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Supplementary Material

A New Strategy Using a Fluorescent Probe Combined with Polydopamine for Detecting the Activity of Acetylcholinesterase

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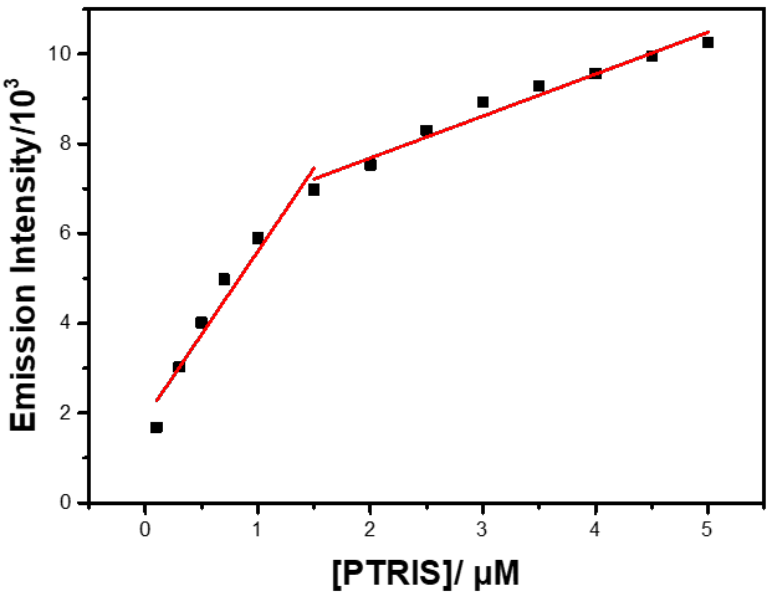

Fig. S1 Emission intensity changes of PTRIS at 550 nm with concentration. Condition: buffer Tris-HCl (50 mM, pH 8.5), 2 mL. Excitation wavelength: 500 nm.

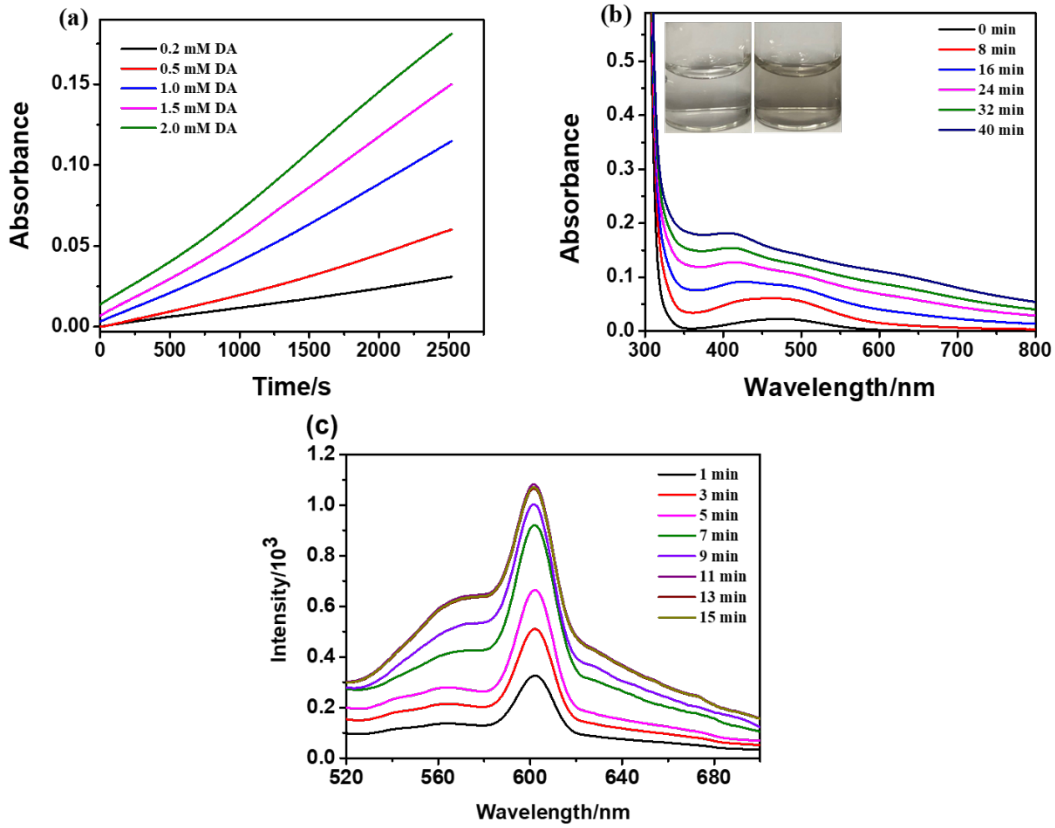

Fig. S2 (a) The absorbance of dopamine in different concentrations (0.2-2.0 mM) at 400 nm with time; (b) The UV-vis spectra of dopamine (2 mM) at 0-40 min. Insert: the original solution of DA (left), the spontaneously formed PDA solution after exposing in air for 40 min (right). (c) The fluorescence emission of DA (2 mM) at the excitation wavelength of 500 nm over time. Conditon: buffer, Tris-HCl (50 mM, pH 8.5), buffer was added till the final volume was 2 mL in each sample, excitation wavelength: 500 nm.

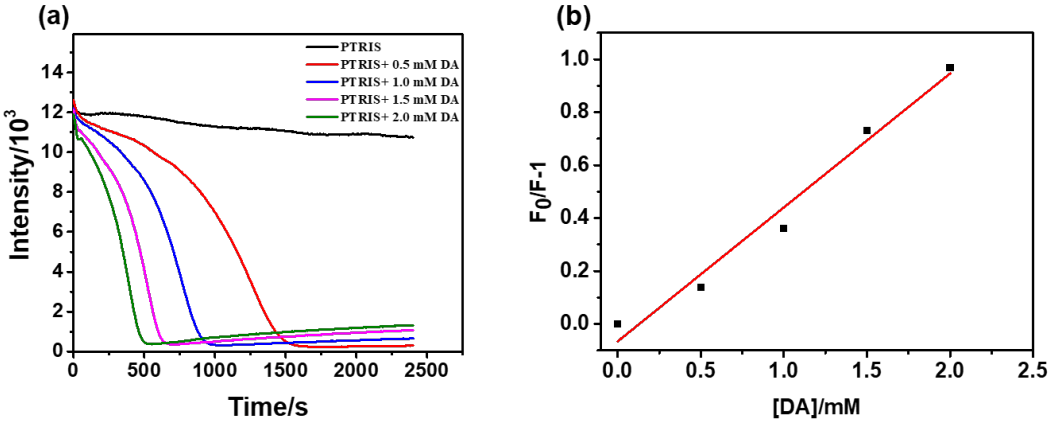

Fig. S3 (a) Fluorescence changes of PTRIS (1 μM) reacted with different concentrations of dopamine (0-2.0 mM) at the maximum emission wavelength of 550 nm with time. (b) Value of (F_0/F-1) vs the concentration of DA in the range of 0-2 mM, which were calculated from the fluorescence intensity at 7 min of Fig.S3a. Conditon: buffer: Tris-HCl (50 mM, pH 8.5), buffer was added till the final volume was 2 mL in each sample, excitation wavelength: 500 nm, emission wavelength: 550 nm.

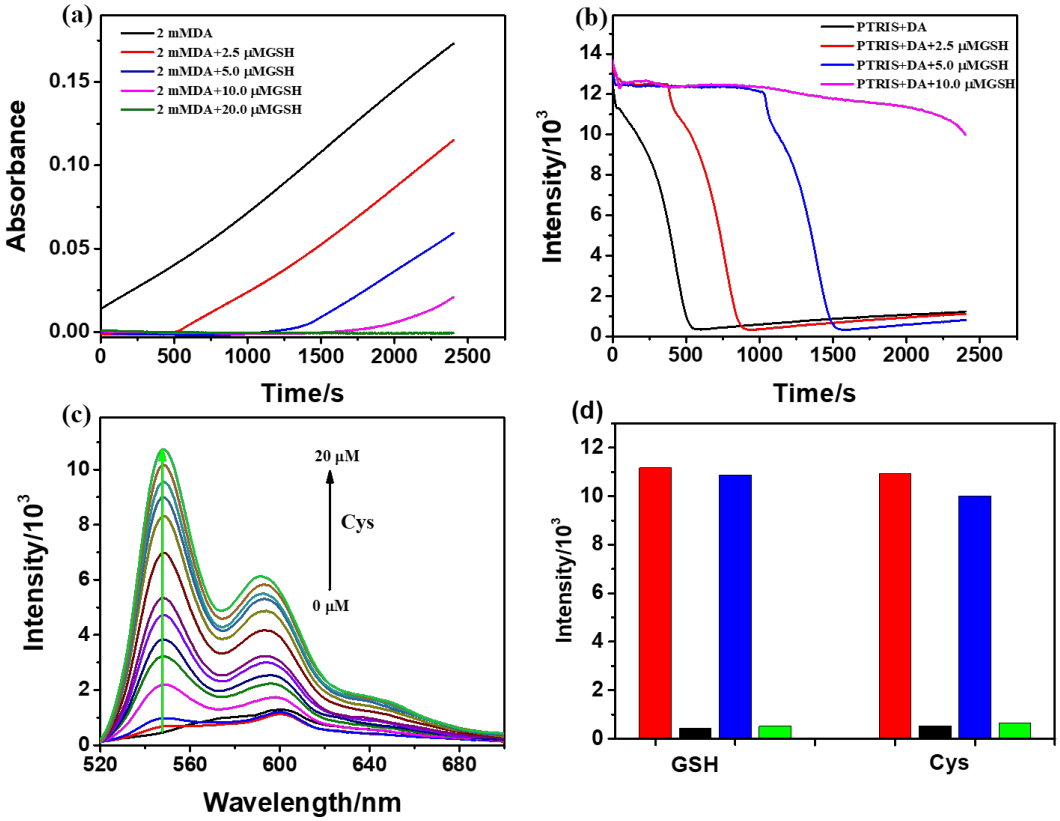

Fig. S4 (a) The absorbance at 400 nm with time in the condition of DA added by different amounts of GSH (0-20 μM); (b) Fluorescence spectra of PTRIS and DA with time by adding different concentrations of GSH (0-10 μM) at the maximum emission wavelength of 550 nm. (c) Fluorescence changes of PTRIS and DA by adding different amounts of Cys (0-20 μM). (d) Fluorescence changes at 550 nm by adding and removing GSH or Cys. Red column: PTRIS; Black column: PTRIS+DA; Blue column: PTRIS+DA+GSH (Cys); Green column: PTRIS+DA+GSH (Cys), the samples were dialyzed against Tris-HCl buffer with dialysis membrane (MWCO: 1 KD), then the fluorescence was measured. Conditon: PTRIS (1 μM), DA (2 mM), GSH 0-20 μM), Cys (0-20 μM), buffer: Tris-HCl (50 mM, pH 8.5), for each sample, Tris-HCl solution was added till the final volume was 2 mL. Excitation wavelength: 500 nm. Emission wavelength: 550 nm.

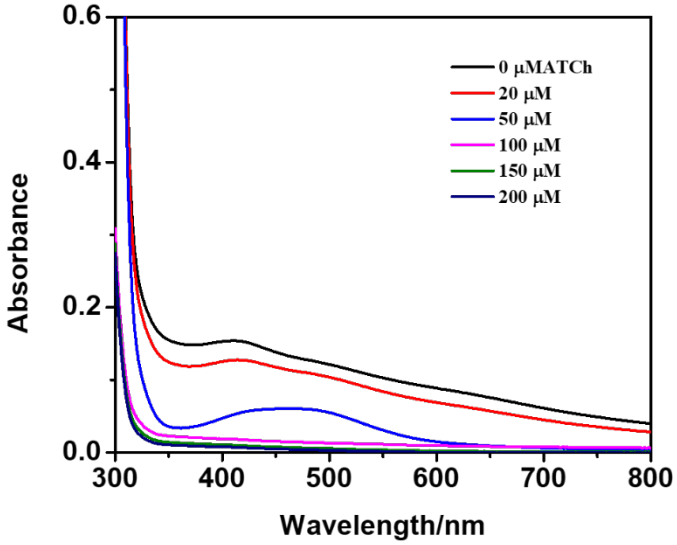

Fig. S5 The UV-Vis spectra of PTRIS+DA+AChE by adding different concentrations of ATCh. Condition: PTRIS (1 μM), DA (2 mM), AChE (10 $mU \cdot mL^{-1}$), ATCh (0-200 μM). buffer: Tris-HCl (50 mM, pH 8.5), buffer was added till the final volume was 2 mL in each sample. Excitation wavelength: 500 nm. Emission wavelength: 550 nm.

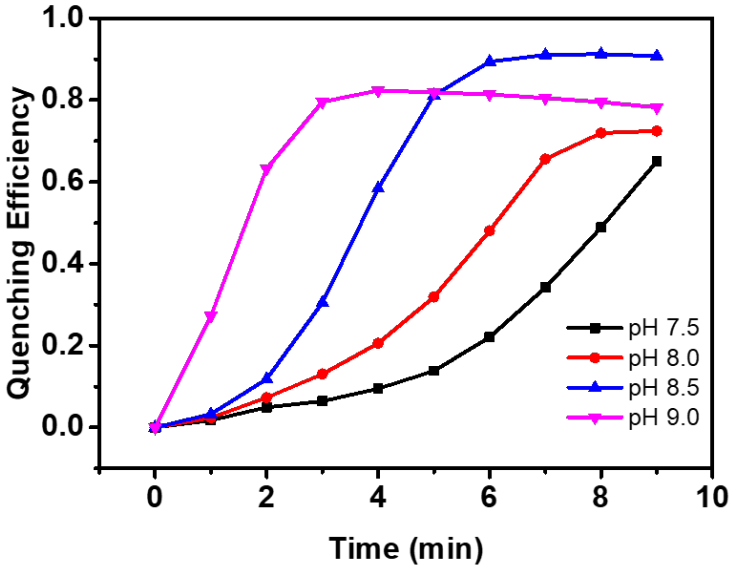

Fig. S6 The quenching efficiency of PTRIS (1 μM) with DA (2 mM) at different pH values. The quenching efficiency is defined as: $QE=(1-F/F_0)$, in which F_0 is the original fluorescence intensity as soon as the DA added, F is the emission intensity at 550 nm at a certain time. Condition: PTRIS (0.2 mM, 10 μL), DA (100 mM, 40 μL), buffer: Tris-HCl (50 mM, pH 7.5, 8.0, 8.5, 9.0), buffer was added till the final volume was 2 mL in corresponding sample. Excitation wavelength: 500 nm. Emission wavelength: 550 nm.

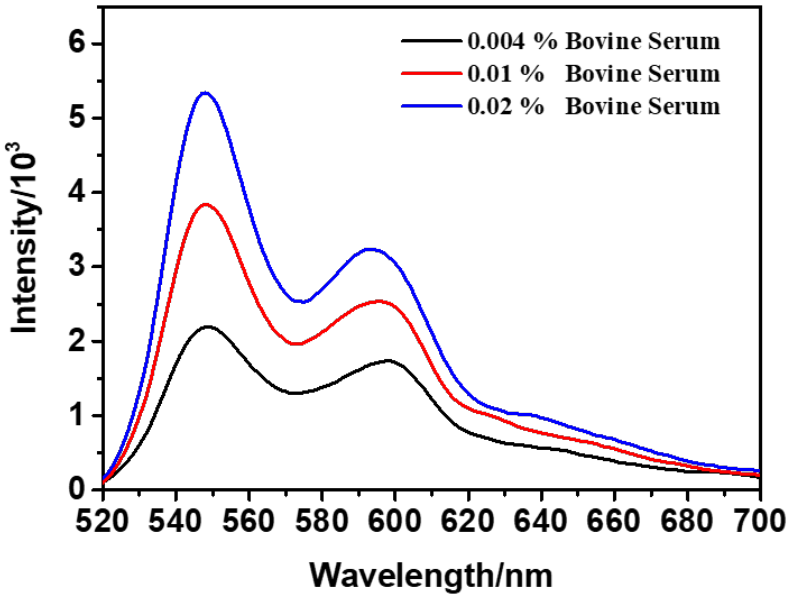

Fig. S7 The emission intensity of AChE in different concentrations of bovine serum. According to the linear regression equation in Fig.3b is F=13.18 C+0.56 (F is the fluorescence intensity divided 1000 at 550 nm, C is the concentration of AChE), a rough content of AChE was calculated to be 0.12 mU·mL^{-1}, 0.25 mU·mL^{-1}, 0.35 mU·mL^{-1}. Condition: PTRIS (1 μM), DA (2 mM), AChE (10 mU·mL^{-1}), ATCh (200 μM), bovine serum solutions was dulited to be 0.004%, 0.01%, 0.02%. Excitation wavelength: 500 nm. Emission wavelength: 550 nm.

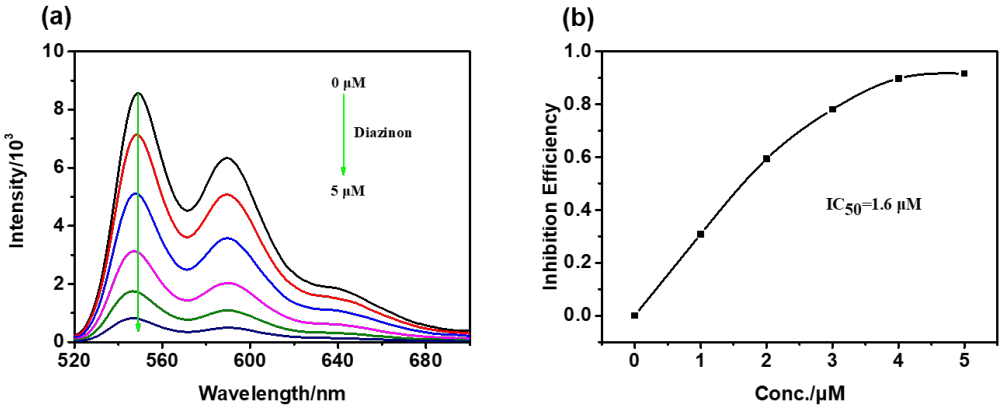

Fig. S8 (a) Fluorescence changes as the increasing of diazinon in the probe detect strategy (0-5 μM); (b) Changes of inhibition efficiency as the increasing of diazinon (0-5 μM). Condition: PTRIS (1 μM), DA (2 mM), ATCh (100 μM), AChE (3 mU·mL^{-1}), buffer: Tris-HCl (50 mM, pH 8.5). Excitation wavelength: 500 nm.