Supporting information for

ORIGINAL ARTICLE

Sodium alginate coating simultaneously increases the biosafety and immunotherapeutic activity of the cationic mRNA nanovaccine

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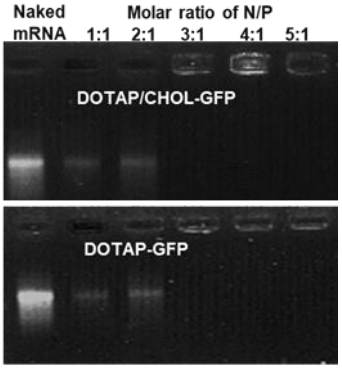

Figure S1. The loading capacity of DOTAP-LPs and DOTAP/ Chol-LPS on mRNA was investigated by gel electrophoresis.

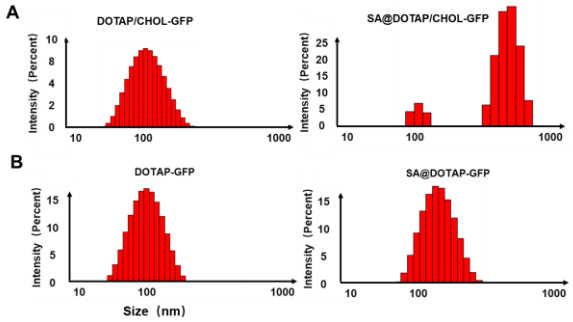

Figure S2. Particle size change of mRNA nano-vaccine coated with sodium alginate. (A) When the mass ratio of mRNA/SA was 1:0.5, the particle size of SA@DOTAP/CHOL-GFP. (B) When the mass ratio of mRNA/SA was 1:0.5, the particle size of SA@DOTAP -GFP.

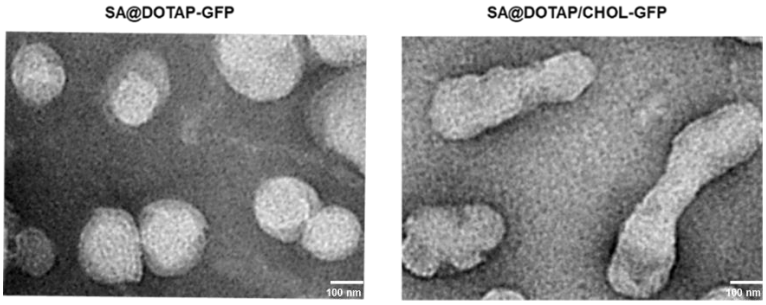

Figure S3. TEM investigating the structure of mRNA nano-vaccine coated with sodium alginate When the mass ratio of mRNA/SA was 1:0.5, scale bar = 100 nm.

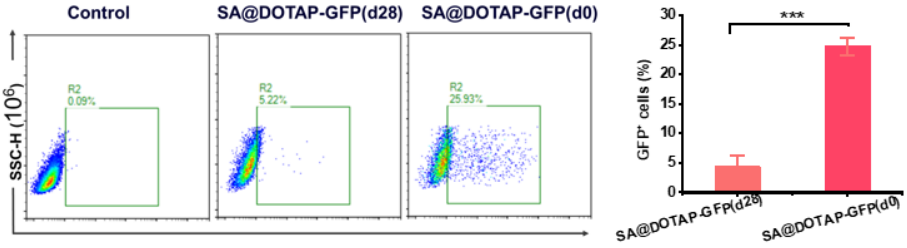

Figure S4. FACS analysis to investigate the mRNA transfection stability of SA@DOTAP-GFP (Day 28) and SA@DOTAP-GFP (Day 0). SA@DOTAP-GFP (Day 28): SA@DOTAP-GFP was prepared by using GFP-mRNA that stored at 4 ℃ for 28 days. SA@DOTAP-GFP (Day 0): SA@DOTAP-GFP that prepared by using fresh GFP-mRNA and stored at 4 ℃ for 28 days. Data are presented as mean ± SD (n = 3). ***P < 0.01.

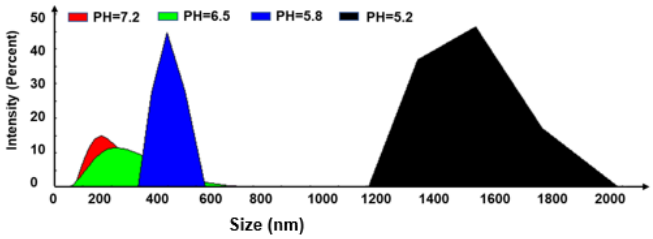

Figure S5. The detachment activity of SA on SA@DOTAP-mRNA.

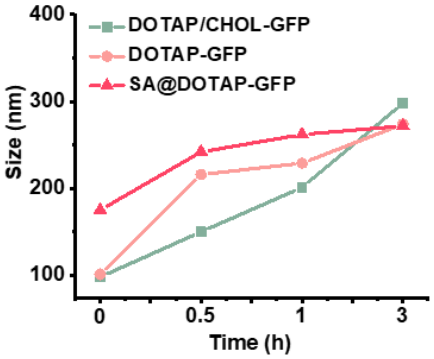

Figure S6. Particle size changes of DOTAP-GFP, DOTAP/CHOL-GFP, and SA@DOTAP-GFP after incubation in aqueous solution containing 50% FBS for the same time.

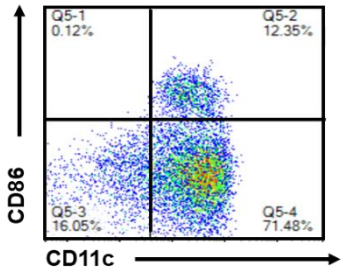

Figure S7. FACS analysis the purity of BMDC cells after 7 days of culture.

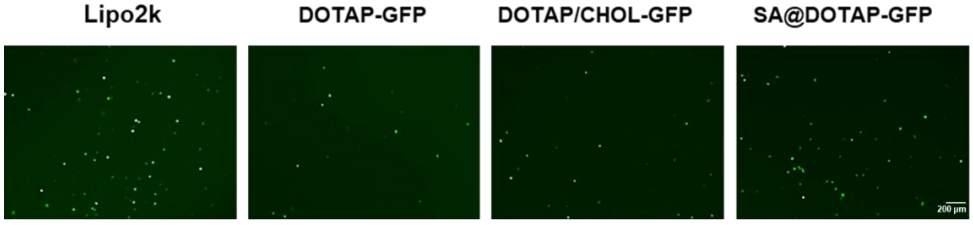

Figure S8. Images of GFP expression in BMDC cells, scale bar = 200 μm.

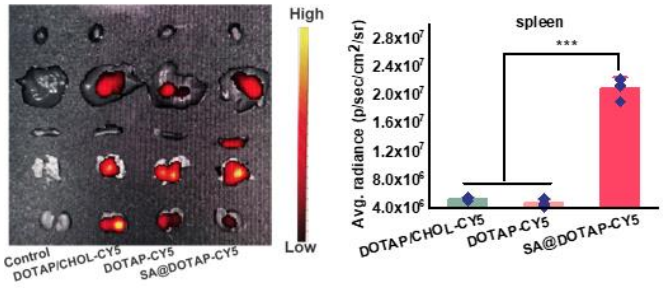

Figure S9. The *in vivo* distribution of CY5-mRNA in mice after intravenous injection with DOTAP/CHOL-CY5, DOTAP-CY5 and SA@DOTAP-CY5 (mean ± SD, n = 3), ***P < 0.01.

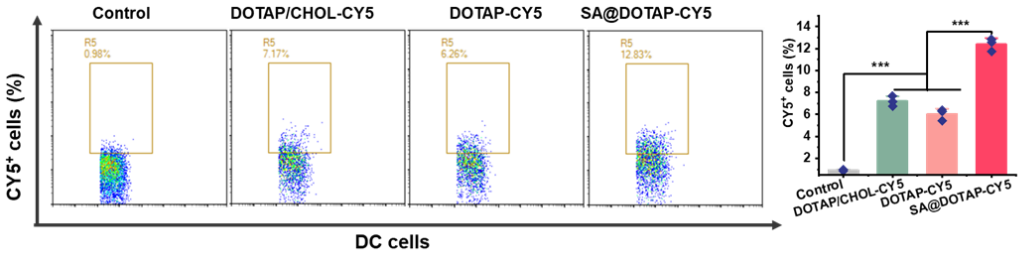

Figure S10. Uptake of DOTAP/CHOL-CY5, DOTAP-CY5 and SA@DOTAP-CY5by DC cells in the spleen (mean ± SD, n = 3), ***P < 0.01.

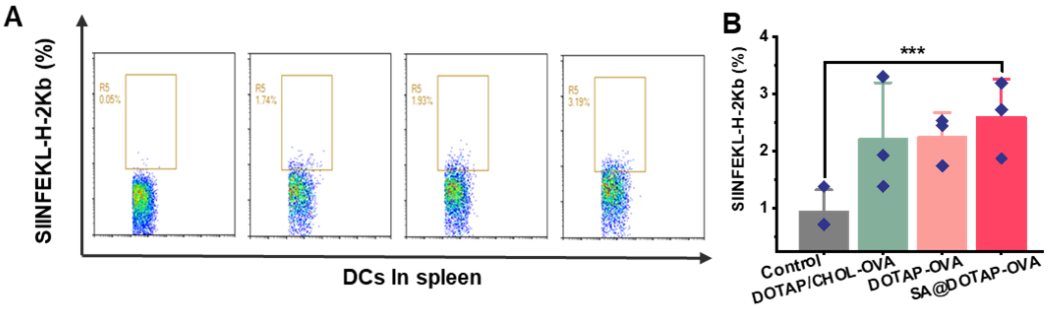

Figure S11. Antigen presentation of different liposome/mRNA complex on DC cells in the spleen measured by flow cytometry. (mean ± SD, n = 3), ***P < 0.01.

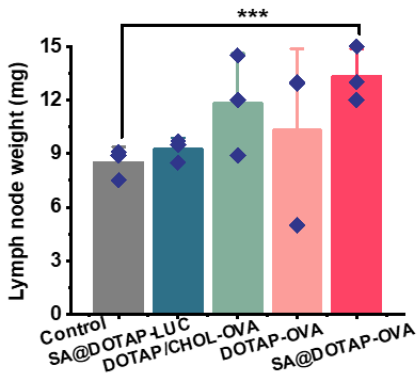

Figure S12. Lymph nodes weight of mice treated with liposome /mRNA complexes groups. (mean ± SD, $n = 3$), ***$P < 0.01$.

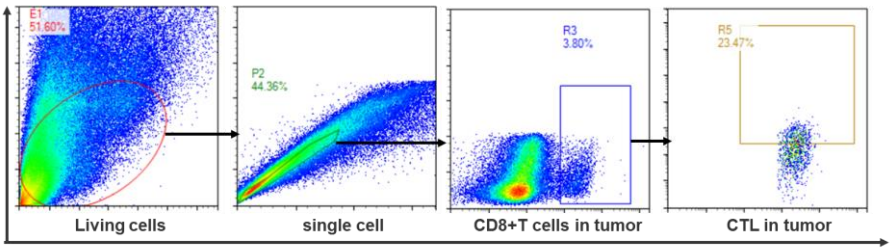

Figure S13. Gating strategy to selected the CTL in tumor. (mean ± SD, $n = 3$).

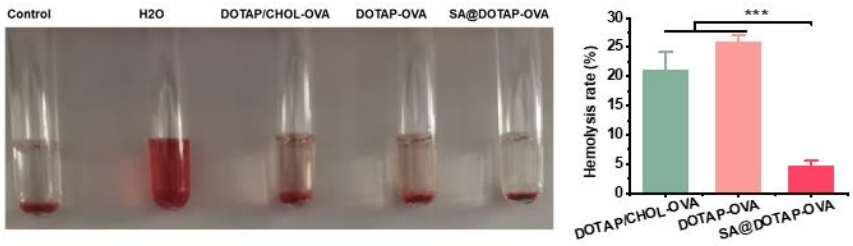

Figure S14. Hemolysis was performed to evaluate the safety of DOTAP/ Chol-OVA, DOTAP-OVA, and SA@DOTAP-OVA. (mean ± SD, $n = 3$), ***$P < 0.01$.

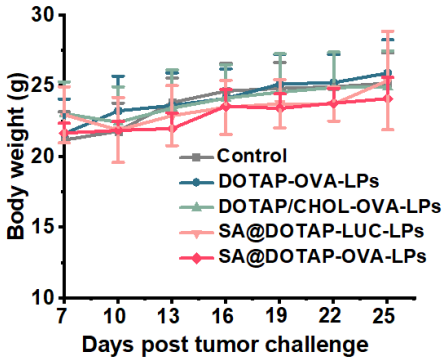

Figure S15. The body weight changes of mice at different times during the treatment. (mean ± SD, $n = 5$).