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Supplementary Materials for

The pore size of mesoporous silica nanoparticles regulates their antigen delivery efficiency

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Table S1. Nitrogen absorption and desorption parameters for MSNs with different pore sizes.

Sample	BET surface area (m^2g^{-1})	Mean pore size (nm)	Pore volume (cm^3g^{-1})
MSNs-L	756	12.9	2.44
MSNs-M	608	10.3	1.56
MSNs-S	535	7.8	1.04

Table S2. Equation of OVA release fitting curve.

Sample	Equation	R^2
OVA@MSNs-L	$y=30.24x(1-exp^{(-15.69x)})$	0.96464
OVA@MSNs-M	$y=21.85x(1-exp^{(-4.76x)})$	0.94671
OVA@MSNs-S	$y=17.82x(1-exp^{(-5.12x)})$	0.93586

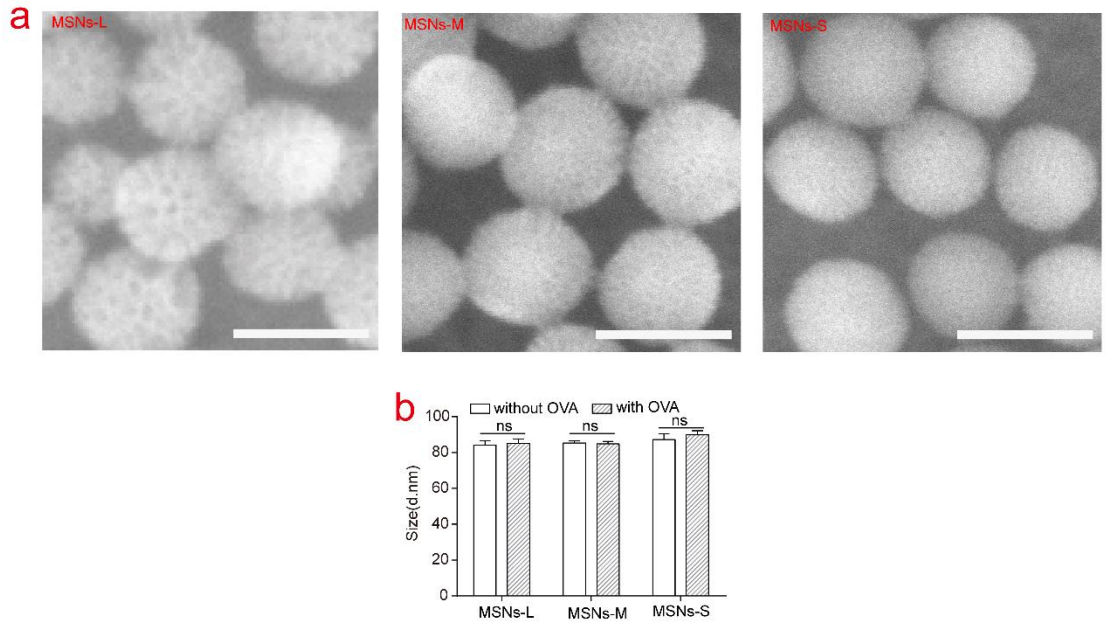

Figure S1.SEM images of MSNs (a) and hydration particle size of MSNs loaded with or without OVA (b).

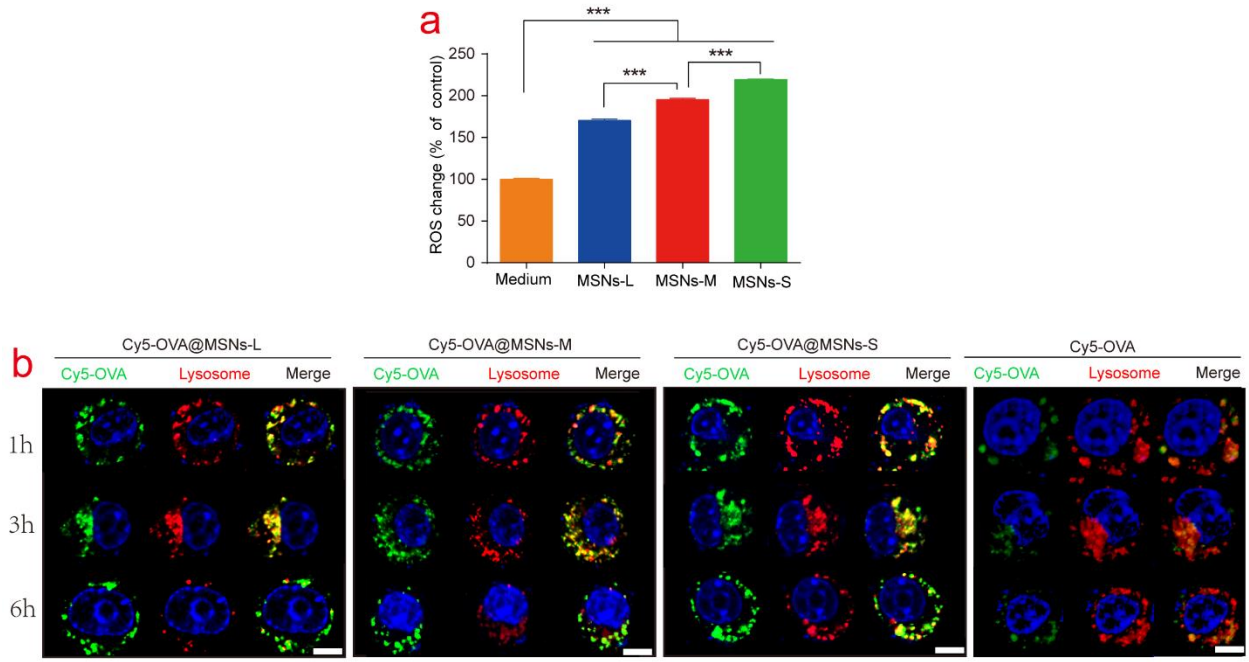

Figure S2. MSNs increased ROS and helped OVA escaped from lysosomes. (a) ROS production of DC2.4 cells incubated with 20 μg/ml MSNs for 1h. (b) Representative confocal laser scanning micrographs of DC2.4 cells exposed to Cy5-OVA@MSNs or Cy5-OVA for 1 h, then cultured in the absence of drug for the indicated times. Green signal corresponds to Cy5-OVA; red signal, to lysosomes stained with LysoTracker Red. Scale bar, 5 μm.

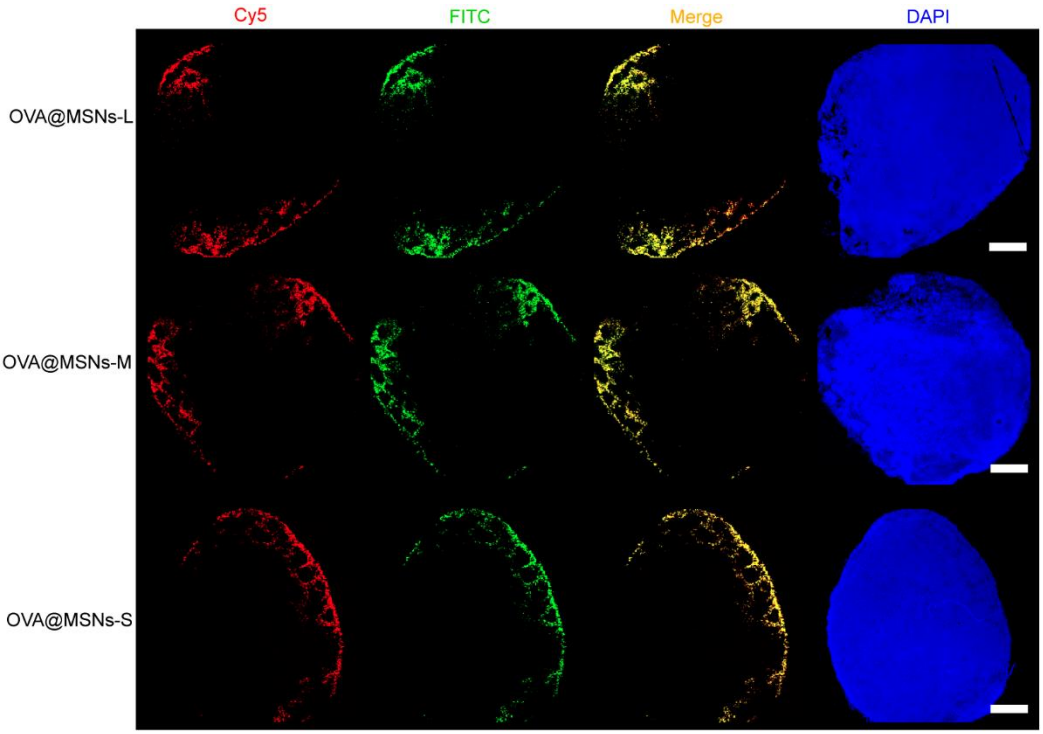

Figure S3. Co-distribution of OVA and MSNs in lymph node. Popliteal lymph nodes were isolated at 10 h after Cy5-OVA@MSNs-FITC injection, and frozen sections were prepared and analyzed by confocal laser scanning microscopy. Scale bar, 200 μm.

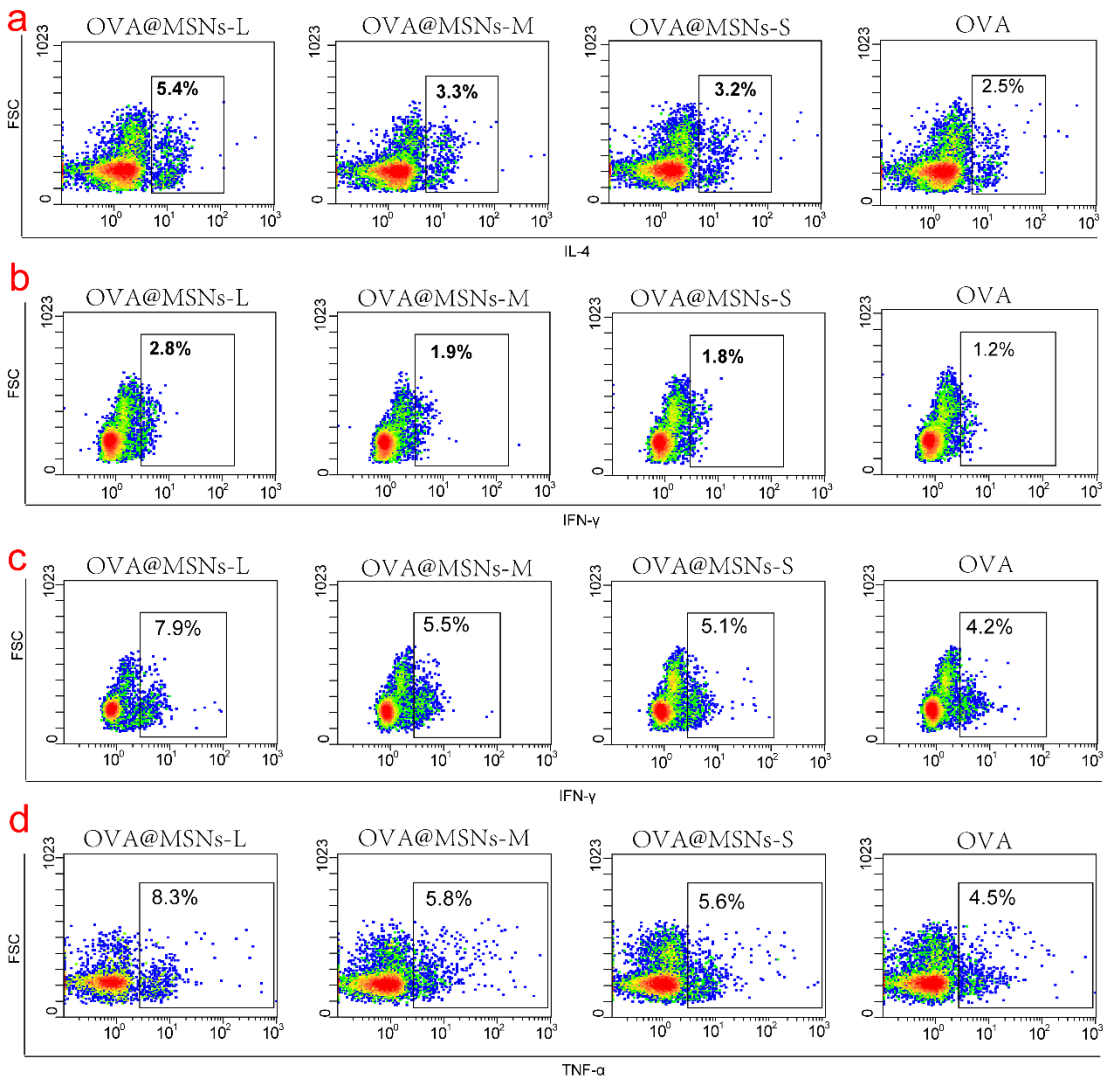

Figure S4. Representative of follow cytometry dot plots of Intracellular cytokine staining. (a) IL-4-producing $CD4^+$ T cells, (b) IFN-γ-producing $CD4^+$ T cells, (c) IFN-γ-producing $CD8^+$ cells and (d) TNF-α-producing $CD8^+$ T cells.

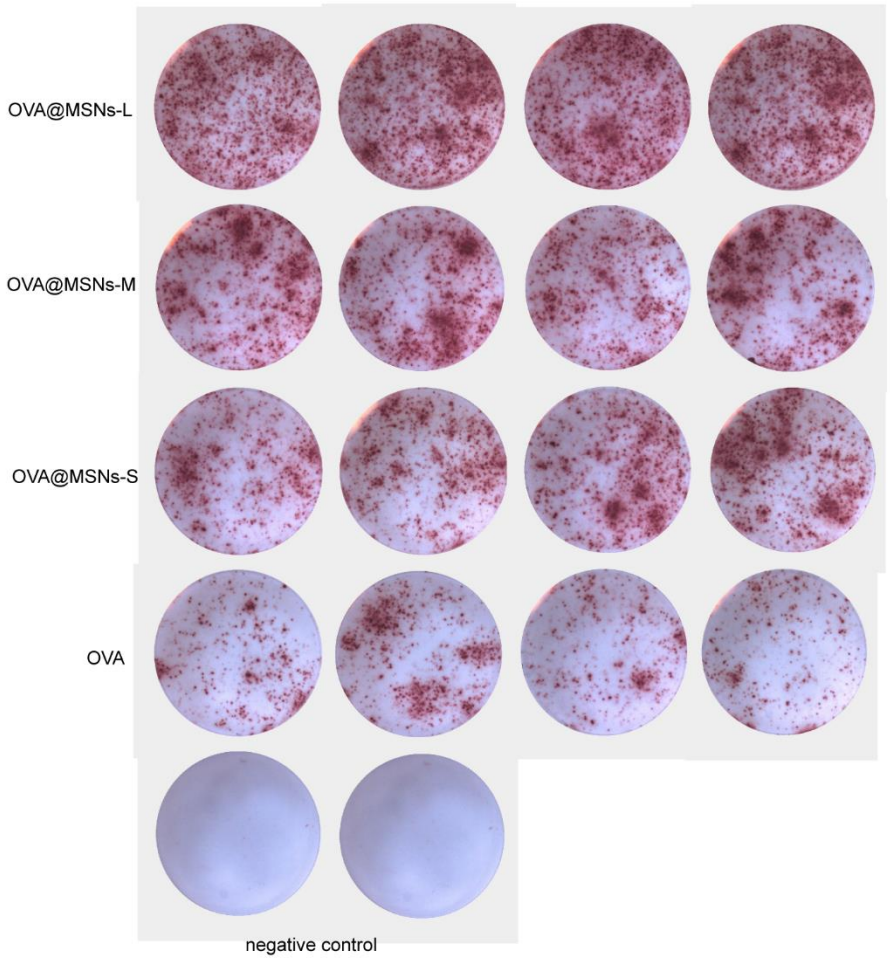

Figure S5. The picture of IFN-γ Elispot assay. Mice were immunized on days 0, 14, 28, The animals were sacrificed on day 35, and splenocytes were collected and seeded at a density of 4×10^6 cells per well into Mouse IFN-γ precoated 96-well plates with 10 μg ml^{-1} SIINFEKL. The following operations were completed according to the procedure.

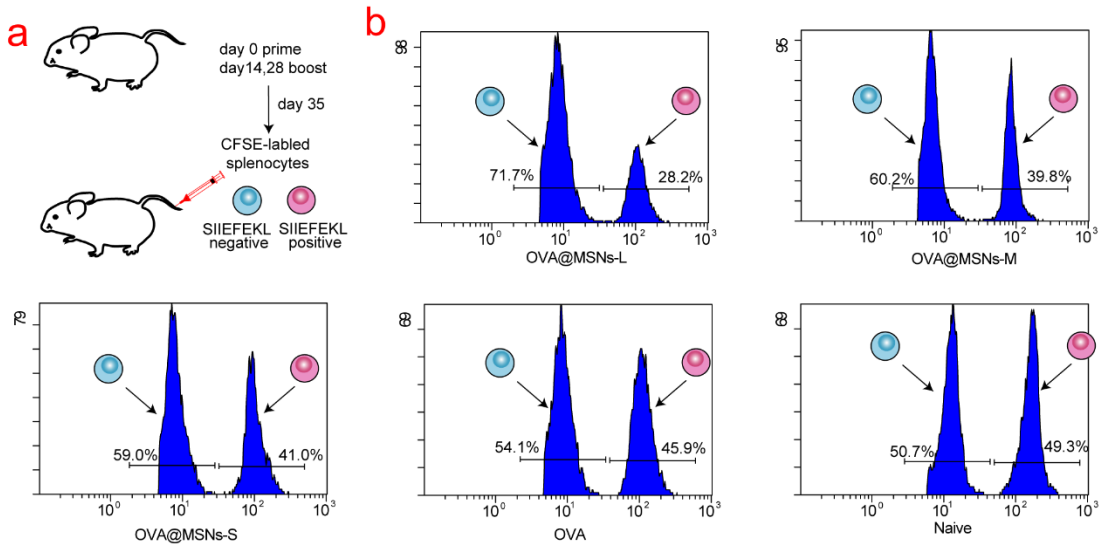

Figure S6. Representative of OVA specific CTL lysis. (a) Schematic of 5,6-Carboxyfluorescein diacetate succinimidyl ester (CFSE) labeled method to evaluate the OVA specific CTL response. (b) Representative follow cytometry results of OVA specific CTL lysis.

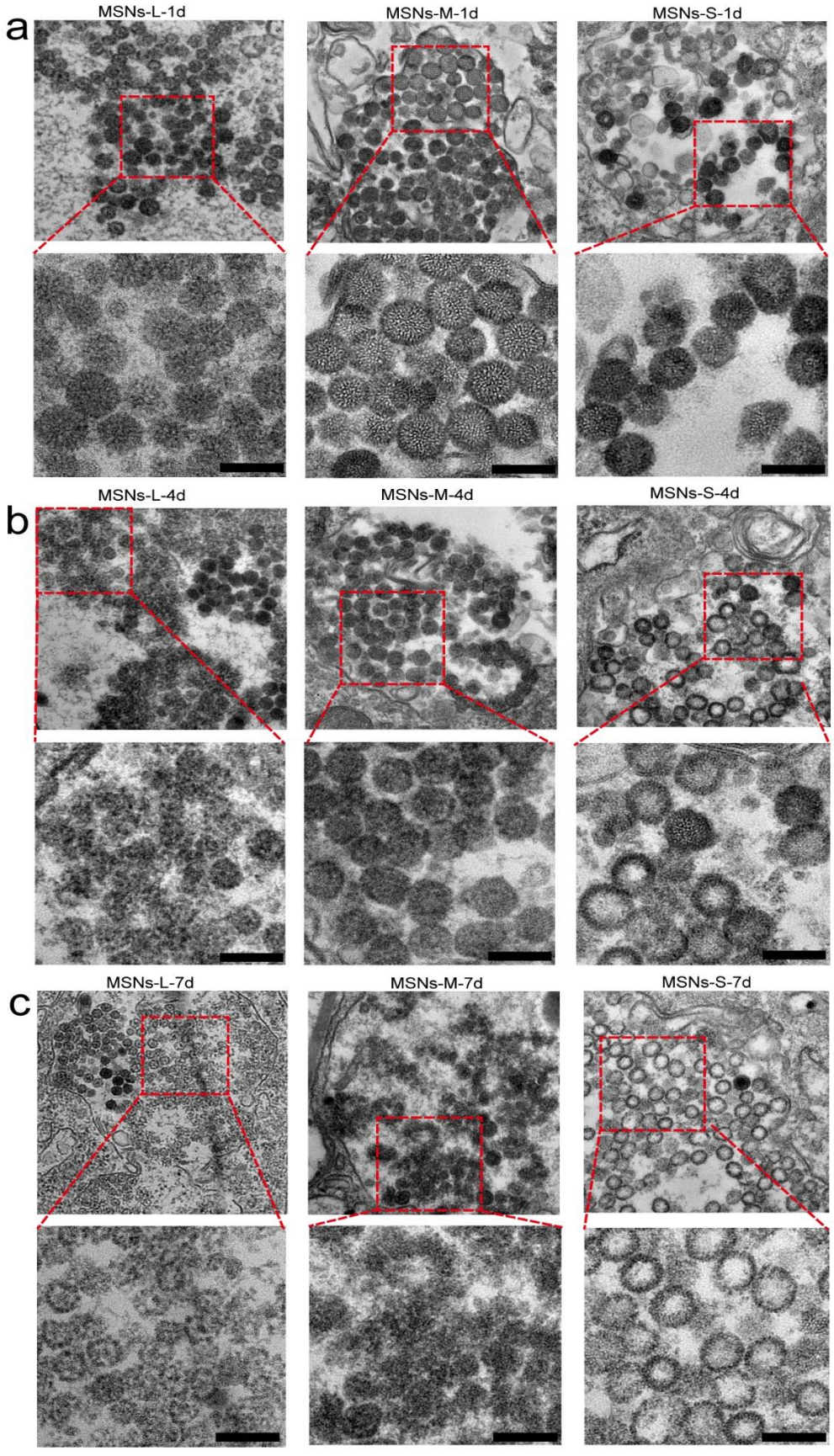
a
MSNs-L-1d
MSNs-M-1d
MSNs-S-1d
b
MSNs-L-4d
MSNs-M-4d
MSNs-S-4d
c
MSNs-L-7d
MSNs-M-7d
MSNs-S-7d

Figure S7. Degradation of MSNs in lymph nodes *in vivo*. Mice were injected subcutaneously with 40 μg MSNs. Popliteal lymph nodes were isolated for ultrathin section and TEM observation on days 1(a),4(b) and 7(c). Scale bar, 100 nm.

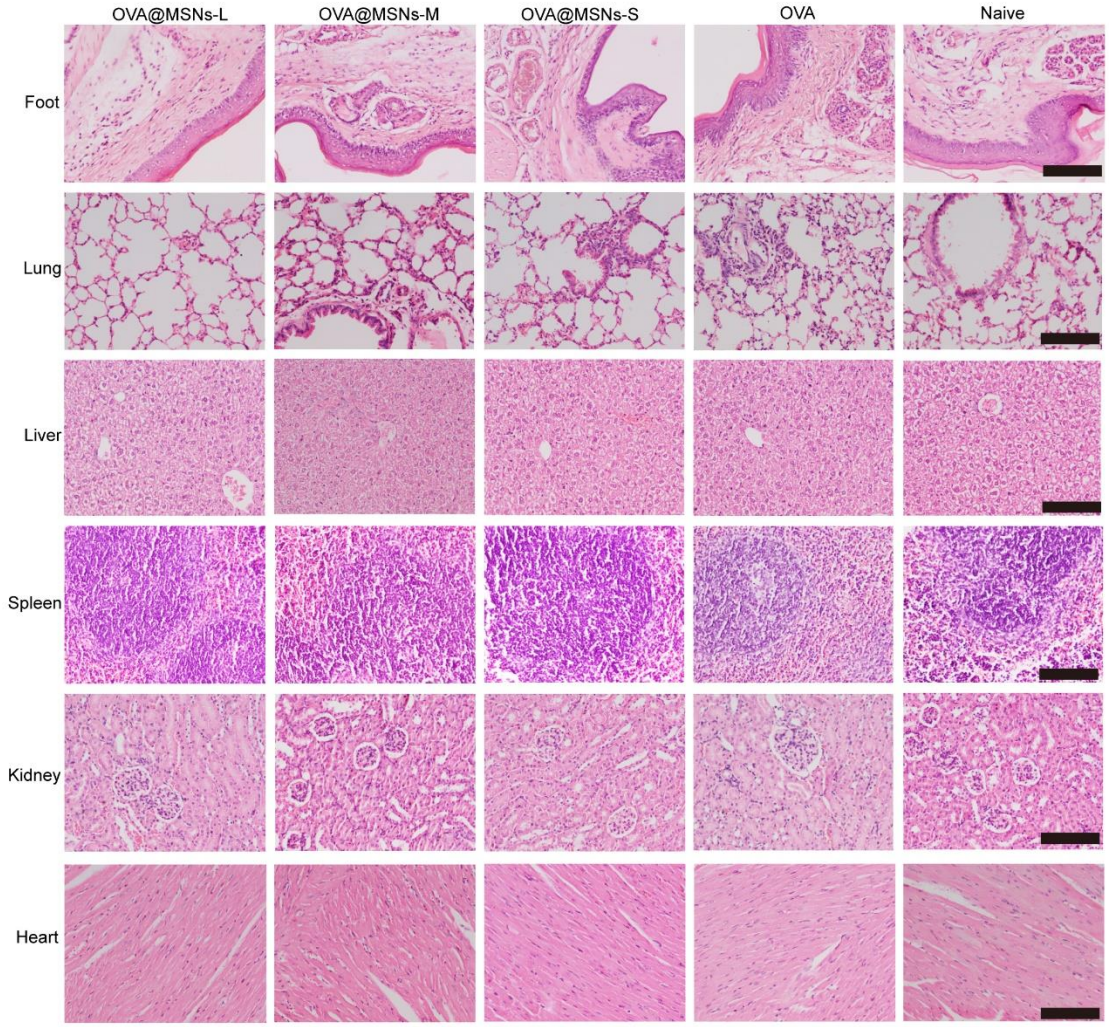

Figure S8. Systemic and local toxicities of OVA@MSNs. Histological evaluation of foot, lung, liver, spleen, kidney and heart. C57BL/6 mice were subcutaneously injected with three times of OVA, OVA@MSNs-L, OVA@MSNs-M, and OVA@MSNs-S at an interval of two weeks. 7 days after last injection, mice were sacrificed and foot, lung, liver, spleen, kidney and heart were separated for paraffin section and H&E staining. Scale bar, 400 μm.