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Supplementary Information

Biological behaviors and chemical fates of Ag_2Se quantum dots *in vivo*: effect of surface chemistry

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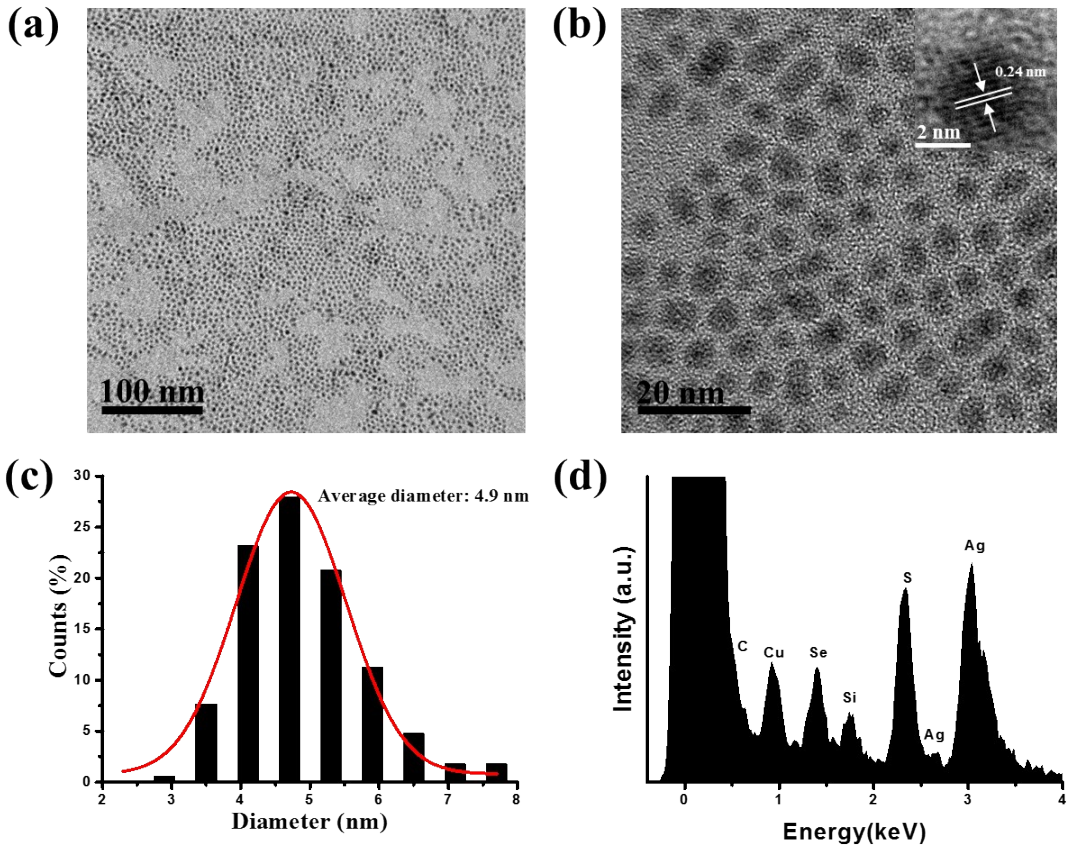

Figure 1. Characterization of Ag_2Se QDs-DT. (a) TEM image; (b) HRTEM image; (c) Size distribution based on the analysis of 168 particles in TEM images; (d) Energy dispersive X-ray spectrum.

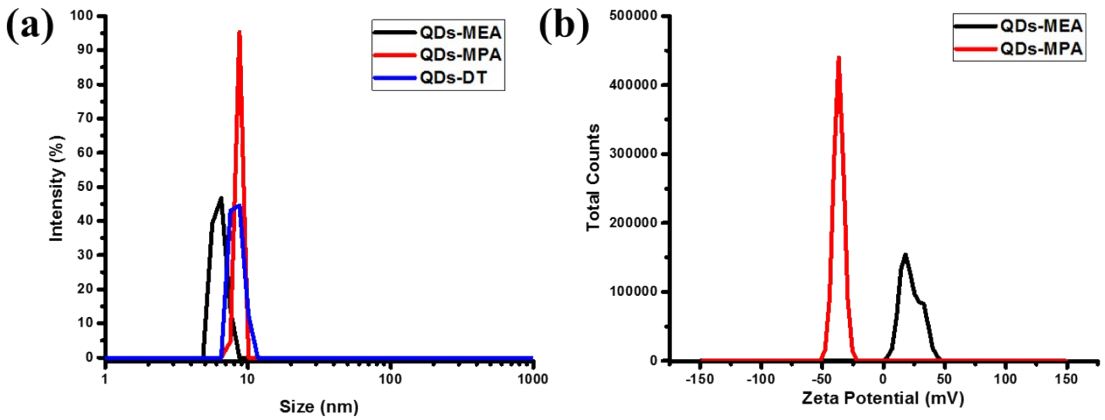

Figure 2. (a) Hydrodynamic diameters of QDs-DT, QDs-MEA, and QDs-MPA. (b) Zeta potentials of QDs-MEA and QDs-MPA.

Table 1 Hydrodynamic diameter and zeta potential of QDs in several kinds of dispersants.

Solution	Hydrodynamic diameter (nm)		Zeta potential (mV)	
	QDs-MEA	QDs-MPA	QDs-MEA	QDs-MPA
Water	6±1	8±1	22.3±8.5	–36.7±4.2
Saline	1445±159	396±85	12.4±1.2	–19.5±4.3
PBS	2590±220	1045±74	1.8±0.5	–7.7±0.3
Serum	177±13	56±5	-1.7±1.4	–5.5±1.8
DMEM	1267±171	658±48	-4.8±0.8	–16.5±2.1

1 μmol/ml QDs were dispersed in distilled H_2O (water), 0.9% NaCl (Saline), phosphate - buffered saline (PBS), or 3% mouse serum in PBS (Serum) and 10% FBS in DMEM (DMEM). The measurements were carried out in triplicate within 10 min. All data are represented as the mean ± SD (n=3).

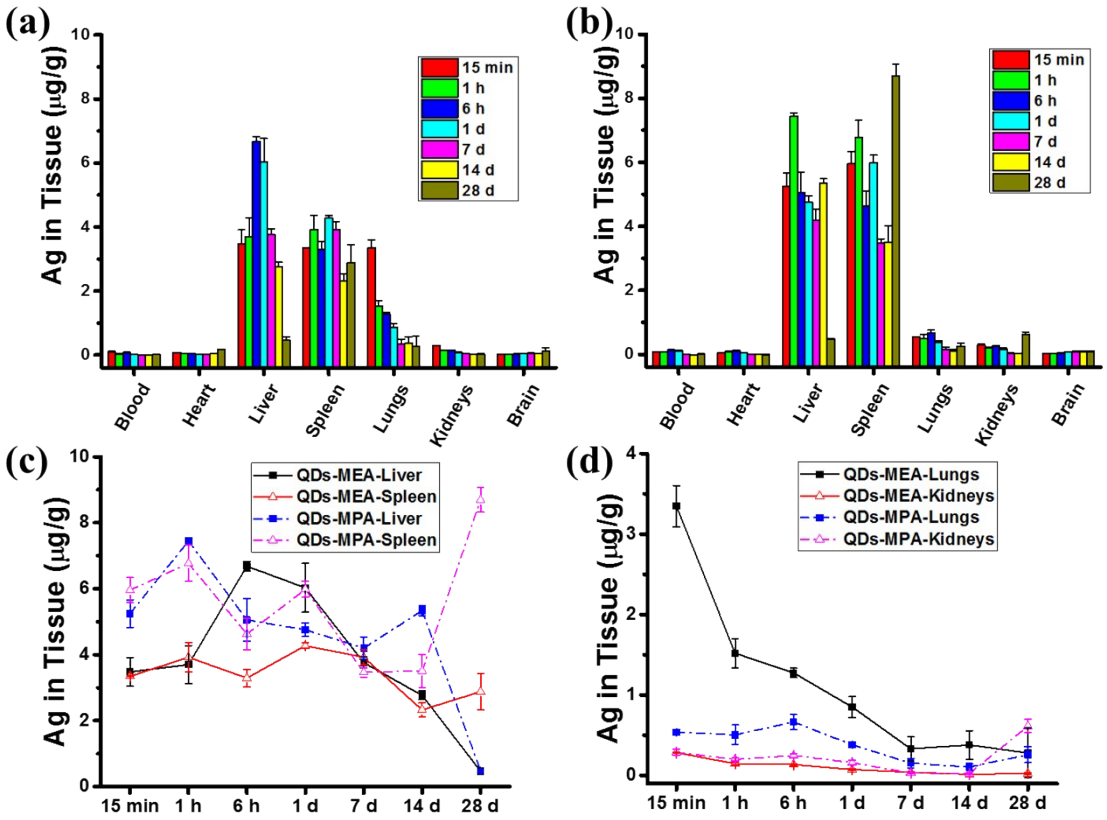

Figure 3. Ag contents in organs (μg/g tissue) of mice at different time points post intravenous injection with QDs-MEA (a) or QDs-MPA (b). (c) Ag contents in the liver and spleen (μg/g tissue). (d) Ag contents in the lungs and kidneys (μg/g tissue).

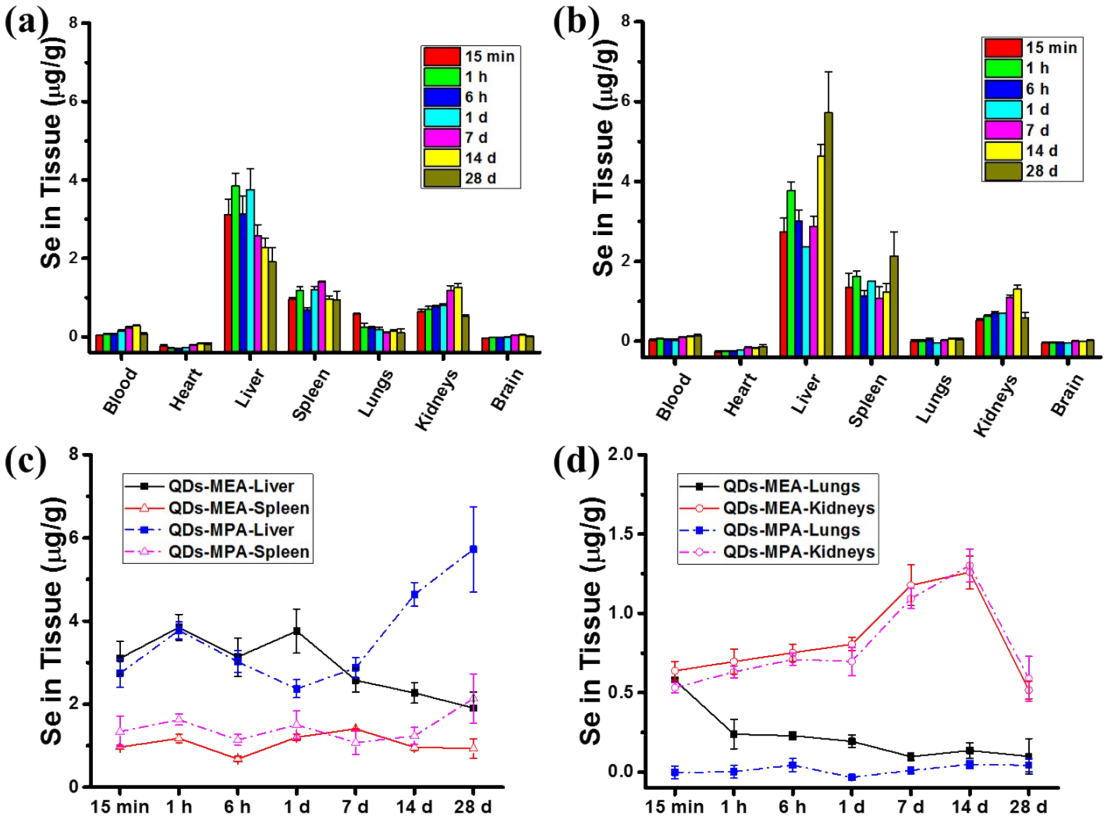

Figure 4. Se contents in organs (μg/g tissue) of mice at different time points post intravenous injection with QDs-MEA (a) or QDs-MPA (b). (c) Se contents in the liver and spleen (μg/g tissue). (d) Se contents in the lungs and kidneys (μg/g tissue).

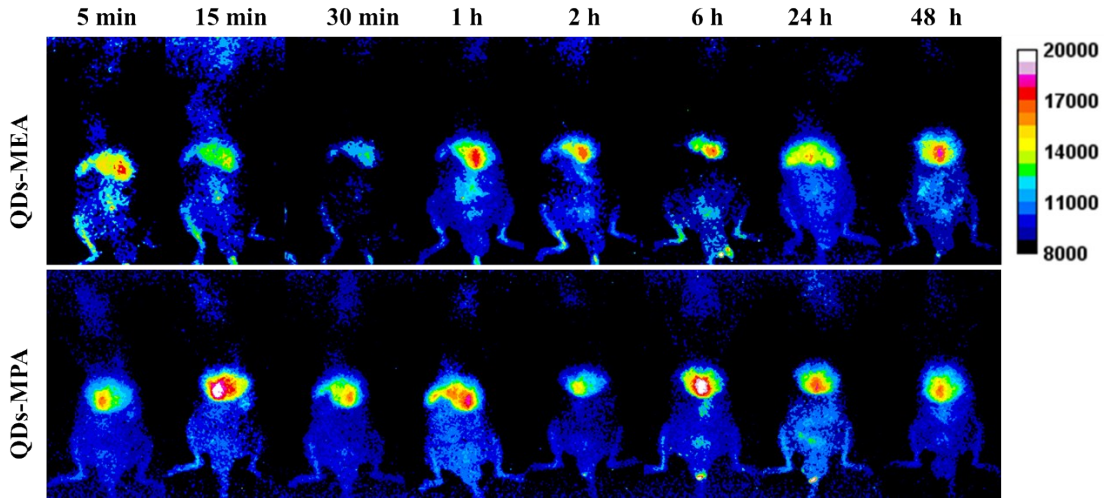

Figure 5. *In vivo* fluorescence imaging of QDs-MEA (upper panel) and QDs-MPA (lower panel) in nude mice within 48 h after intravenous injection.

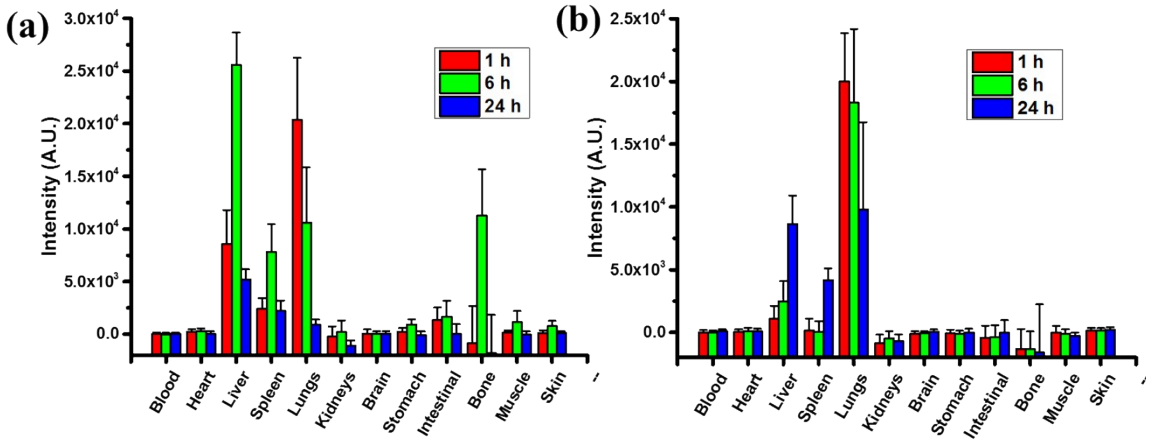

Figure 6. Fluorescence intensities of mouse organs at different time points post exposed to QDs-MEA (a) and QDs-MPA (b). All data are represented as the mean ± SD (n=4).

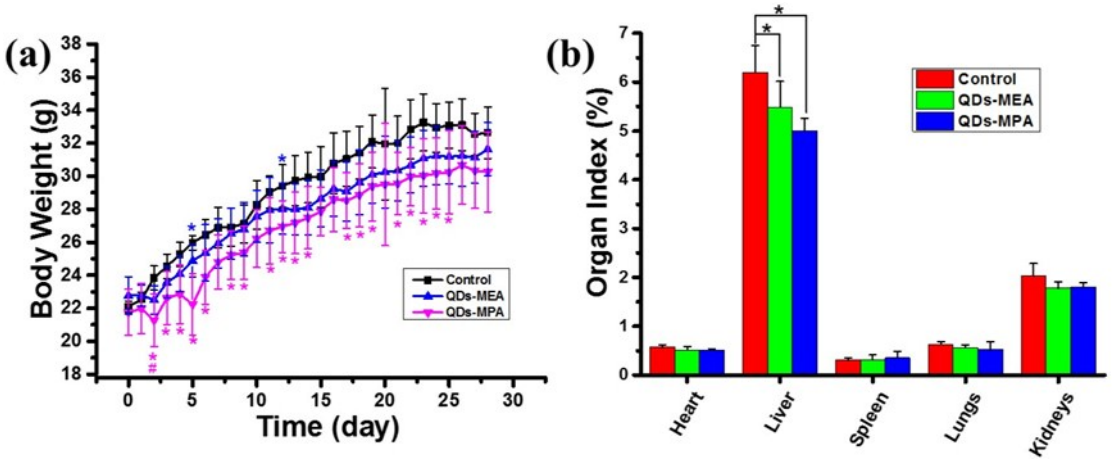

Figure 7. Body weight growth curves (a) and organ indexes (b) at day 28 after mice were intravenously exposed to QDs-MEA or QDs-MPA at the dose of 8 μmol/kg b.w. (n=5). **p* < 0.05 comparing with the control group. #p < 0.05 comparing the QDs-MPA group with the QDs-MEA group.

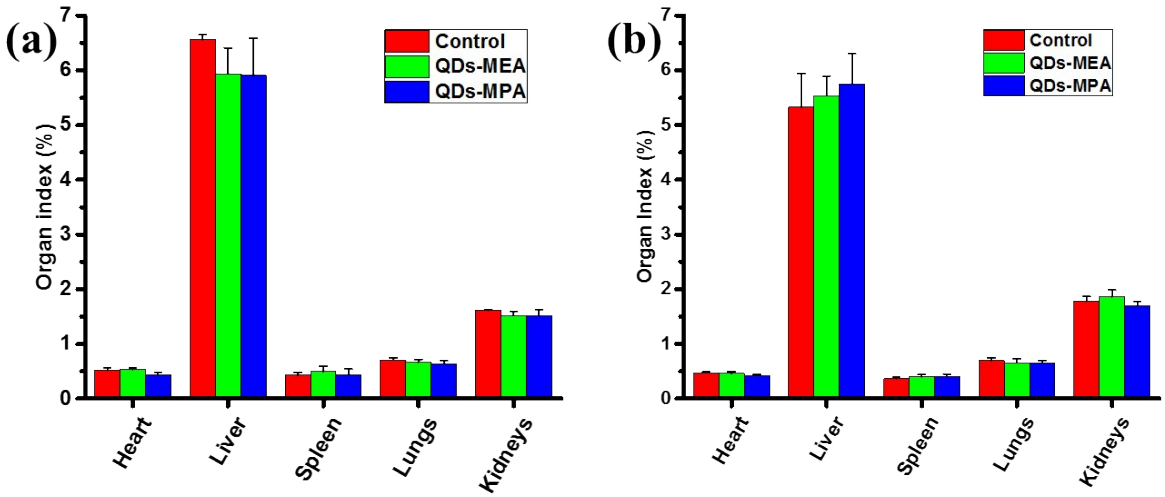

Figure 8. Organ indexes of mice at day 7 (a) and day 14 (b) after intravenously injected with QDs-MEA or QD-MPA at the dose of 8 μmol/kg b.w. All data are represented as the mean ± SD (n=5).

Table 2. Biochemical parameters of mice at days 7 and 28 postexposure to QDs-MEA and QDs-MPA at a dose of 8 μmol/kg b.w. (n=5).

Parameter	Day 7			Day 28		
	Control	QDs–MEA	QDs–MPA	Control	QDs–MEA	QDs–MPA
CR (μmol/L)	6.4±4.4	6.7±1.9	8.9±3.4	1.4±1.1	3.9±1.2*	2.7±2.2
TBIL (μmol/L)	0.68±0.48	0.38±0.19	0.28±0.22	1.51±1.08	0.23±0.20*	0.57±0.15$^{\#}$
TP (g/L)	50.1±0.9	51.9±3.6	53.6±2.8	51.7±3.0	50.8±2.9	49.5±2.7
ALB (g/L)	30.7±0.8	32.3±1.7	32.5±1.6	32.2±1.7	31.6±1.2	31.2±1.7
GLB (g/L)	19.4±0.5	19.6±2.0	21.1±1.6	19.4±1.4	19.2±2.2	18.2±1.1
A/G	1.59±0.06	1.65±0.09	1.54±0.10	1.66±0.06	1.67±0.20	1.72±0.06
ALT (U/L)	40.6±9.4	36.2±14.4	86.8±58.8	59.6±15.0	67.5±23.6	46.7±7.6
ALP (U/L)	154±24	141±13	185±33$^{\#}$	124±26	116±23	116±23
BUN (mmol/L)	7.9±1.7	8.6±0.8	11.1±1.5*$^{\#}$	10.1±1.5	8.5±1.9	8.8±1.2
UA (μmol/L)	105±27	133±33	121±42	123±44	170±32	172±48
GLU (mmol/L)	10.4±1.1	8.5±1.3*	8.0±1.3*	7.0±1.3	7.2±1.7	7.0±1.5
AST (U/L)	153±21	159±48	268±193	190±51	215±79	150±45
LDH (U/L)	989±169	862±219	1174±282	785±201	1064±242*	533±151*$^{\#}$

$^{*}p<0.05$ comparing with the control group; $^{\#}p<0.05$ comparing with the QDs-MEA group.

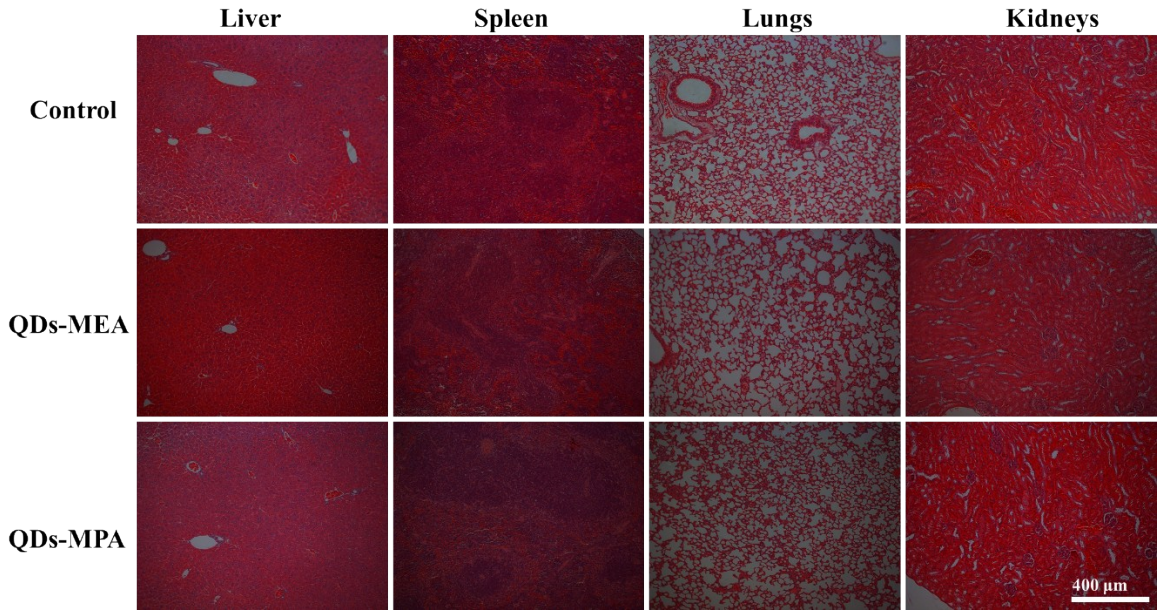

Figure 9. Representative H&E stained images of major organs of mice at day 7 after injection of QDs-MEA, QDs-MPA, or saline (the control group). All images are at the same magnification and the scale bar is given at the right bottom.

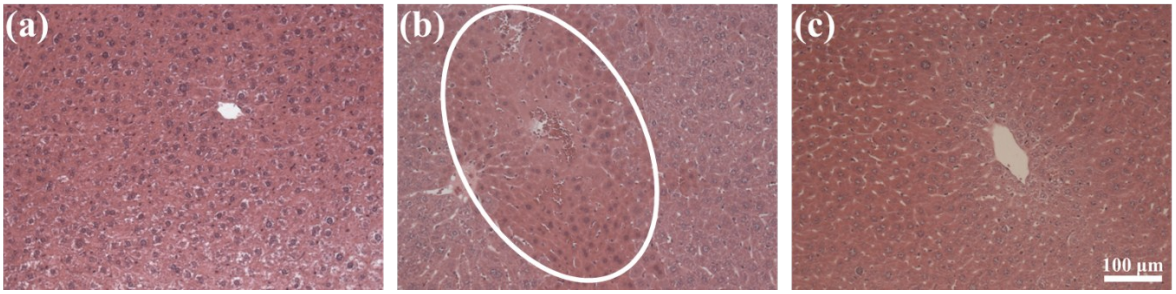

Figure 10. Enlarged H&E stained images of the liver of mice at day 28 after the injection of saline (a), QDs-MEA (b), and QDs-MPA (c). Edema and necrosis phenomena are indicated by the circle.