**Figure S1** Illustrations of the operating system: the initial interface (A); information entry page (B); reminder page for the correct connection and opening of the anti-high pressure infusion tube prior to operation (C); pages displayed during the start (D), active operation (E), and pause of the nebulization process (F); operation record-saving page postnebulization (G); and research-history overview page (H).
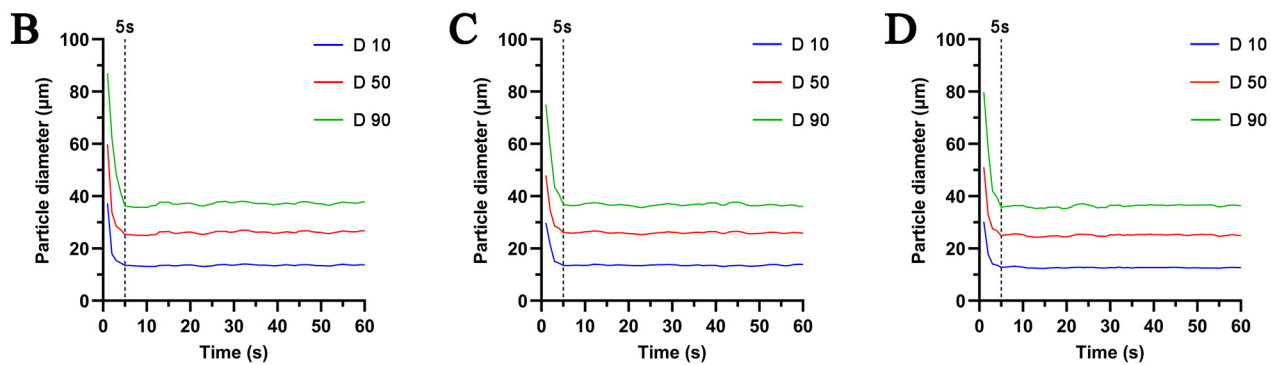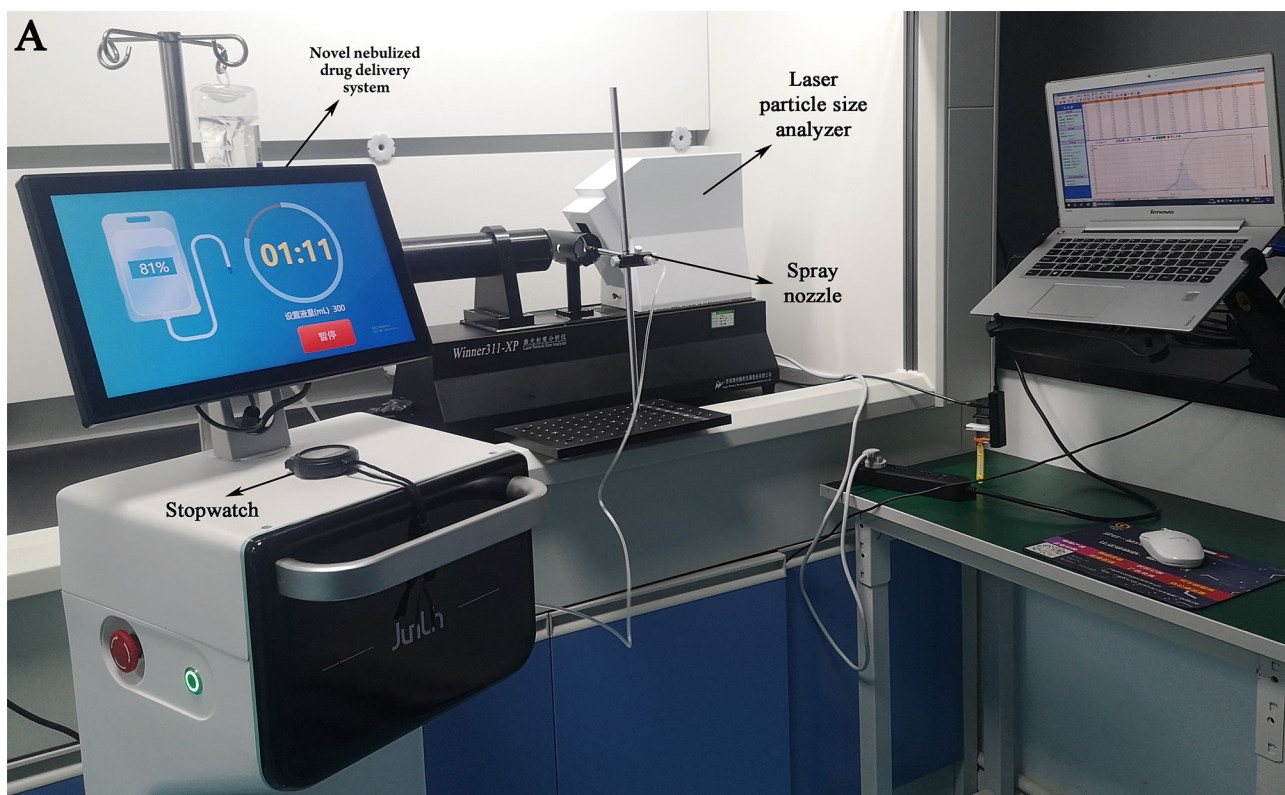
Figure S2 Experimental setup for granulometric analysis: overview of the experimental platform (A), time required to achieve a stable aerosol generation for nebulizing sterile water (B), 0.9% NaCl solution (C), and 5%-glucose solution (D) after initiation of the nebulization system.
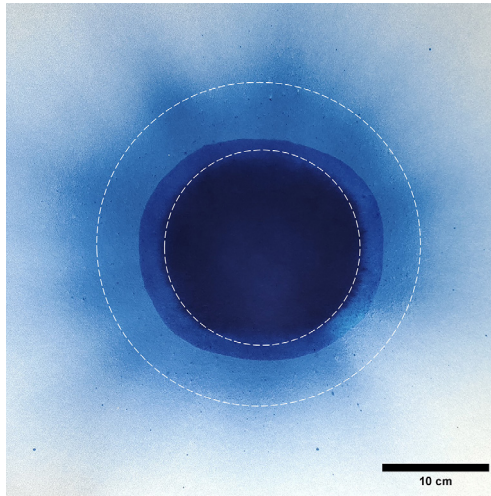
Figure S3 Intensive and expanded spray areas at vertical distance of 5 cm between the spray nozzle and the blotting paper.
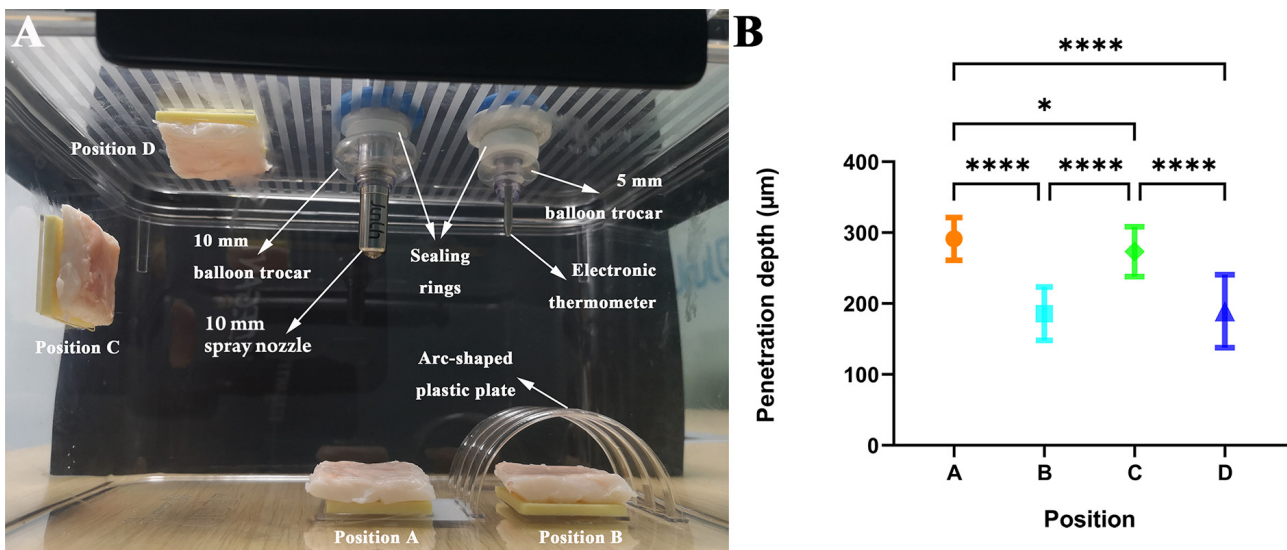
Figure S4 In vitro experiments. A hermetic plastic box model was established (A). The doxorubicin penetration depths of the freshly excised porcine peritoneum were respectively placed on four different positions inside the box model, A = position A, B = position B, C = position C, D = position D (B). *, $P<0.05$; ****, $P<0.0001$.
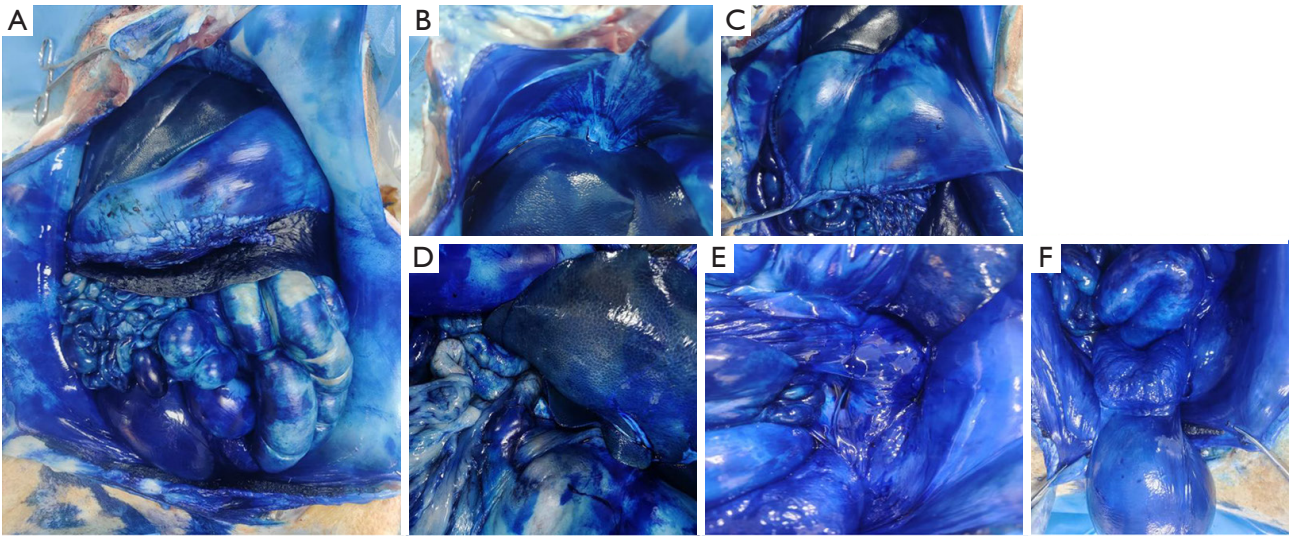
Figure S5 The blue staining of organs and tissues inside the porcine abdominal cavity. The overall view (A) and views of the diaphragmatic peritoneum and liver (B), stomach (C), pancreas (D), mesentery (E), and pelvis (F).

Table S1 Granulometric composition of the sprayed aerosol

Experimental measurements	Sterile water				0.9% NaCl				5% Glu			
	D10 (µm)	D50 (µm)	D90 (µm)	<30 µm*, %	D10 (µm)	D50 (µm)	D90 (µm)	<30 µm*, %	D10 (µm)	D50 (µm)	D90 (µm)	<30 µm*, %
M1	13.6	26.4	40.3	63.3	13.6	26.0	39.5	65.0	12.8	25.4	39.5	66.4
M2	13.2	24.3	36.0	73.5	14.4	26.5	39.4	63.6	13.0	25.8	39.9	65.3
M3	13.5	25.1	37.4	69.7	13.8	26.6	40.5	62.6	13.8	27.6	42.9	58.1
Mean ± SD	13.5±0.2	25.3±1.0	37.9±2.2	68.8±5.1	13.9±0.4	26.4±0.3	39.8±0.6	63.7±1.2	13.2±0.6	26.3±1.2	40.8±1.9	63.3±4.5

*, the percentage of aerosol particles whose diameter was smaller than 30 µm. M, measurement; D10, the maximal droplet size at the 10th percentile; D50, the maximal droplet size at the 50th percentile; D90, the maximal droplet size at the 90th percentile; Glu, glucose solution; SD, standard deviation.

Table S2 The gravimetric analyses

Experimental measurements	Vertical distance (cm)	Spray time (s)	W_a (g)	W_d (g)	Depositional percentage (%)
M1	8.0	15.0	8.8	7.4	84.1
M2	8.0	15.0	8.8	7.9	89.7
M3	8.0	15.0	8.8	8.0	90.9
Mean ± SD	–	–	–	–	88.2±3.6

M, measurement; SD, standard deviation; W_a, the weight of the sterile water which was sprayed via the nozzle inside a hermetic plastic bottle for 15 seconds; W_d, the weight of sterile water which was deposited on the water writing cloth after being vertically sprayed on the cloth for 15 s.

Table S3 The estimated stresses of the sprayed aerosol on the directly opposing surfaces for different distances

Parameter	Distance[&]			
	5 cm	8 cm	10 cm	12 cm
Impulsive force (N)*	$0.025±0.1×10^{-3}$	$0.021±0.1×10^{-4}$	$0.020±0.1×10^{-4}$	$0.019±0.6×10^{-3}$
Diameter of SA (cm)*	9.160±0.404	14.500±0.791	17.300±1.539	17.420±1.777
CSA of SA ($×10^{-4}$ m^2)*	65.968±5.885	165.439±18.001	236.431±42.073	240.196±51.425
Estimated stress (Pa)	3.790	1.269	0.846	0.791

[&], distances including the linear distance between the nozzle orifice and the surface of the measuring balance during the measurement of the impulsive force and the vertical distance between the nozzle orifice and the directly opposing surface of WWC during measurements of the diameter of the SA and the CSA of the SA. *, the impulsive force (N), diameter of SA (cm), and the CSA of the SA (m^2) are all presented as the mean ± standard deviation. N, Newton; SA, sprayed area; CSA, cross-sectional area; Pa, Pascal; WWC, water writing cloth.

Table S4 The doxorubicin penetration depth of the hermetic box model

Sample position	Penetration depth (μm)*
A	291.4±30.2
B	186.0±37.7
C	273.5±35.2
D	189.2±51.5

*, the penetration depth is expressed as the mean ± standard deviation. A, position A; B, position B; C, position C; D, position D.