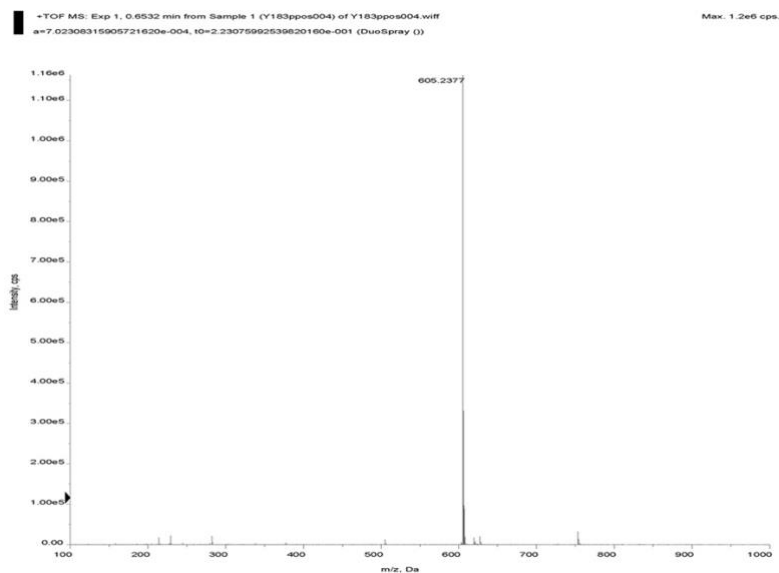


1 **Supplementary material for**

2 **Quantum dot beads-based lateral flow immunoassay to broadly detect PDE-5**

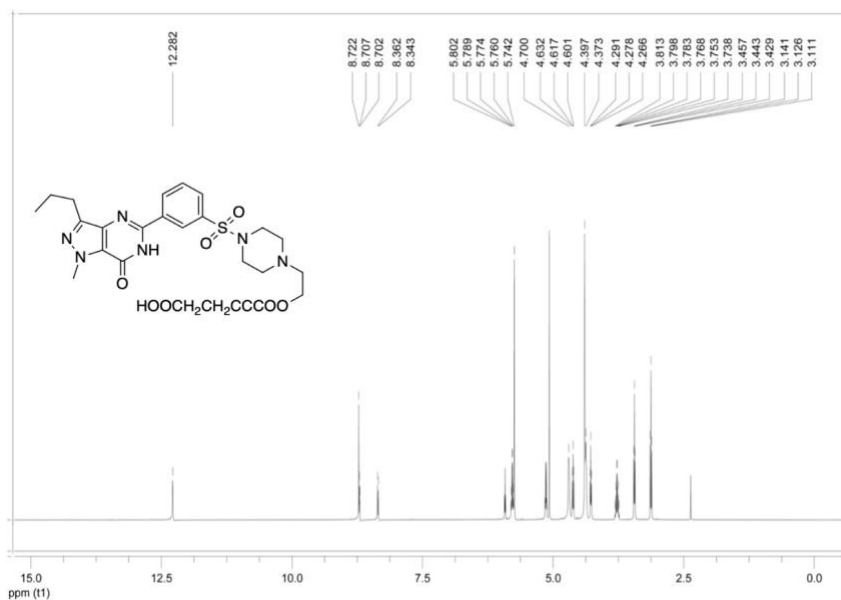
3 **inhibitors adulterated in functional food**

4



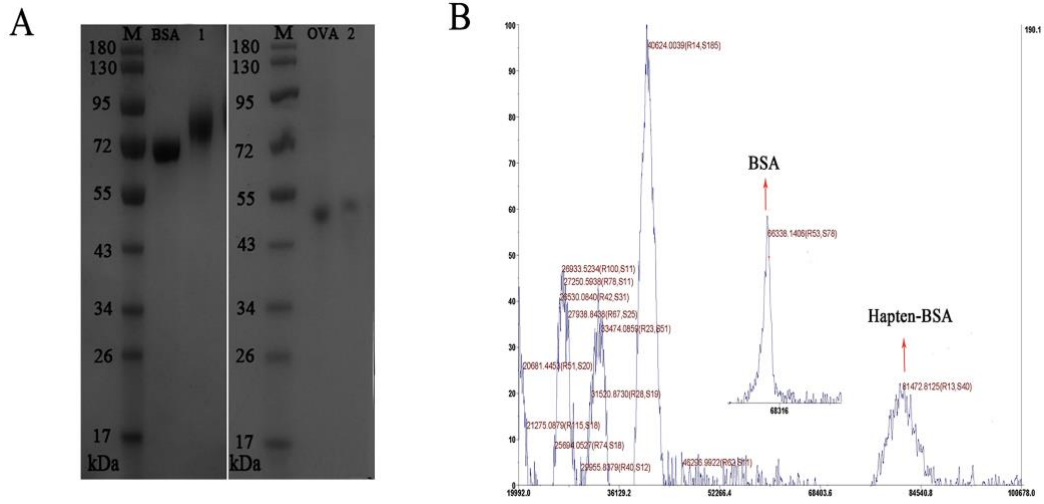
5

6 **Figure S1.** TOF-MS of the hapten.

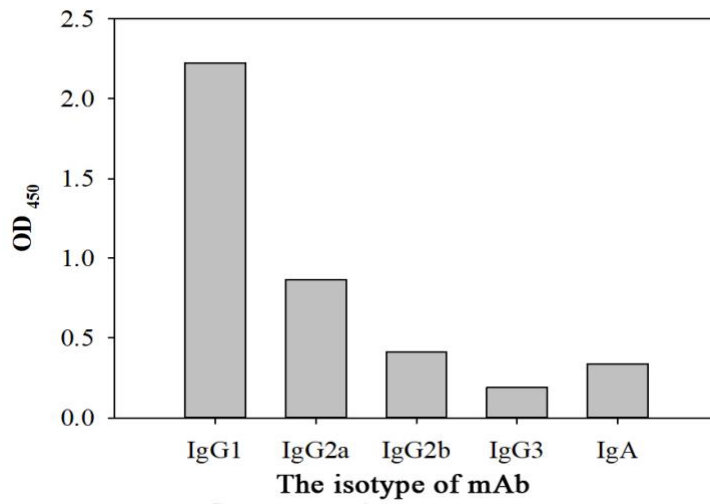


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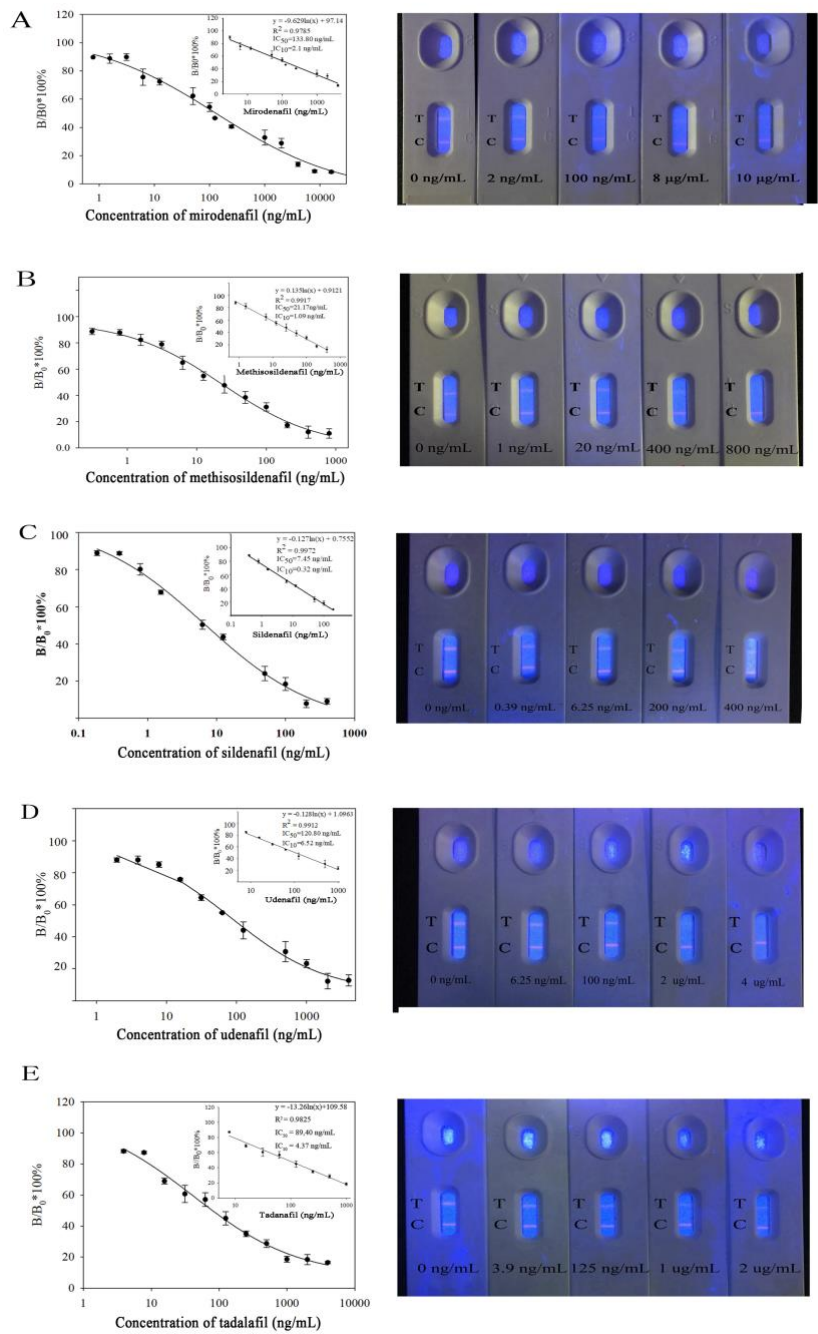
8 **Figure S2.** ¹H NMR of the hapten.



9
 10 **Figure S3.** (A): SDS-PAGE of antigen. (M: Protein marker (100 $\mu\text{g}/\text{mL}$); 1: Hapten-BSA (100 $\mu\text{g}/\text{mL}$); 2: Hapten-OVA (50
 11 $\mu\text{g}/\text{mL}$). (B): The MALDI-TOF/MS of hapten-BSA.



12
 13 **Figure S4.** The isotype determination of mAb (diluted by 10000 times).

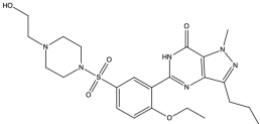
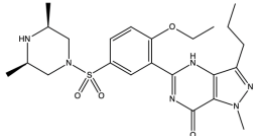
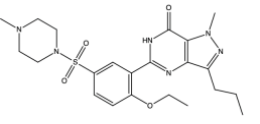
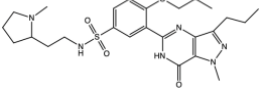
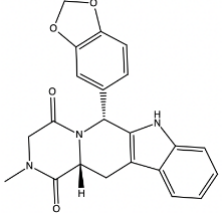
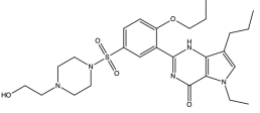


14

15 **Figure S5.** The detection results of PDE-5 inhibitors using QBs-LFIA.

16

Table S1. Cross-reaction of mAb for PDE-5 inhibitors using ic-ELISA.

Compounds	Structure	IC ₅₀ (ng/mL)	IC ₁₀ (ng/mL)	CR (%)	Linear range (ng/mL)
Lodenafil		12.75	1.30	100	1.33-71.67
Methiso-sildenafil		13.30	1.16	95.81	2.18-81.50
Sildenafil		7.79	1.01	163.67	1.56-36.33
Mirodenafil		96	9.34	13.33	16.64-560
Udenafil		153	18.13	6.24	31.25-745
Tadalafil		278	26.91	8.35	48.36-1605

19 **Table S2.** Comparison of the immunoassay reported for the determination of PDE-5 inhibitors.

Hapten	Type of antibody	Identified ability	IC ₅₀	LOD	Linear range	Analytical methods	Reference
Sildenafil	polyclonal	Sildenafil	6 ng/mL	0.6 ng/mL	0.6~100 ng/mL	ELISA	[32]
		Vardenafil	60 ng/mL	—	—		
		Tadalafil	250 ng/mL	—	—		
Tadalafil	polyclonal	Tadalafil	10.04 ng/mL	—	—	AuNPs-ICs	[33]
		Amino tadalafil	9.55 ng/mL				
		Acetaminotadalafil	11.46 ng/mL				
		Nor-tadalafil	17.01 ng/mL				
Vardenafil	monoclonal	Vardenafil	18.2 ng/mL	5.0 ng/mL	5.0~40 ng/mL	ic-ELISA	[35]
Sildenafil	monoclonal	Sildenafil	20.0 µg/kg	0.5 µg/kg	1.4~13.11 µg/kg	ICA	[36]
		Lodenafil	12.75 ng/mL	1.30 ng/mL			
		Methiso-sildenafil	13.30 ng/mL	1.16 ng/mL			
		Sildenafil	7.79 ng/mL	1.01 ng/mL	Table S1	QBs-LFIA	this article
		Mironafil	96.49 ng/mL	9.34 ng/mL			
		Udenafil	153.16 ng/mL	18.13ng/mL			
		Tadalafil	278.71 ng/mL	26.91ng/mL			

20

21 **Table S3.** Matrix interference of capsules and tablets.

Samples	Concentration					
	of lodenafil (ng/mL)	PBS Buffer	no dilution	2× dilution	5× dilution	10× dilution
Tablet	0	—	—	—	—	—
	10	±	±	±	±	±
	100	+	+	+	+	+
Capsule	0	—	—	—	—	—
	10	±	±	±	±	±
	100	+	+	+	+	+

22 ^a —: negative; +,±: positive

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