

Nephrotoxicity evaluation of indium phosphide quantum dots with different surface modifications in BALB/c mice

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Table S1 TP levels changes in serum of mice administered with 25mg/kg BW QDs (H) or 2.5mg/kg BW QDs (L) ($\bar{x} \pm s$, g/L).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	61.23 $\pm$ 8.58	55.17 $\pm$ 2.38	65.67 $\pm$ 3.03	60.47 $\pm$ 1.91	56.00 $\pm$ 5.73
hQDs-L	60.67 $\pm$ 6.52	57.60 $\pm$ 3.35	60.80 $\pm$ 1.42	60.40 $\pm$ 2.38	65.13 $\pm$ 1.55
hQDs-H	63.40 $\pm$ 3.42	56.90 $\pm$ 1.97 [*]	56.70 $\pm$ 4.99 ^{*, #}	60.67 $\pm$ 2.32	59.50 $\pm$ 4.00
aQDs-L	67.07 $\pm$ 6.20	56.37 $\pm$ 0.64 [*]	64.30 $\pm$ 3.05	57.57 $\pm$ 3.52 [*]	67.97 $\pm$ 7.39
aQDs-H	50.47 $\pm$ 3.26 [*]	56.37 $\pm$ 2.15	48.30 $\pm$ 5.65 [*]	60.20 $\pm$ 1.41	58.17 $\pm$ 13.46
cQDs-L	61.77 $\pm$ 5.10	55.37 $\pm$ 7.41	69.40 $\pm$ 8.88	64.37 $\pm$ 8.84	65.43 $\pm$ 0.90
cQDs-H	62.17 $\pm$ 2.39	57.35 $\pm$ 7.30	60.33 $\pm$ 1.40	64.83 $\pm$ 2.05	65.27 $\pm$ 5.85

*Significantly different compared to control group at the same sampling time, $P < 0.05$;

[#]Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S2 ALB levels changes in serum of mice administered with 25mg/kg BW QDs (H) or 2.5mg/kg BW QDs (L) ($\bar{x} \pm s$, g/L).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	37.27 $\pm$ 5.10	35.53 $\pm$ 1.12	35.27 $\pm$ 1.51	31.57 $\pm$ 1.45	34.53 $\pm$ 1.40
hQDs-L	34.63 $\pm$ 1.47	34.67 $\pm$ 1.94	35.80 $\pm$ 0.17	36.83 $\pm$ 2.99	37.27 $\pm$ 1.10
hQDs-H	34.83 $\pm$ 2.20	32.70 $\pm$ 0.35	33.00 $\pm$ 3.40	34.33 $\pm$ 1.15	38.37 $\pm$ 4.62
aQDs-L	37.36 $\pm$ 2.14	37.27 $\pm$ 0.90	36.33 $\pm$ 1.91	32.16 $\pm$ 1.82	38.37 $\pm$ 3.76
aQDs-H	34.83 $\pm$ 2.66	34.90 $\pm$ 1.08	39.97 $\pm$ 1.50	32.97 $\pm$ 0.45	36.60 $\pm$ 4.52
cQDs-L	35.87 $\pm$ 4.47	35.76 $\pm$ 0.66	37.97 $\pm$ 6.90	34.57 $\pm$ 4.50	36.30 $\pm$ 1.40
cQDs-H	35.93 $\pm$ 1.21	35.97 $\pm$ 1.63	35.20 $\pm$ 1.73	34.37 $\pm$ 2.50	37.90 $\pm$ 2.60

Table S3 TG levels changes in serum of mice administered with 25mg/kg BW QDs (H) or 2.5mg/kg BW QDs (L) ($\bar{x} \pm s$, mmol/L).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	2.03 $\pm$ 0.39	1.42 $\pm$ 0.30 [#]	2.54 $\pm$ 0.26	1.55 $\pm$ 0.44	2.19 $\pm$ 0.25
hQDs-L	2.37 $\pm$ 0.31	1.63 $\pm$ 0.37 [#]	1.72 $\pm$ 0.24 ^{*, #}	1.58 $\pm$ 0.45 [#]	2.19 $\pm$ 0.31
hQDs-H	2.96 $\pm$ 0.42	2.16 $\pm$ 0.52 [#]	1.90 $\pm$ 0.13 [#]	2.13 $\pm$ 0.22 ^{*, #}	2.40 $\pm$ 0.45
aQDs-L	2.29 $\pm$ 0.14	1.84 $\pm$ 0.25	2.17 $\pm$ 0.29	1.09 $\pm$ 0.19 [#]	2.60 $\pm$ 0.35
aQDs-H	2.17 $\pm$ 1.37	1.48 $\pm$ 0.10	2.78 $\pm$ 0.89	1.32 $\pm$ 0.06	2.33 $\pm$ 0.14
cQDs-L	2.31 $\pm$ 0.34	1.20 $\pm$ 0.26 [#]	1.28 $\pm$ 0.41 ^{*, #}	1.22 $\pm$ 0.42 [#]	2.40 $\pm$ 0.57
cQDs-H	2.46 $\pm$ 1.05	1.97 $\pm$ 0.69	1.89 $\pm$ 0.21	1.11 $\pm$ 0.23 [#]	1.98 $\pm$ 0.48

*Significantly different compared to control group at the same sampling time, $P < 0.05$;

[#]Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S4 CREA levels changes in serum of mice administered with 25mg/kg BW QDs (H) or 2.5mg/kg BW QDs (L) ($\bar{x} \pm s$, μ mol/L).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	56.67 $\pm$ 6.49	51.94 $\pm$ 7.40	50.50 $\pm$ 2.15	58.00 $\pm$ 3.33	48.83 $\pm$ 6.20
hQDs-L	65.33 $\pm$ 10.71	57.46 $\pm$ 6.31	44.57 $\pm$ 2.20 [#]	68.87 $\pm$ 5.17	60.17 $\pm$ 5.23
hQDs-H	61.57 $\pm$ 5.44	52.20 $\pm$ 6.52	43.87 $\pm$ 7.81	51.13 $\pm$ 17.98	53.50 $\pm$ 7.45
aQDs-L	60.00 $\pm$ 1.56	56.40 $\pm$ 4.29	40.67 $\pm$ 4.88	51.06 $\pm$ 21.17	52.93 $\pm$ 4.66
aQDs-H	60.30 $\pm$ 13.45	43.37 $\pm$ 18.94	45.33 $\pm$ 6.35	62.83 $\pm$ 1.27	64.87 $\pm$ 12.97

cQDs-L	66.13 ± 7.71	47.20 ± 6.56*	58.90 ± 9.62	66.53 ± 6.54	60.50 ± 2.62
cQDs-H	58.80 ± 3.85	51.53 ± 4.08	46.97 ± 3.06*	66.63 ± 3.50*	57.63 ± 6.47

*Significantly different compared to control group at the same sampling time, $P < 0.05$;

‡Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S5 UREA levels changes in serum of mice administered with 25mg/kg BW QDs (H) or 2.5mg/kg BW QDs (L) ($\bar{x} \pm s$, $\mu\text{mol/L}$).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	9.10 ± 1.46	8.25 ± 0.63	9.82 ± 0.74	7.21 ± 1.52	7.17 ± 0.68
hQDs-L	9.75 ± 1.59	8.46 ± 0.34	10.06 ± 1.03	7.14 ± 0.65	9.10 ± 2.84
hQDs-H	10.11 ± 0.89	8.73 ± 1.30	8.45 ± 1.28	7.62 ± 1.14‡	8.18 ± 1.73
aQDs-L	8.97 ± 0.51	5.71 ± 4.47	9.25 ± 0.54	7.20 ± 1.17	7.63 ± 1.40
aQDs-H	7.53 ± 2.89	7.14 ± 0.75	10.60 ± 0.55*	7.35 ± 0.83	8.08 ± 1.32
cQDs-L	11.54 ± 2.99	7.99 ± 1.22‡	11.14 ± 1.93	6.77 ± 0.94‡	7.64 ± 1.63‡
cQDs-H	9.22 ± 2.07	7.54 ± 1.43	10.48 ± 1.01	6.30 ± 0.43‡	6.91 ± 1.85

‡Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S6 UA levels changes in serum of mice administered with 25mg/kg BW QDs (H) or 2.5mg/kg BW QDs (L) ($\bar{x} \pm s$, $\mu\text{mol/L}$).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	181.57 ± 24.22	160.93 ± 16.25	228.10 ± 41.94	319.63 ± 107.11*	175.37 ± 23.87
hQDs-L	232.73 ± 39.21	273.57 ± 60.28	260.90 ± 10.66	246.72 ± 52.86	226.31 ± 33.04
hQDs-H	201.03 ± 24.10	220.67 ± 69.12	269.77 ± 56.05	295.13 ± 39.08*	175.66 ± 43.24
aQDs-L	213.17 ± 43.72	189.20 ± 11.25	296.56 ± 105.80	380.16 ± 80.37*	189.05 ± 8.35
aQDs-H	189.23 ± 45.11	200.1 ± 46.14	228.80 ± 19.41	389.60 ± 21.25*	149.07 ± 24.95
cQDs-L	237.70 ± 24.81	206.47 ± 10.01	261.03 ± 69.86	324.97 ± 93.82*	189.06 ± 18.25
cQDs-H	168.17 ± 6.60	202.37 ± 54.93	246.57 ± 45.02	361.00 ± 34.88*	216.40 ± 61.95

‡Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S7 TC levels changes in serum of mice administered with 25mg/kg BW QDs (H) or 2.5mg/kg BW QDs (L) ($\bar{x} \pm s$, mmol/L).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	3.14 ± 0.41	2.95 ± 0.37	3.44 ± 0.31	2.90 ± 0.25	2.74 ± 0.26
hQDs-L	2.93 ± 0.42	2.87 ± 0.21	2.90 ± 0.23	3.52 ± 0.46‡	2.74 ± 0.13
hQDs-H	3.52 ± 0.21	3.32 ± 0.53	2.95 ± 0.47	3.04 ± 0.11	3.16 ± 0.63
aQDs-L	3.36 ± 0.16	2.95 ± 0.17‡	3.19 ± 0.14	2.74 ± 0.24‡	3.32 ± 0.27
aQDs-H	3.03 ± 1.08	2.86 ± 0.22	3.83 ± 0.54	3.09 ± 0.17	3.19 ± 0.45
cQDs-L	3.15 ± 0.27	2.85 ± 0.53	3.09 ± 0.40	3.09 ± 0.59	3.10 ± 0.45
cQDs-H	3.46 ± 0.11	3.35 ± 0.50	3.27 ± 0.13	3.17 ± 0.28	3.15 ± 0.12

‡Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S8 MDA levels changes in serum of mice administered with 25mg/kg BW QDs. ($\bar{x} \pm s$, $\mu\text{mol/mg}$)

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	1.43 ± 1.14	1.03 ± 0.25	0.88 ± 0.34	0.43 ± 0.20‡	0.44 ± 0.15‡
hQDs-H	1.28 ± 0.27	1.42 ± 0.46	0.93 ± 0.51	1.76 ± 1.96*	0.81 ± 0.80
aQDs-H	3.07 ± 1.74*	0.97 ± 0.21‡	0.86 ± 0.69‡	0.59 ± 0.52‡	0.43 ± 0.43‡
cQDs-H	1.43 ± 0.77	0.92 ± 0.17	0.83 ± 0.39‡	0.83 ± 0.66‡	0.34 ± 0.34‡

*Significantly different compared to control group at the same sampling time, $P < 0.05$;

‡Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S9 T-AOC levels changes in serum of mice administered with 25mg/kg BW QDs ($\bar{x} \pm s$, mM/mg).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	0.0077 ± 0.006	0.0107 ± 0.006	0.0096 ± 0.006	0.0195 ± 0.005*	0.0192 ± 0.005*
hQDs-H	0.0081 ± 0.007	0.0069 ± 0.007	0.0051 ± 0.004	0.0170 ± 0.009	0.0155 ± 0.009

aQDs-H	0.0112 ± 0.013	0.0115 ± 0.0008	0.0076 ± 0.006	0.0229 ± 0.007 [#]	0.0129 ± 0.007
cQDs-H	0.0103 ± 0.007	0.0096 ± 0.005	0.0069 ± 0.003	0.0268 ± 0.009 [#]	0.0237 ± 0.009 [#]

[#]Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S10 CAT levels changes in serum of mice administered with 25mg/kg BW QDs ($\bar{x} \pm s$, U/mg).

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	1569.78 ± 923.67	2530.44 ± 1015.88	2113.51 ± 238.18	1294.69 ± 181.72	1706.41 ± 463.75
hQDs-H	1386.69 ± 574.58	2318.44 ± 1159.73	660.76 ± 415.21 [*]	2558.46 ± 632.99 ^{*, #}	1154.94 ± 373.99
aQDs-H	1320.94 ± 167.12	1589.72 ± 401.77	1169.53 ± 365.33 [*]	1172.69 ± 457.42	2069.37 ± 859.72 [#]
cQDs-H	2868.23 ± 434.83 [*]	2315.43 ± 712.46	1927.77 ± 425.88 [#]	1376.30 ± 671.45 [#]	1847.14 ± 500.10 [#]

^{*}Significantly different compared to control group at the same sampling time, $P < 0.05$;

[#]Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S11 SOD levels changes in serum of mice administered with 25mg/kg BW QDs ($\bar{x} \pm s$, U/mg)

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	5.06 ± 2.04	4.13 ± 3.34	2.54 ± 0.92 [#]	2.08 ± 1.32 [#]	1.55 ± 0.44 [#]
hQDs-H	4.01 ± 2.43	2.84 ± 1.48	2.32 ± 0.94	2.55 ± 1.59	3.20 ± 2.12
aQDs-H	8.62 ± 5.21 [*]	2.23 ± 1.43 [#]	3.35 ± 1.41 [#]	3.44 ± 0.89 [#]	3.67 ± 1.52 [#]
cQDs-H	5.52 ± 1.83	2.86 ± 1.00 [#]	4.50 ± 3.29	3.07 ± 1.57 [#]	3.02 ± 1.66 [#]

^{*}Significantly different compared to control group at the same sampling time, $P < 0.05$;

[#]Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S12 GPx levels changes in serum of mice administered with 25mg/kg BW QDs ($\bar{x} \pm s$, U/mg)

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	35.38 ± 9.31	30.40 ± 27.59	12.71 ± 12.02 [#]	10.38 ± 9.09 [#]	9.10 ± 1.23 [#]
hQDs-H	22.33 ± 12.99	17.99 ± 6.87	9.97 ± 3.75	18.88 ± 20.58	12.53 ± 7.41
aQDs-H	72.85 ± 45.41 [*]	14.38 ± 14.76 [#]	17.52 ± 13.79 [#]	20.54 ± 16.38 [#]	24.23 ± 12.01 ^{*, #}
cQDs-H	50.24 ± 29.66	21.92 ± 6.90 [#]	29.21 ± 23.82	19.15 ± 6.51 [#]	13.52 ± 7.64 [#]

^{*}Significantly different compared to control group at the same sampling time, $P < 0.05$;

[#]Significantly different compared to Day 1 in the same treated group, $P < 0.05$.

Table S13 GR levels changes in serum of mice administered with 25mg/kg BW QDs (H) ($\bar{x} \pm s$, U/mg)

	Day 1	Day 3	Day 7	Day 14	Day 28
Control	16.14 ± 5.47	21.69 ± 7.23	15.18 ± 4.06	9.76 ± 1.06 [#]	10.71 ± 2.28
hQDs-H	19.14 ± 2.74	19.85 ± 3.45	15.06 ± 3.93 [#]	12.93 ± 2.53 ^{*, #}	11.87 ± 3.02 [#]
aQDs-H	19.79 ± 5.58	15.01 ± 2.59 ^{*, #}	14.35 ± 1.87 [#]	9.77 ± 1.49 [#]	9.57 ± 2.21 [#]
cQDs-H	19.38 ± 3.33	20.37 ± 1.49	13.67 ± 1.82 [#]	10.13 ± 2.88 [#]	8.71 ± 1.65 [#]

^{*}Significantly different compared to control group at the same sampling time, $P < 0.05$;

[#]Significantly different compared to Day 1 in the same treated group, $P < 0.05$.