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Supporting Information

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Nanoparticle-Based Electrochemical Immunosensor for Detection of Phosphorylated Acetylcholinesterase: An Exposure Biomarker of Organophosphate Pesticides and Nerve Agents

Guodong Liu,[a,b] Jun Wang,[a] Richard Barry, [a] Catherine Petersen, [a] Charles Timchalk, [a] Paul L Gassman, [a] Yuehe Lin*[a]

*[a] Pacific Northwest National Laboratory
Richland, WA, 99352(USA)*

*[b] Department of Chemistry and Molecular Biology
North Dakota State University
Fargo, ND, 58105 (USA)*

Supporting information

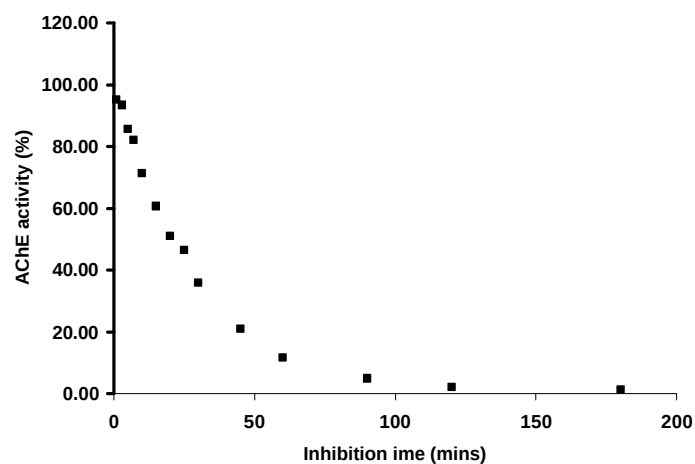


Figure S1. The plot of human AChE activity vs the inhibition time. The human AChE concentration is 8.2 pmol/mL, and the paraoxon concentration is 15 pmol/mL. The AChE activity was measured by the modified Ellman method.

Matched peptides shown in Bold Red

1	MRPPQCLLHT	PSLASPLLLL	LLWLLGGGVG	AEGREDAELL	VTVRGGRLRG
51	IRLKTPGGPV	SAFLGIPFAE	PPMGPRRFLP	PEPKQPWSGV	VDATTFQSVC
101	YQYVDTLYPG	FEGTEMWNP	RELSEDCLYL	NWTPYPRPT	SPTFVLWIIY
151	GGGFYSGASS	LDVYDGRFLV	QAERTVLVSM	NYRVGAFGFL	ALPGSREAPG
201	NVGLLDQRLA	LQWVQENVAA	FGGDPTSVTL	FGESAGAASV	GMHLLSPPSR
251	GLFHRAVLQS	GAPNGPWATV	GMGEARRRAT	QLAHLVGCPP	GGTGGNDTEL
301	VACLRTSPAQ	VLVNHFWHLV	PQESVFRFSF	VPVVDGDFLS	DTPEALINAG
351	DFHGLQVLVG	VVKDEGSYFL	VYGAPGFSKD	NESLISRAEF	LAGVRVGVPPQ
401	VSDLAEEAVV	LHYTDWLHPE	DPARLREALS	DVVGDNHNVV	PVAQLAGRLA
451	AQGARVYAYV	FEHRASTLSW	PLWMGVPHGY	EIEFIFGIPL	DPSRNYTAAE
501	KIFAQRLMRY	WANFARTGDP	NEPRDPKAPQ	WPPYTAGAQQ	YVSLDLRPLE
551	VRRGLRAQAC	AFWNRFLPKL	LSATASEAPS	TCPGFTHGEA	APRPGPLPLPL
601	LLHQLLLLLF	LSHLRRL			

Figure S2 Sequence coverage of HuAChE from erythrocytes using LC MS/MS. Sequence coverage of 68% (font in red above) was obtained. The MASCOT® software algorithm was modified to search the MS/MS data for specific organophosphate modifications (e.g. diethylphosphorylation or monoethylphosphorylation (aged adduct)).

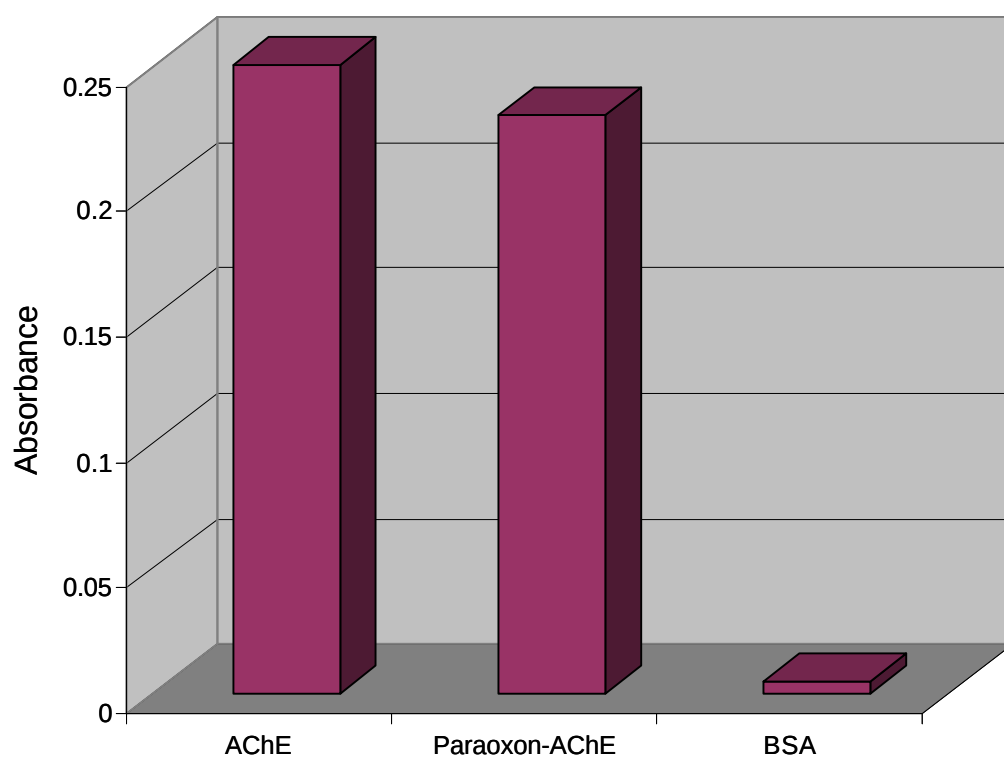


Figure S3 Typical ELISA responses of 10 nM paraoxon-AChE, 10 nM AChE, and 100 nM BSA using horseradish peroxidase-labeled monoclonal anti-AChE.

#	a	a ⁺⁺	b	b ⁺⁺	Seq.	y	y ⁺⁺	#
1	30.03	15.52	58.03	29.52	G			21
2	87.06	44.03	115.05	58.03	G	1931.86	966.44	20
3	202.08	101.54	230.08	115.54	D	1874.84	937.92	19
4	299.13	150.07	327.13	164.07	P	1759.81	880.41	18
5	400.18	200.59	428.18	214.59	T	1662.76	831.88	17
6	487.21	244.11	515.21	258.11	S	1561.71	781.36	16
7	586.28	293.65	614.28	307.64	V	1474.68	737.84	15
8	687.33	344.17	715.33	358.17	T	1375.61	688.31	14
9	800.41	400.71	828.41	414.71	L	1274.57	637.79	13
10	947.48	474.25	975.48	488.24	F	1161.48	581.24	12
11	1004.5	502.76	1032.5	516.75	G	1014.41	507.71	11
12	1133.55	567.28	1161.54	581.27	E	957.39	479.2	10
13	1328.58	664.79	1356.57	678.79	S	828.35	414.68	9
14	1399.61	700.31	1427.61	714.31	A	633.32	317.16	8
15	1456.64	728.82	1484.63	742.82	G	562.28	281.65	7
16	1527.67	764.34	1555.67	778.34	A	505.26	253.13	6
17	1598.71	799.86	1626.7	813.86	A	434.22	217.62	5
18	1685.74	843.37	1713.74	857.37	S	363.19	182.1	4
19	1784.81	892.91	1812.81	906.91	V	276.16	138.58	3
20	1841.83	921.42	1869.83	935.42	G	177.09	89.05	2
21					M	120.07	60.54	1

Table S1. Identified daughter ions of monoethylphosphorylated peptide 222-242 (red) of huAChE assigned with the OP assigned to S13 and homoserine at the C-terminus using the MASCOT® searching algorithm. An RMS error of 150 ppm was obtained.