

### Supporting Information

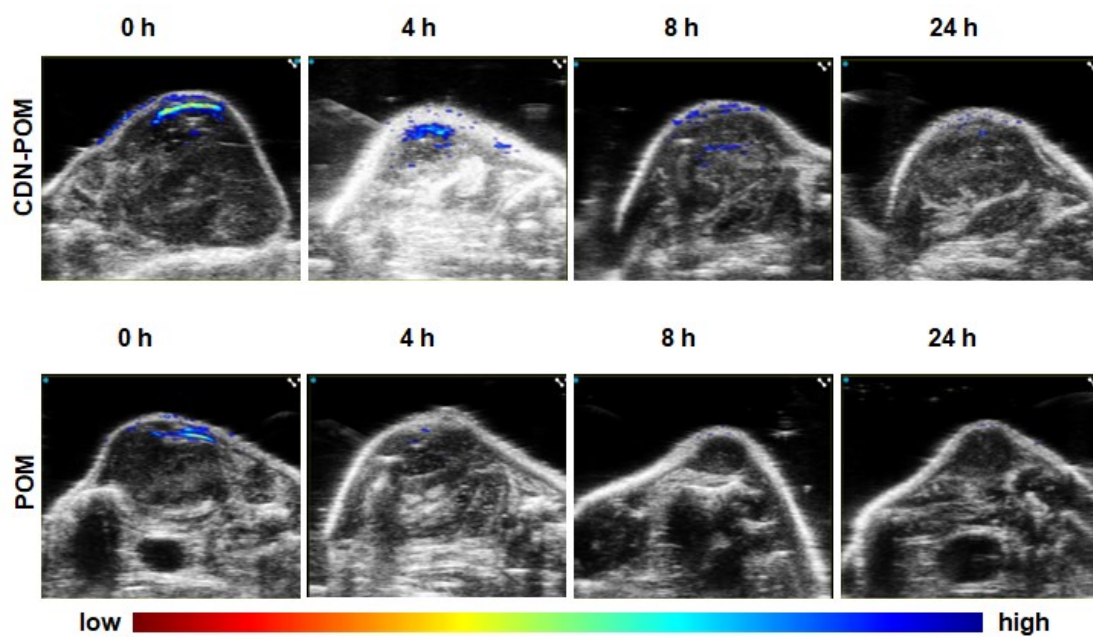


Figure S1. *In Vivo* near-infrared spectral photoacoustic imaging. PA images of the tumor region were obtained at 0, 4, 8 and 24 h post-injection of POM (1 mg/mL, 100  $\mu$ L) and CDN-POM hydrogel (100 $\mu$ L, 1% wt POM).

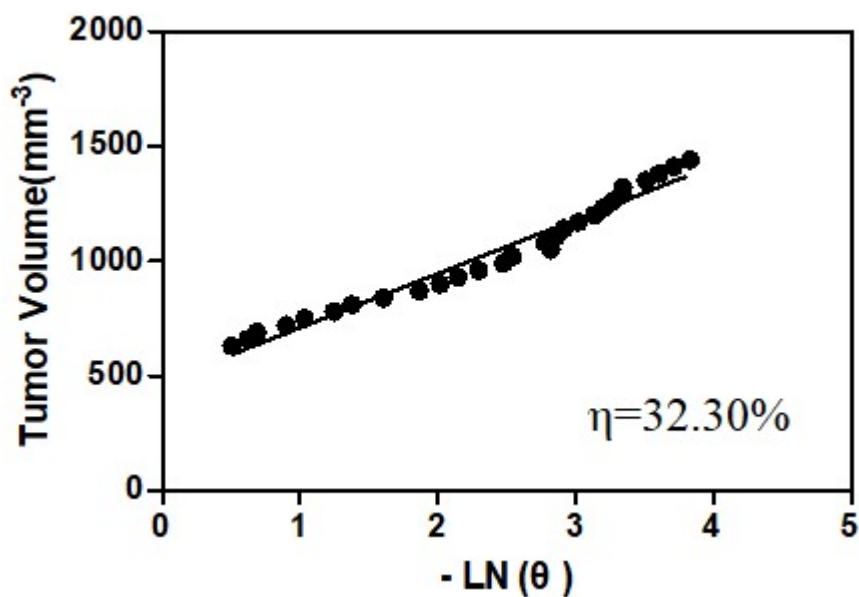


Figure S2. The photo-thermal conversion efficiency ( $\eta$ ) was calculated as follows:  $\eta = hS (T_{max, POM} - T_{max, solvent}) / I(1 - 10^{-A808})$ ;  $t = -t_s \ln \theta$ ;  $\theta = (T - T_{sur}) / (T_{max, NPs} - T_{sur})$ ;  $hS = mdCd/s$ . The photo-thermal conversion efficiency of POM was 32.3%.

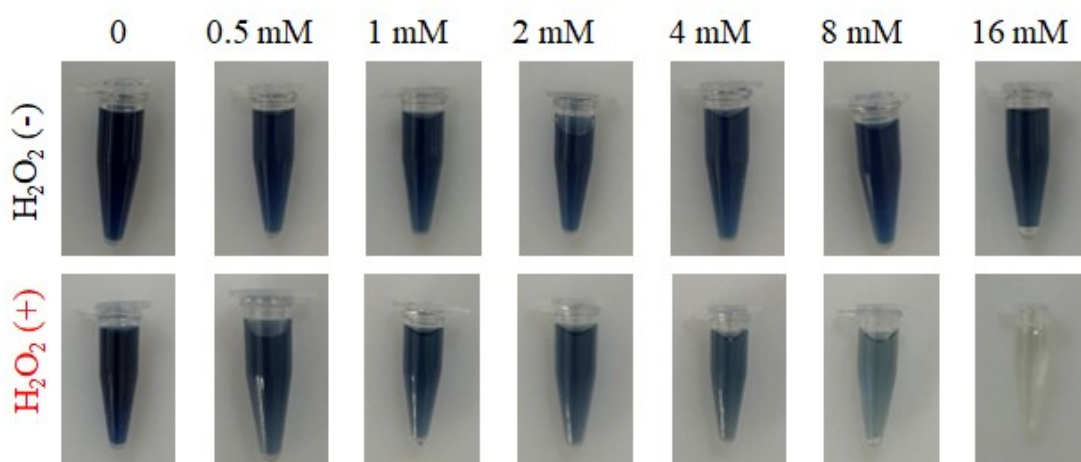


Figure S3. POM before and after incubation with  $H_2O_2$  at various concentrations.

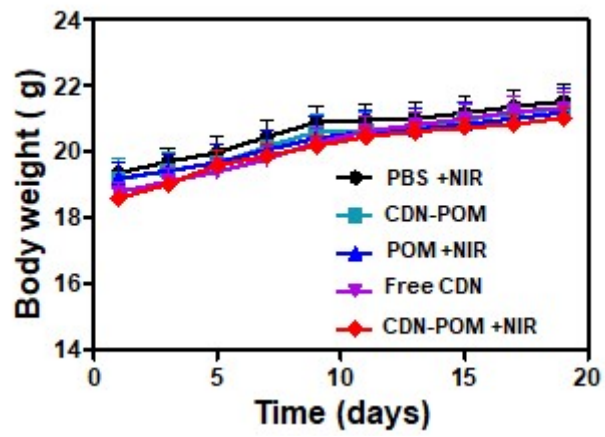


Figure S4. Body weights of mice from different treatment groups.

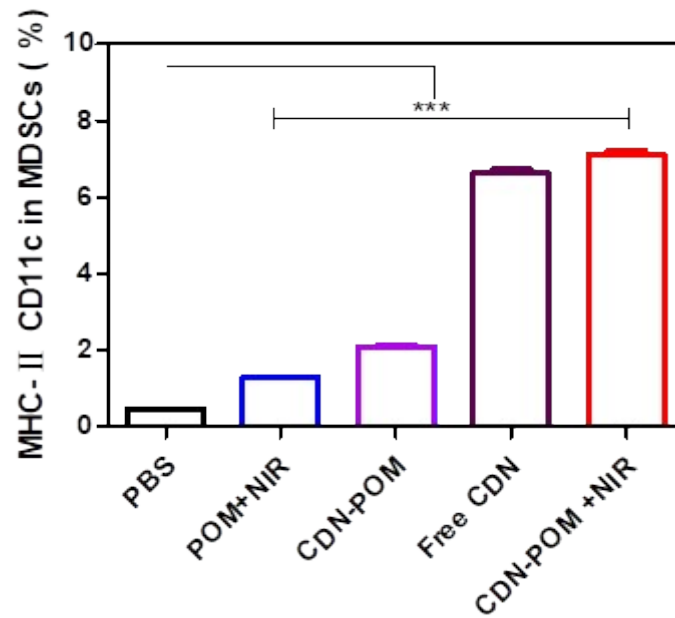


Figure S5. Quantitative analysis of MHC- II or CD11c cells in MDSCs (n=3).

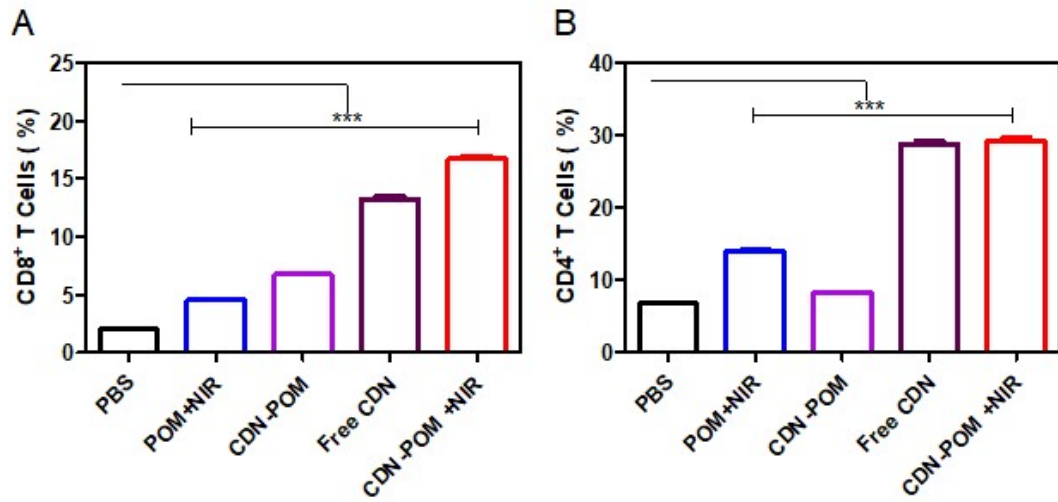


Figure S6. Quantitative analysis of CD8<sup>+</sup> (A) and CD4<sup>+</sup> (B) T cells in the spleen (n=3).

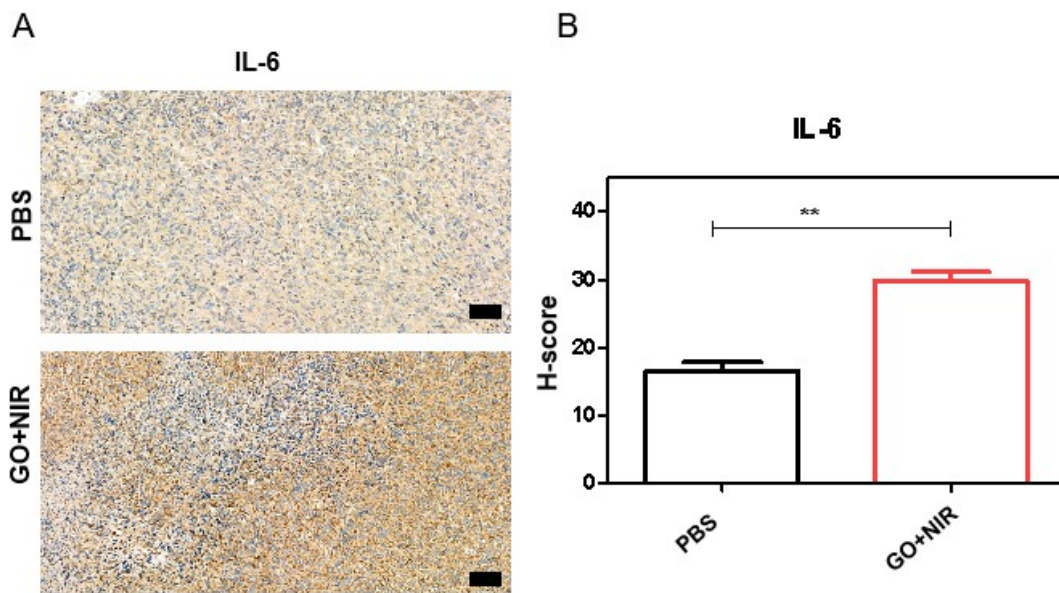


Figure S7. (A) Determination of the levels of IL-6 in Balb/c mice (n = 3) after various treatments as indicated (\*\*p < 0.01). (B) Typical immunohistochemical staining images of related inflammatory cytokines. Scale bar: 100  $\mu$ m.

## ACKNOWLEDGMENTS

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## Declarations

## Competing interests

The authors have no relevant financial or non-financial interests to disclose.

## Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of the Fifth Affiliated Hospital of Sun Yat-Sen University (No. 00329).