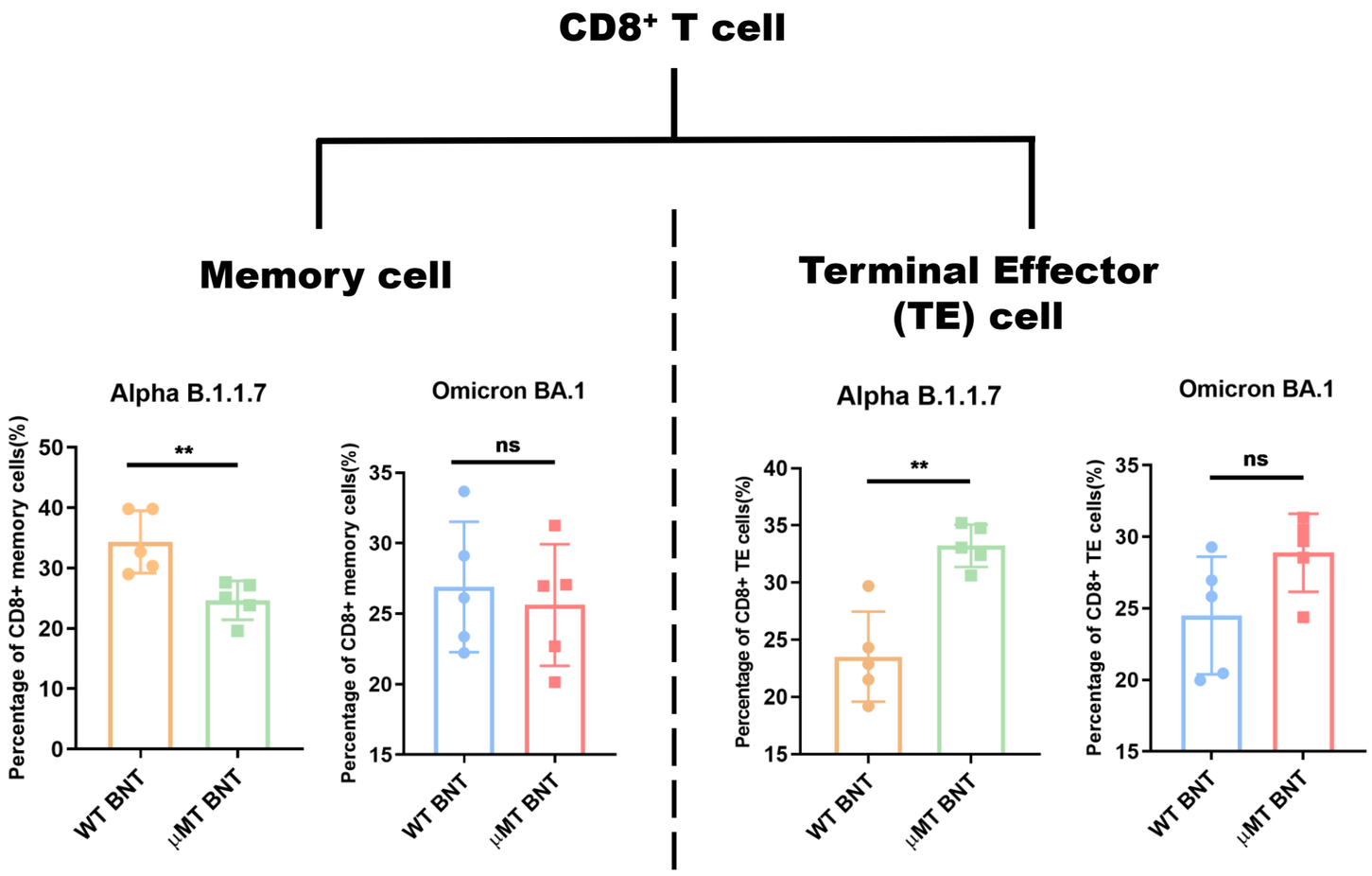
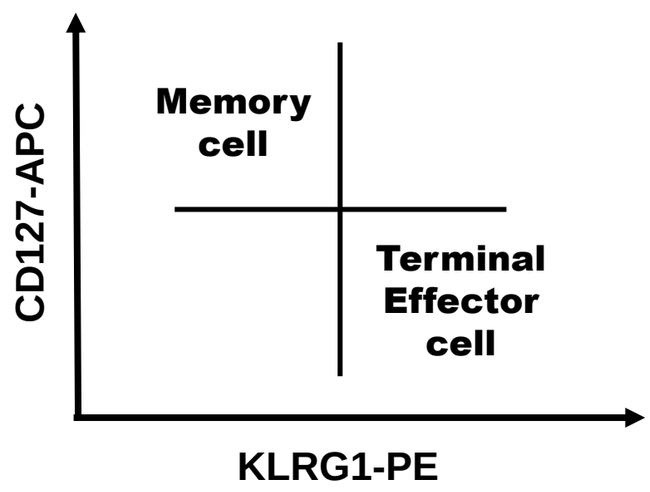
a



b



c

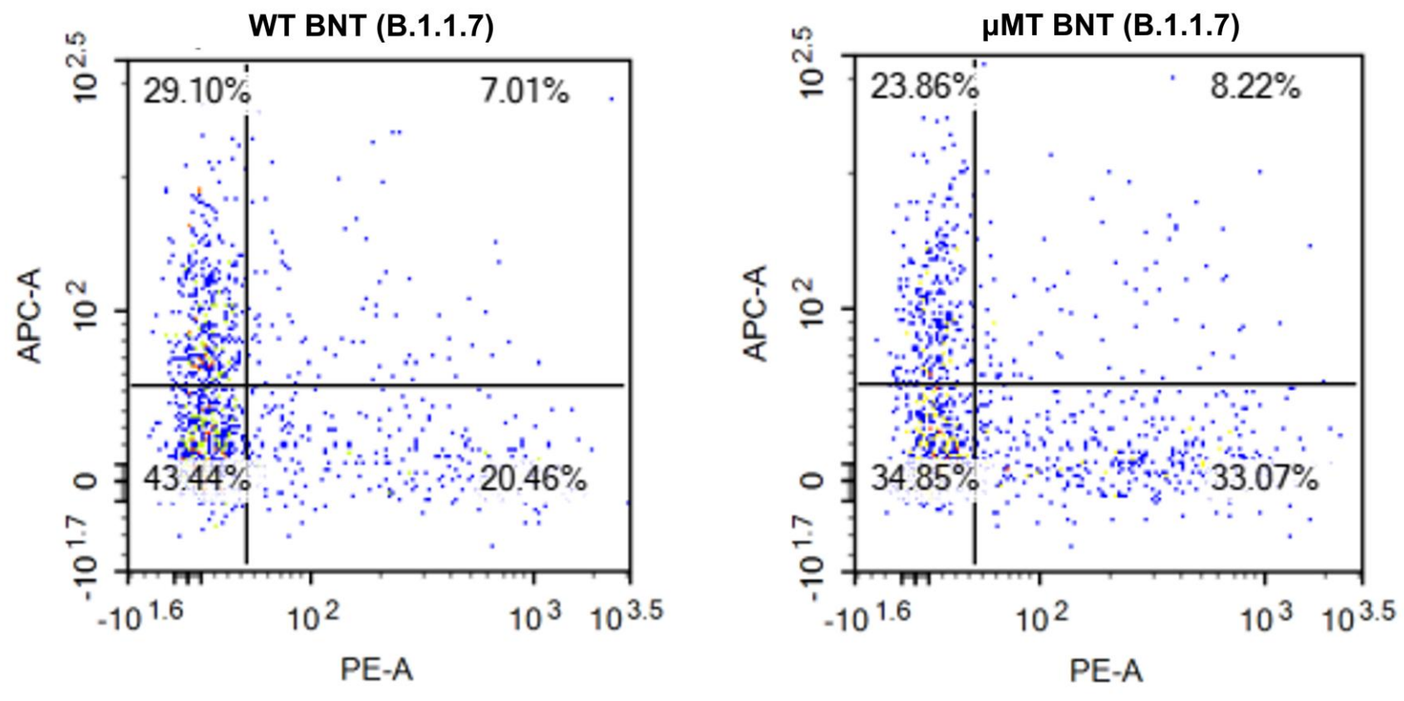


Fig. S1 Spike protein of SARS-CoV-2 induced the differentiation of CD8⁺ T memory cell in spleen of vaccinated WT and µMT mice in vitro. (a) The percentage of CD8⁺ T cell subsets in spleen of vaccinated WT and µMT mice after spike protein stimulation (Alpha and Omicron BA.1). (n=5) (b) Schematic diagram of characterization of CD8⁺ T memory cell subsets by flow cytometry. CD127⁻ KLRG1⁺ ─ TE cell; CD127⁺ KLRG1⁻ ─ memory cell. (c) Representative dot plots showing CD8⁺ T memory cell differentiation in spleen of vaccinated WT and µMT mice. Statistical significance was determined using two-tailed Student's t-tests.

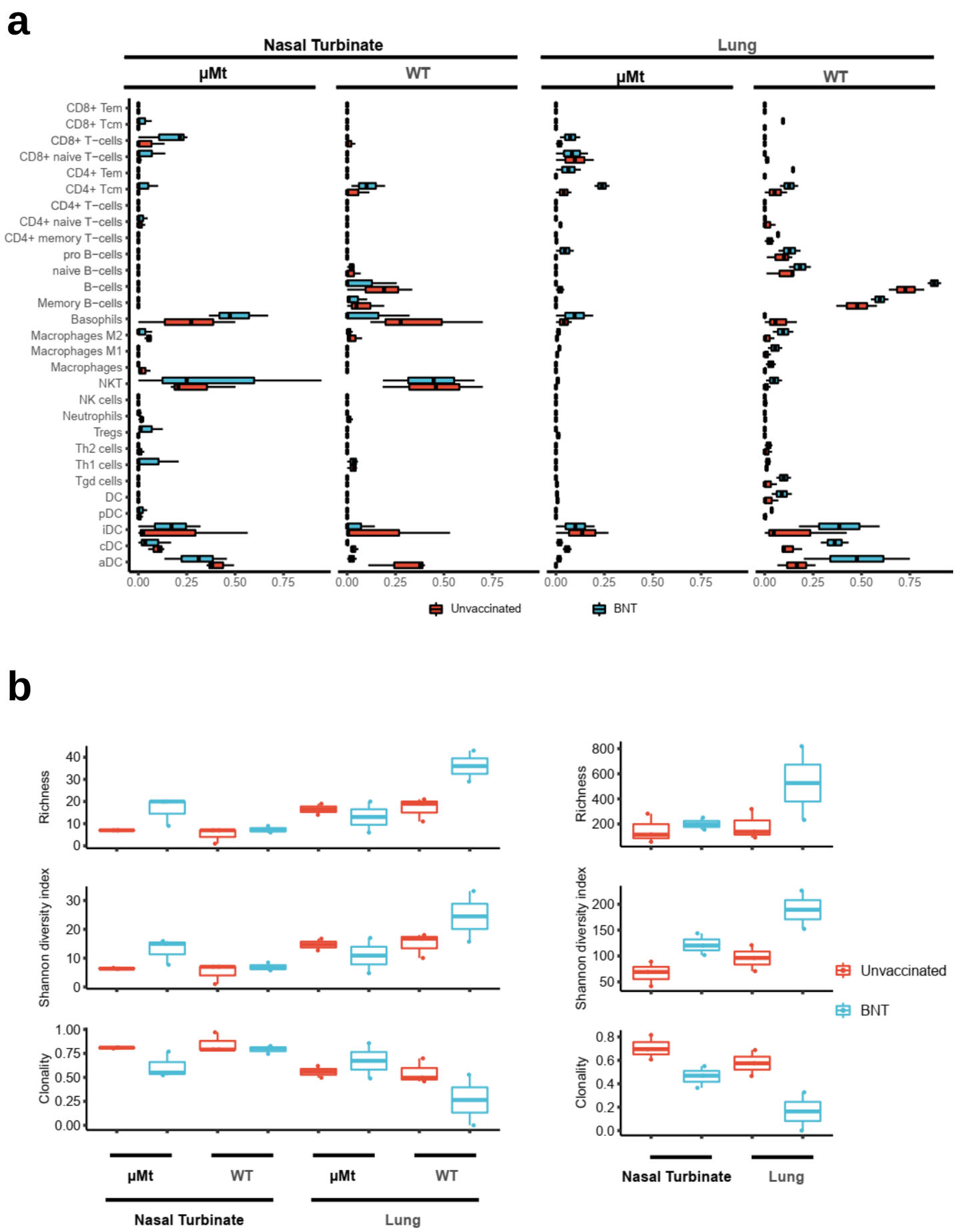


Fig. S2 Cell type enrichment analysis and immune repertoire richness/diversity analysis of the RNA-seq data. (a) Cell type enrichment analysis of RNA-seq data indicated the function enrich scores of each cell type for vaccinated and unvaccinated WT and μMT mice. (b) Immune repertoire richness and diversity analysis of the samples. IGH results were not showed in μMT mice due to the missing B cell receptor gene expression.

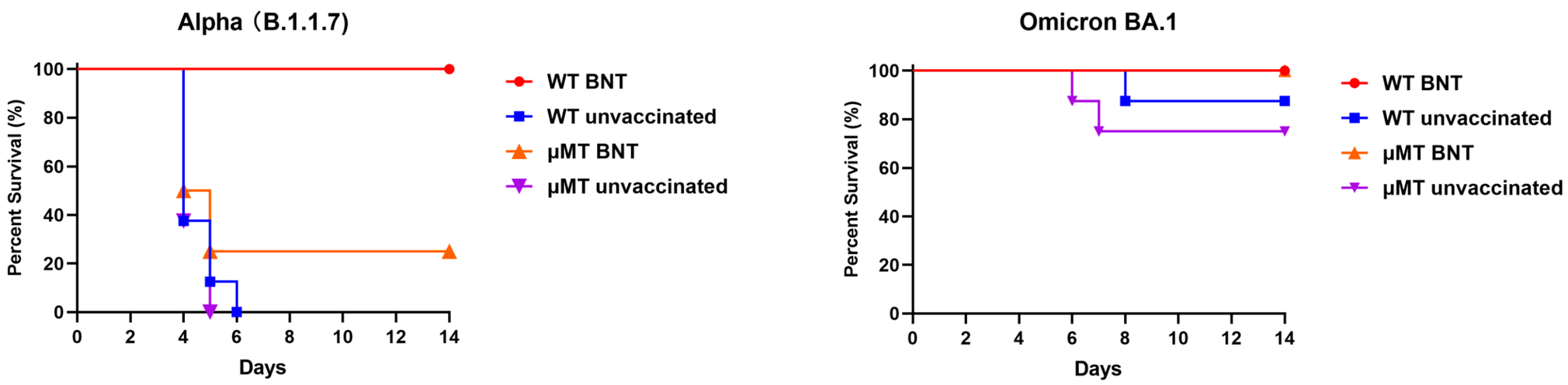


Fig. S3 BNT162b2 vaccination increased the survival of K18-hACE2 WT and μMT mice. The survival of vaccinated and unvaccinated WT and μMT mice against Alpha (a) and Omicron BA.1 (b) challenge. (n=8). Statistical significance was determined using log-rank (Mantel–Cox) tests.

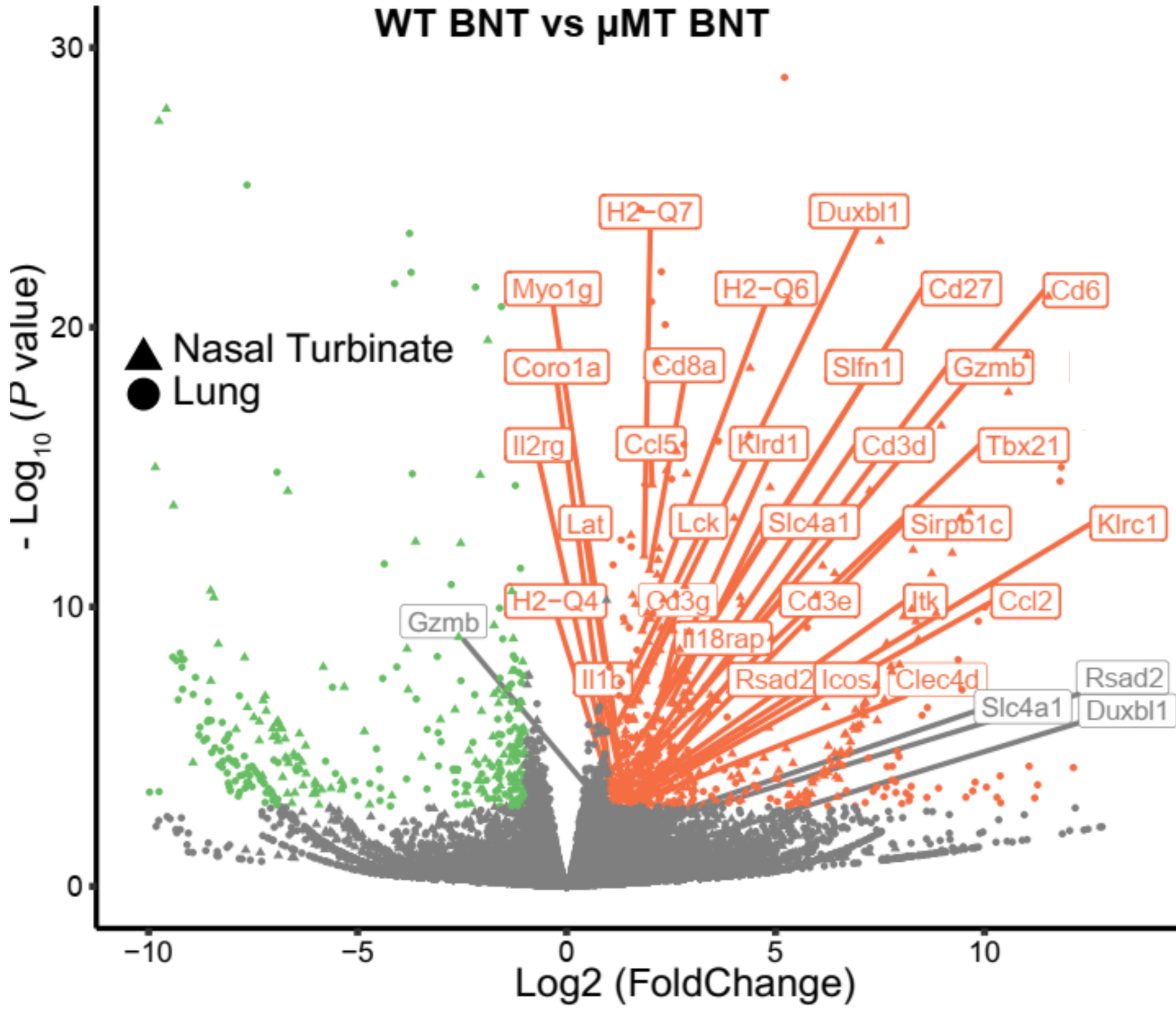


Fig. S4 Volcano plot showing differential expression genes comparing transcriptome of C57BL/6J µMT to WT mice in both NT and lung after BNT162b2 vaccination. Genes with orange labels were significantly up regulated in NT or lung of vaccinated µMT mice (adjusted P value < 0.05 and gene expression fold change > 2), scatters with grey labels indicated gene up regulated in both NT and lung of vaccinated WT mice (P value < 0.05 and gene expression fold change > 2).

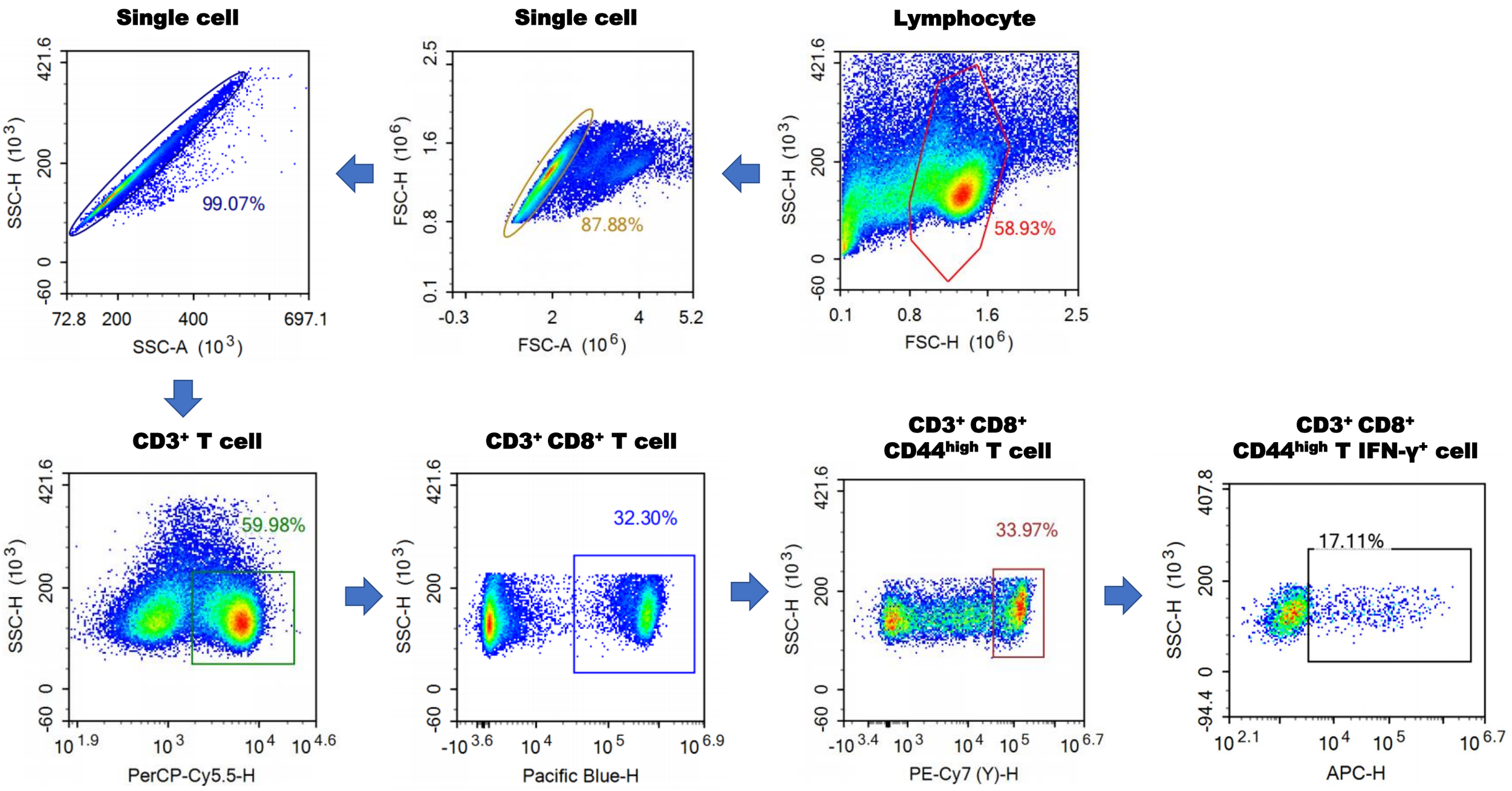


Fig. S5 Gating strategy for detection of CD3⁺ CD8⁺ CD44^{high} IFN-γ⁺ T cells in spleen of vaccinated C57BL/6J WT and μMT mice after spike protein stimulation.