Fig. S2 AFM image and height profile of WS$_2$ nanosheet (A) and peptide-WS$_2$ complex (B).
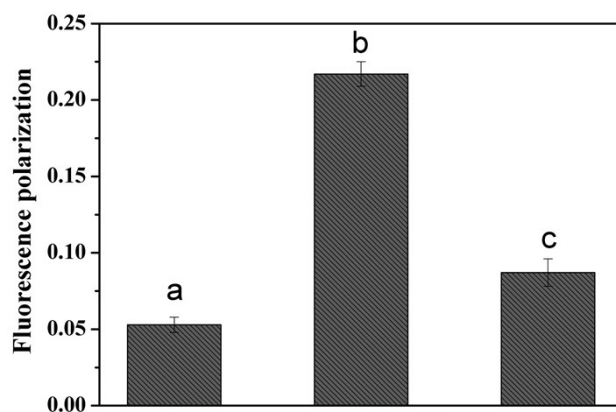
Fig. S3 Changes of fluorescence anisotropy of (a) 50 nM FAM-peptide, (b) 50 nM FAM-peptide + 25 mg·mL^{-1} WS$_2$ nanosheet, (c) 50 nM FAM-peptide + 25 mg·mL^{-1} WS$_2$ nanosheet + 100 nM BACE1.
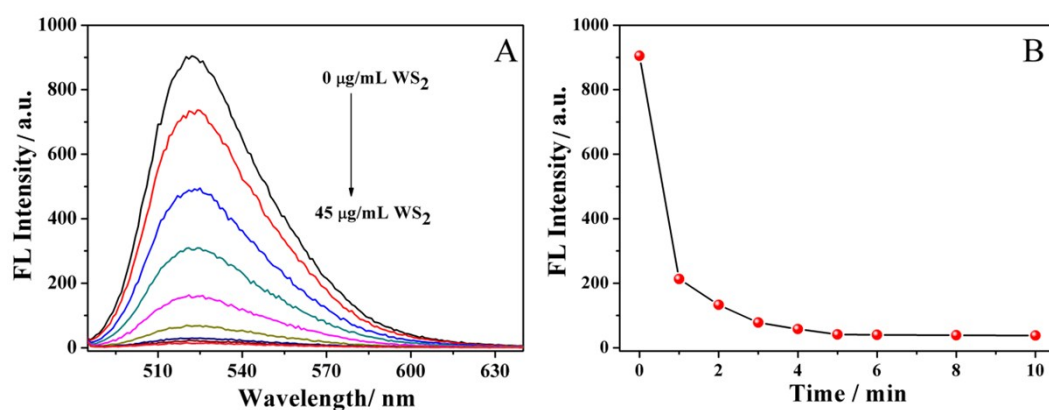

Fig. S4 (A) Fluorescence quenching of FAM-peptide in the presence of an increasing amount of WS$_2$ nanosheet (0, 2, 5, 10, 15, 20, 25, 35, and 45 μg·mL^{-1}). (B) Fluorescence quenching of FAM-peptide by WS$_2$ nanosheet (25 μg·mL^{-1}) as a function of time.
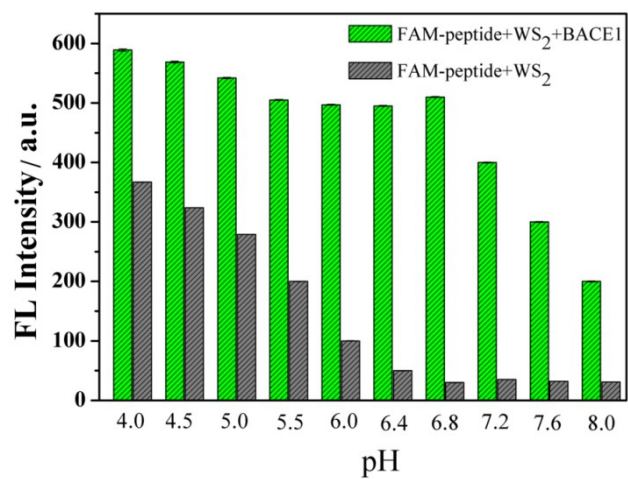
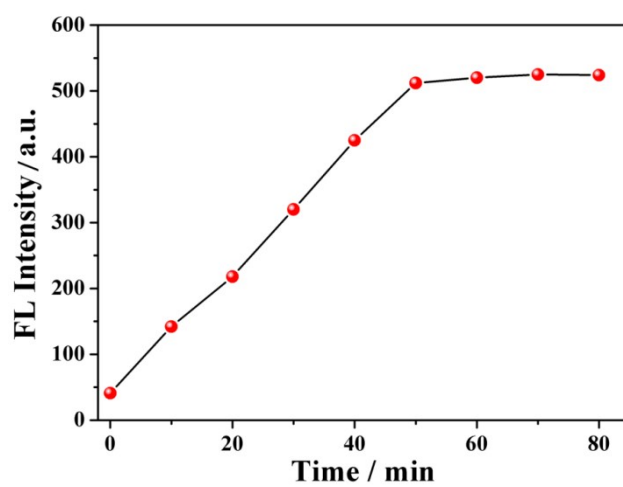**Fig. S5** The effect of pH on fluorescence intensity.

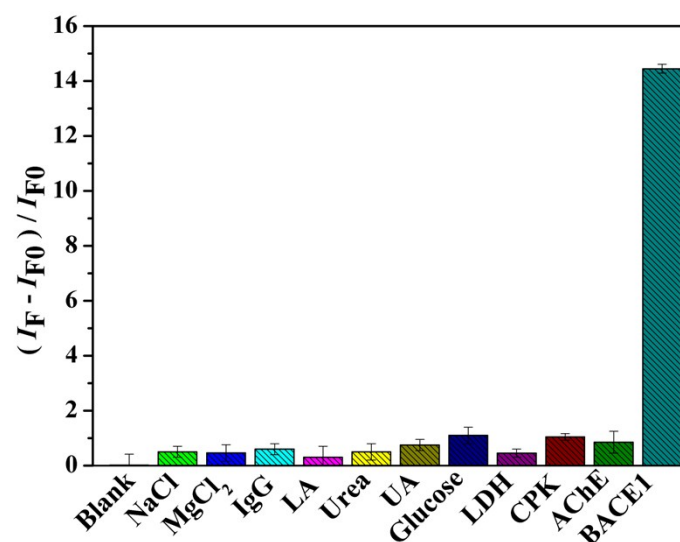**Fig. S6** The effect of cleavage time on fluorescence intensity.

Fig. S7 Fluorescence intensity of the WS$_2$ nanosheet-based biosensing platform in the presence of different interfering substances: Blank (without BACE1), NaCl(1 mM), MgCl$_2$(1 mM), IgG(500 nM), LA(1 mM), urea(1 mM), UA(1 mM), glucose(1 mM), LDH(500 nM), CPK (500 nM), AChE(500 nM), and BACE1(100 nM).

Fig. S8 The difference in fluorescence intensity of WS$_2$ nanosheet-based biosensing platform for BACE1 under various conditions.(mixed solution including NaCl(1 mM), MgCl$_2$(1 mM), IgG(500 nM), LA(1 mM), urea(1 mM), UA(1 mM), glucose(1 mM), LDH(500 nM), CPK (500 nM), AChE(500 nM), and BACE1(100 nM))
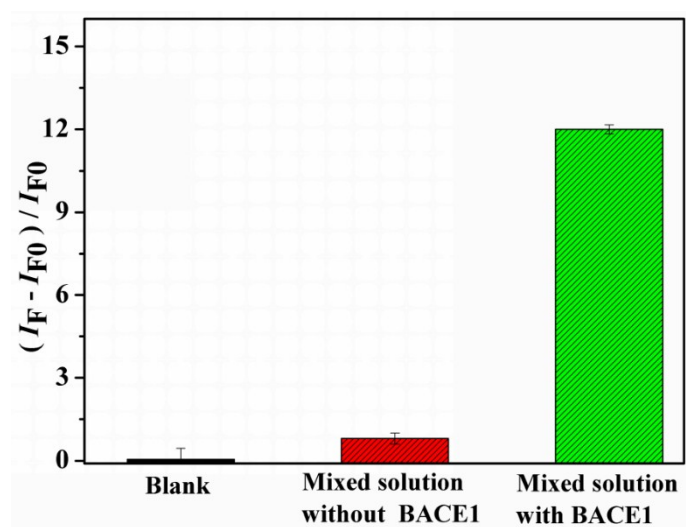
Table S1   Recovery test of BACE1 in rat CSF samples

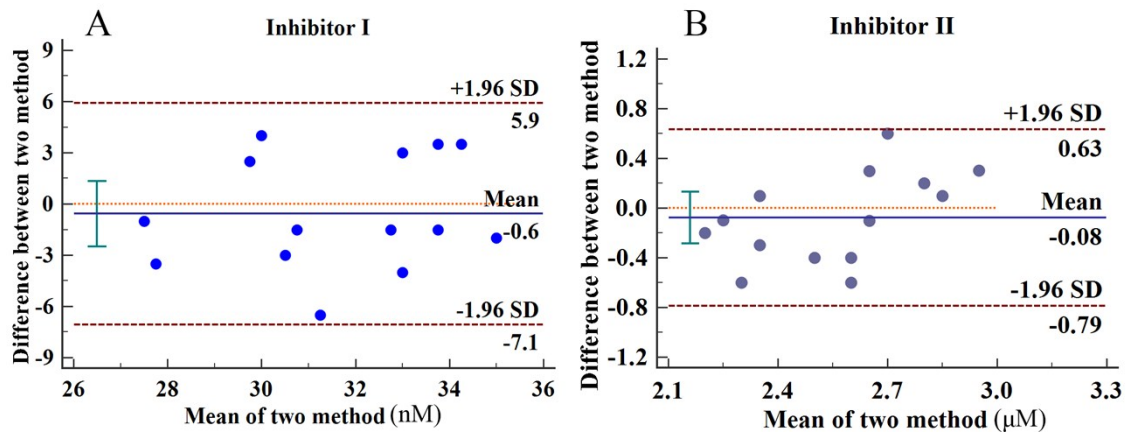| Sample No.	Added (nM)	Found (nM)	Recovery (%)	RSD (n=3, %)
1	0.30	0.27	90.00	1.50
2	8.00	7.81	97.63	0.41
3	75.00	78.60	104.8	3.32

Fig. S9   Bland-Altman plots of IC50 values obtained from our proposed method and

ELISA assay (A) inhibitor I, (B) inhibitor II.