.Supplementary Information for:

Alginate di-aldehyde modified metal-organic framework nanocarriers as delivery and adjuvant in inactivated pseudorabies vaccination

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Table S1. List of primers of gI/gE gene of PRV used in this study.

Primer	Sequence
gI/gE	F:GGTGTTTGCATAATTTTGTGGGTGG-3' R:GAAAGGGCCGCATGGTCTCA-3'

Table S2. The body weight changes of mice in different groups between 1 dpi and 28 dpi.

	Group						
	PBS	PRV	ISA201/PRV	Alum/PRV	ZIF-7/8/PRV	ADA/PRV	ZIF-7/8-ADA/PRV
1 dpi	23.19±0.97	23.56±0.98	23.13±1.30	22.89±1.58	22.81±0.83	23.03±1.21	22.98±1.05
7 dpi	25.31±1.37	25.43±1.31	25.09±0.65	25.19±0.77	24.92±0.63	25.21±0.74	25.45±1.11
14 dpi	26.29±0.85	26.49±1.15	26.63±1.00	26.75±0.84	27.00±0.63	26.89±0.82	27.30±0.64
21 dpi	28.10±0.88	27.10±0.78	28.38±0.94	27.77±0.84	28.53±0.93	28.27±1.15	28.43±1.32
28 dpi	29.05±2.10	28.40±1.86	28.74±1.00	29.14±0.98	29.22±1.14	29.24±1.61	29.22±1.89

Table S3. Blood routine examination of mice in different immune groups in 7 dpi.

	PBS	PRV	ISA201/PRV	Alum/PRV	ZIF-7/8/PRV	ADA/PRV	ZIF-7/8-ADA/PRV	Standard Range
Leukocyte	8.2	8.69	7.59	7.54	6.63	7.21	7.57	0.8-10.6
Lymphocyte	1.23	1.42	2.16	1.59	1.85	1.19	2.05	0.23-3.6
Neutrophils	0.06	4.48	1.5	2.46	6.32	5.52	4.1	0.6-8.9
Monocytes	0.05	0.08	0.05	0.09	0.04	0.07	0.05	0.04-0.14
Oxyphil	0.07	0.19	0.04	0.07	0.21	0.14	0.06	0.00-0.51
Basophile	0.05	0.02	0.04	0.01	0.02	0.04	0.07	0.00-0.12
Erythrocyte	8.05	8.46	7.07	8.26	7.58	7.58	7.58	6.5-11.5
Platelet	689	834	1439	857	735	924	984	400-1600

Table S4. Blood routine examination of mice in different immune groups in 14 dpi.

	PBS	PRV	ISA201/PRV	Alum/PRV	ZIF-7/8/PRV	ADA/PRV	ZIF-7/8-ADA/PRV	Standard Range
Leukocyte	8.2	8.69	7.59	7.54	6.63	7.21	7.57	0.8-10.6
Lymphocyte	1.23	1.42	2.16	1.59	1.85	1.19	2.05	0.23-3.6
Neutrophils	0.06	4.48	1.5	2.46	6.32	5.52	4.1	0.6-8.9
Monocytes	0.05	0.08	0.05	0.09	0.04	0.07	0.05	0.04-0.14
Oxyphil	0.07	0.19	0.04	0.07	0.21	0.14	0.06	0.00-0.51
Basophile	0.05	0.02	0.04	0.01	0.02	0.04	0.07	0.00-0.12
Erythrocyte	8.05	8.46	7.07	8.26	7.58	7.58	7.58	6.5-11.5
Platelet	689	834	1439	857	735	924	984	400-1600

Figure S1. ^{1}H NMR spectrum of ADA.

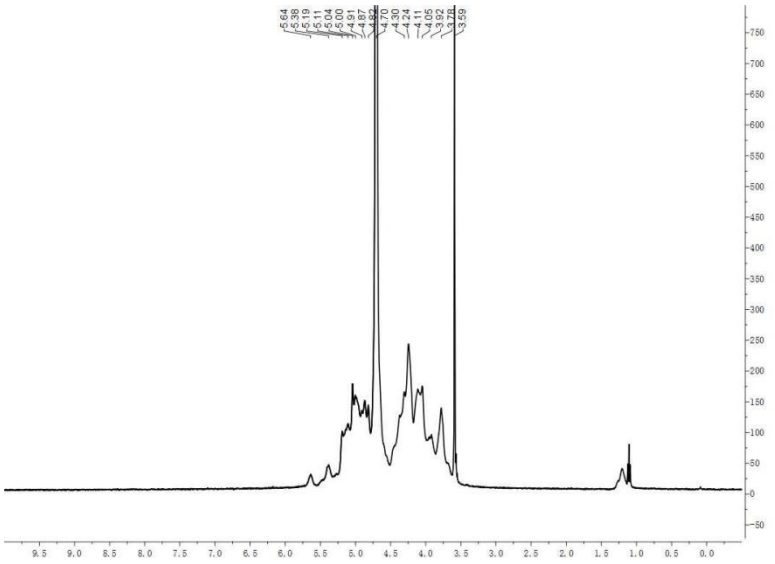

Figure S2. TEM images of (A) ZIF-7/8 and (B) ZIF-7/8-ADA.

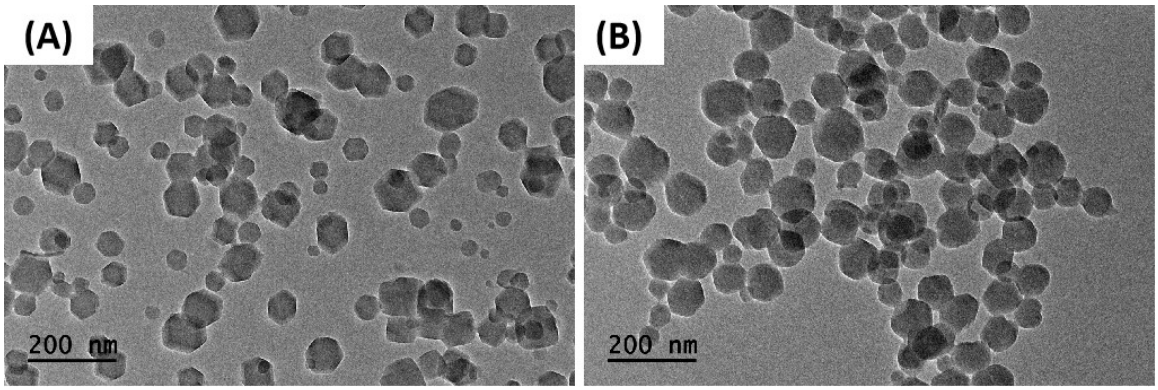

Figure S3. (A) XPS spectrum of ZIF-7/8 and high-resolution (B) C1s, (C) N1s, and (D) O1s XPS spectrum of ZIF-7/8-ADA.

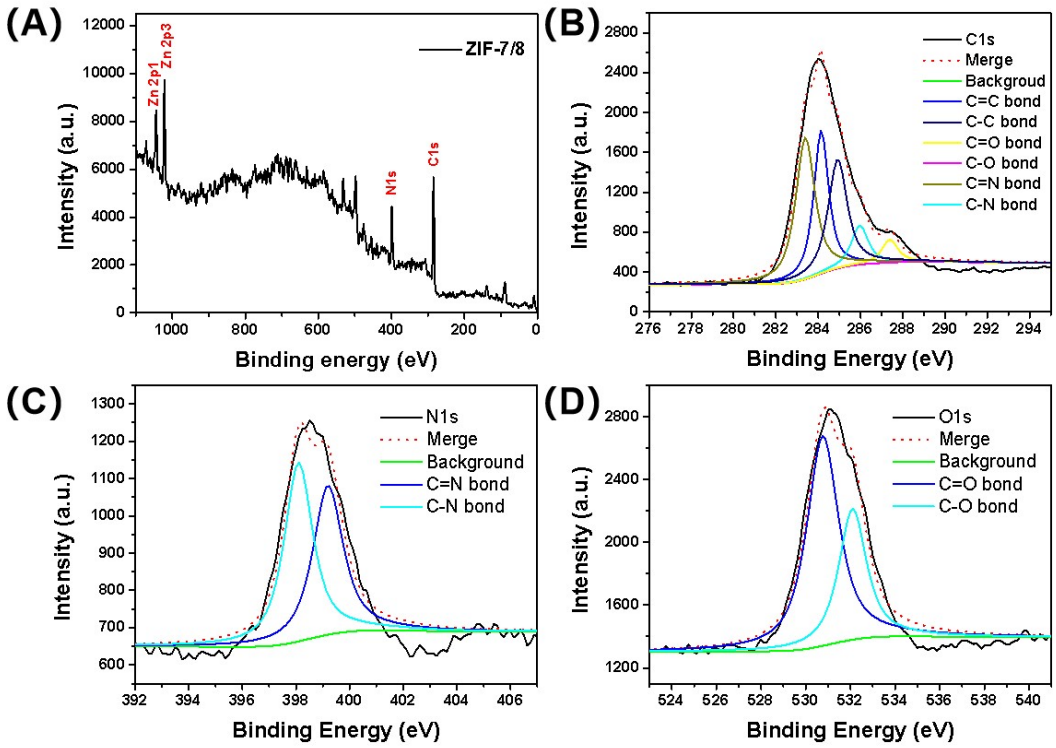

Figure S4. Nitrogen adsorption-desorption isotherms of ZIF-7/8. (A) BET surface area and (B) BJH pore width.

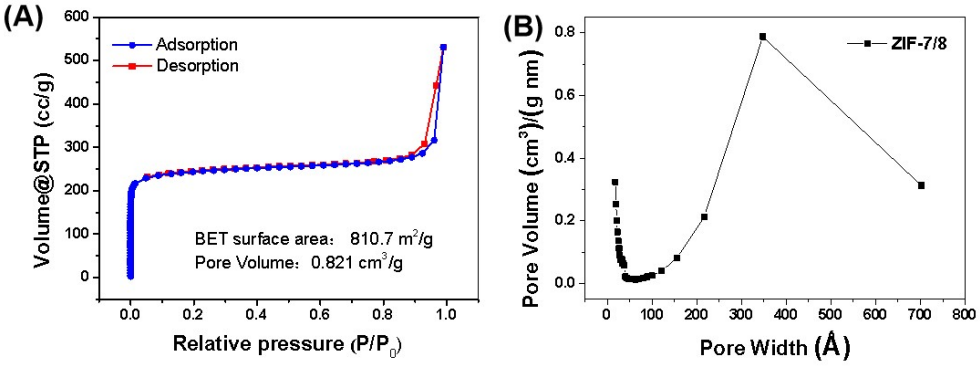

Figure S5. TEM images of (A) PRV, (B) ZIF-7/8/PRV and (C) ZIF-7/8-ADA/PRV.

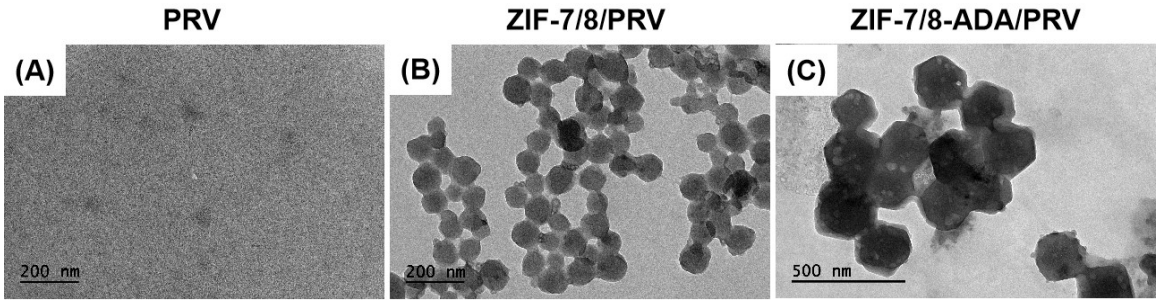

Figure S6. Adsorption of the inactivated PRV antigen by ZIF-7/8-ADA. (A) PRV cumulative adsorption curves of the ZIF-7/8-ADA in PBS solution with different volume ratios; (B) SDS-PAGE image of ZIF-7/8-ADA adsorbed PRV.

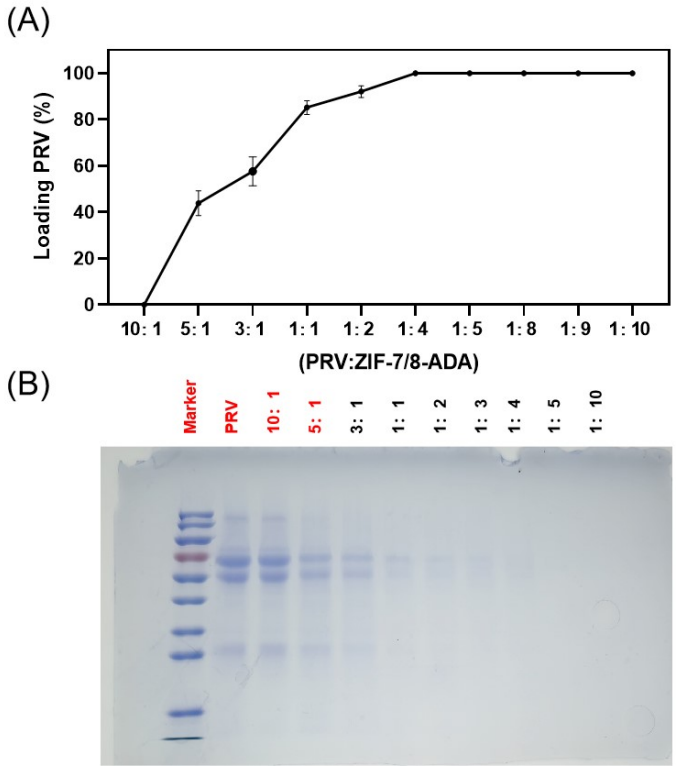

Figure S7. H&E staining images of major organs in ICR mice injected with different concentration of ZIF-7/8-ADA after 28 dpi. (A) 200 μg/mL and (B) 1000 μg/mL. Scale bars correspond to 50 μm.

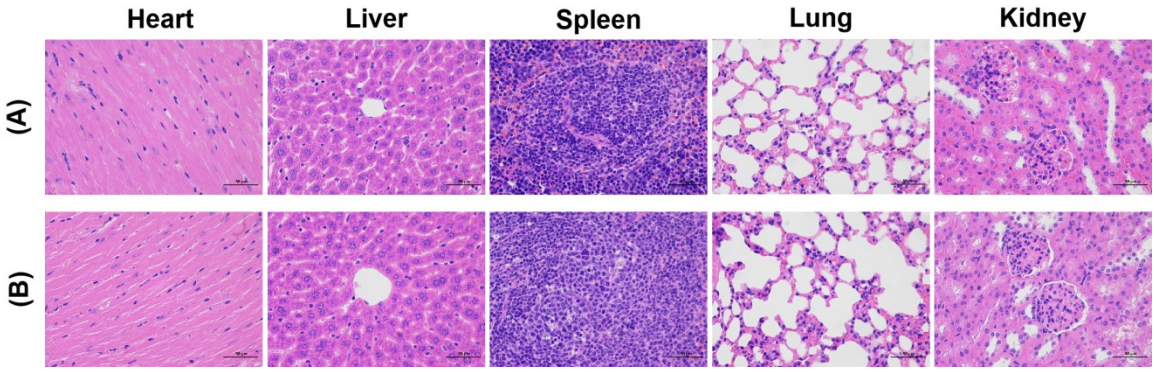

Figure S8. Cell uptake of ZIF-7/8-ADA by BMDCs. (A) The CLSM images of BMDCs, incubated with OVA-FITC, ZIF-7/8-ADA-RhB/OVA-FITC and ZIF-7/8-ADA-RhB for 12 h,respectively. Scale bar: 20 μm. The mean green (B) and red (C) fluorescence intensity of OVA-FITC and ZIF-7/8-ADA-RhB/OVA-FITC and ZIF-7/8-ADA-RhB, respectively. (D) The co-localization analyst in ZIF-7/8-ADA-RhB/OVA-FITC between ZIF-7/8-ADA-RhB and OVA-FITC.

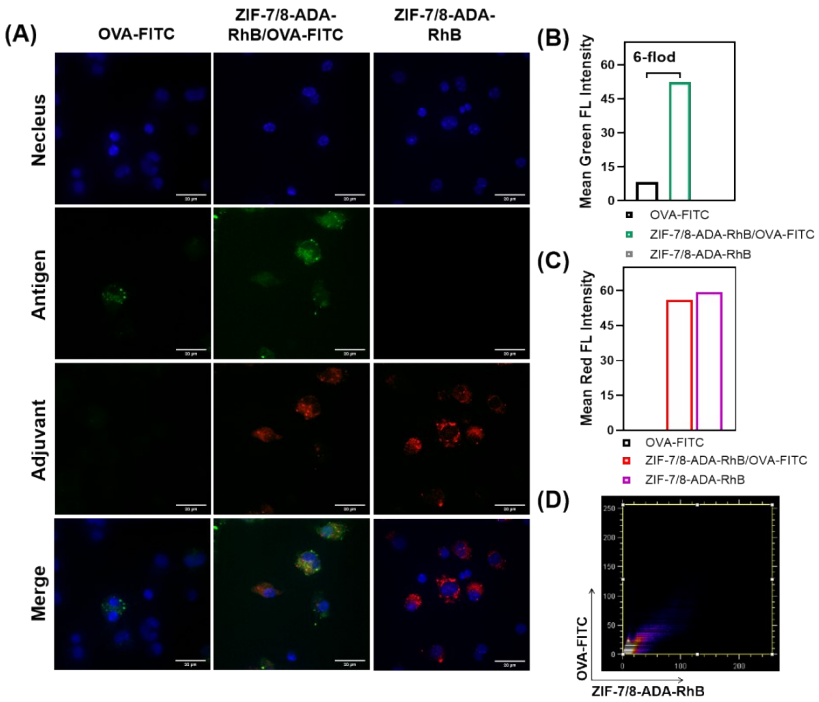

Figure S9. H&E staining images of major organs of surviving mice after PRV-challenged with $100LD_{50}$/mL dose. Scale bars represent 50 μm.

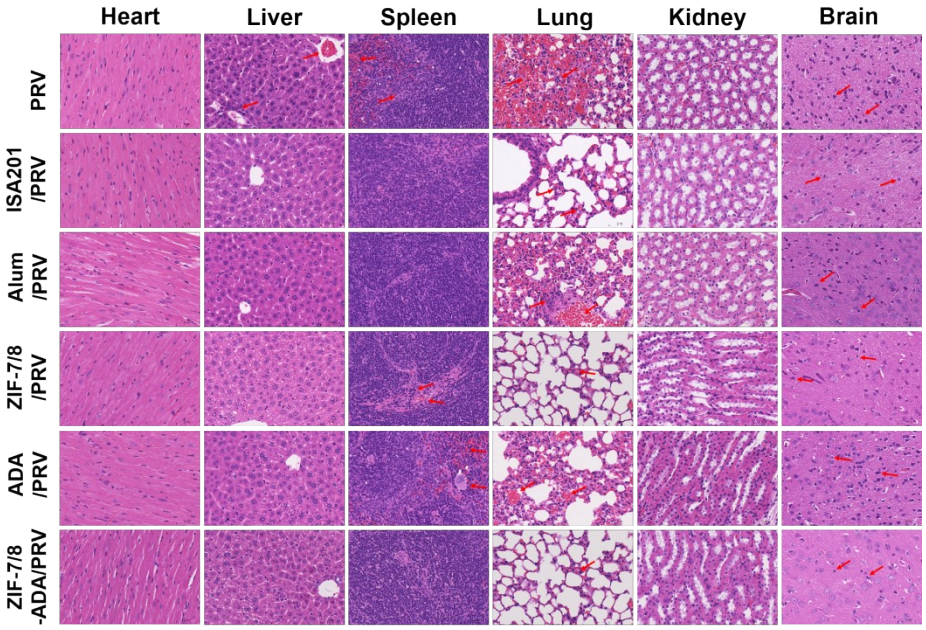

Figure S10. Flow cytometry analysis of $CD11c^{+}CD80^{+}$, $CD11c^{+}CD86^{+}$, $CD11c^{+}MHC\text{-}I^{+}$ and $CD11c^{+}MHC\text{-}II^{+}$ in BMDCs after immunized with PBS, PRV, Alum/PRV, ISA201/PRV, ZIF-7/8/PRV, ADA/PRV, and ZIF-7/8-ADA/PRV.