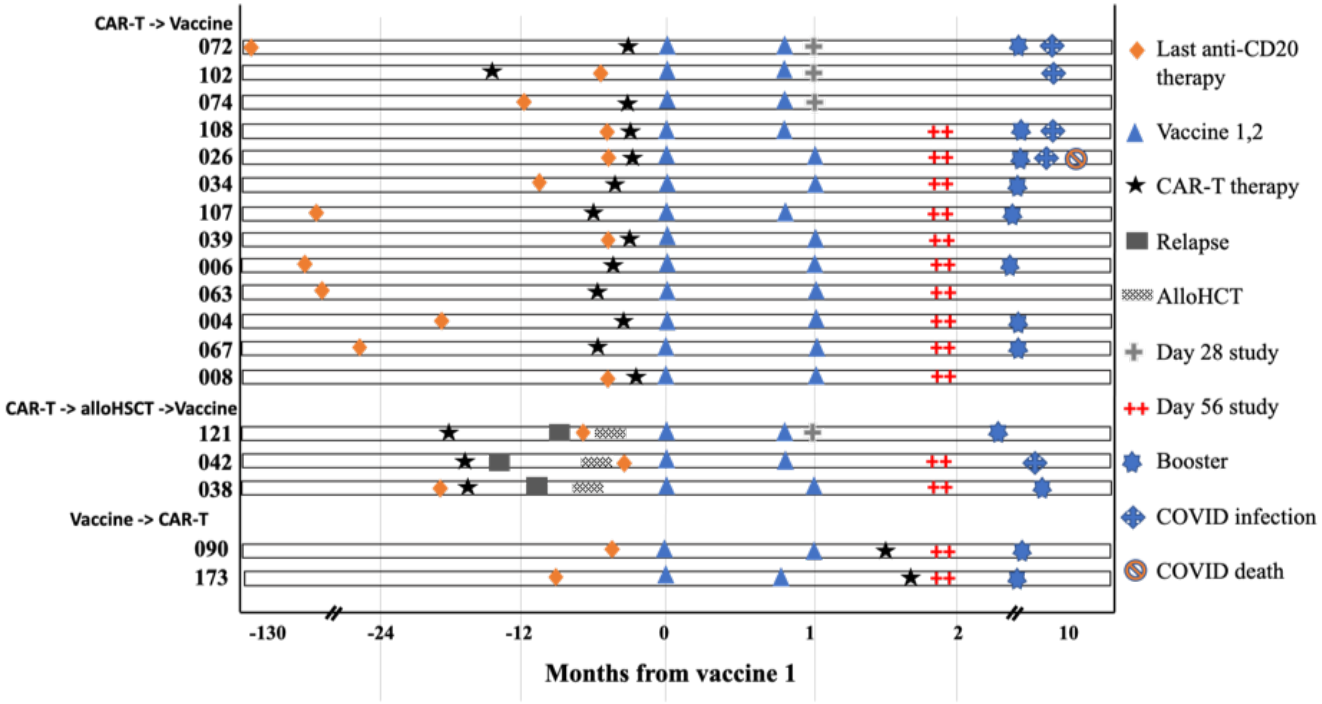
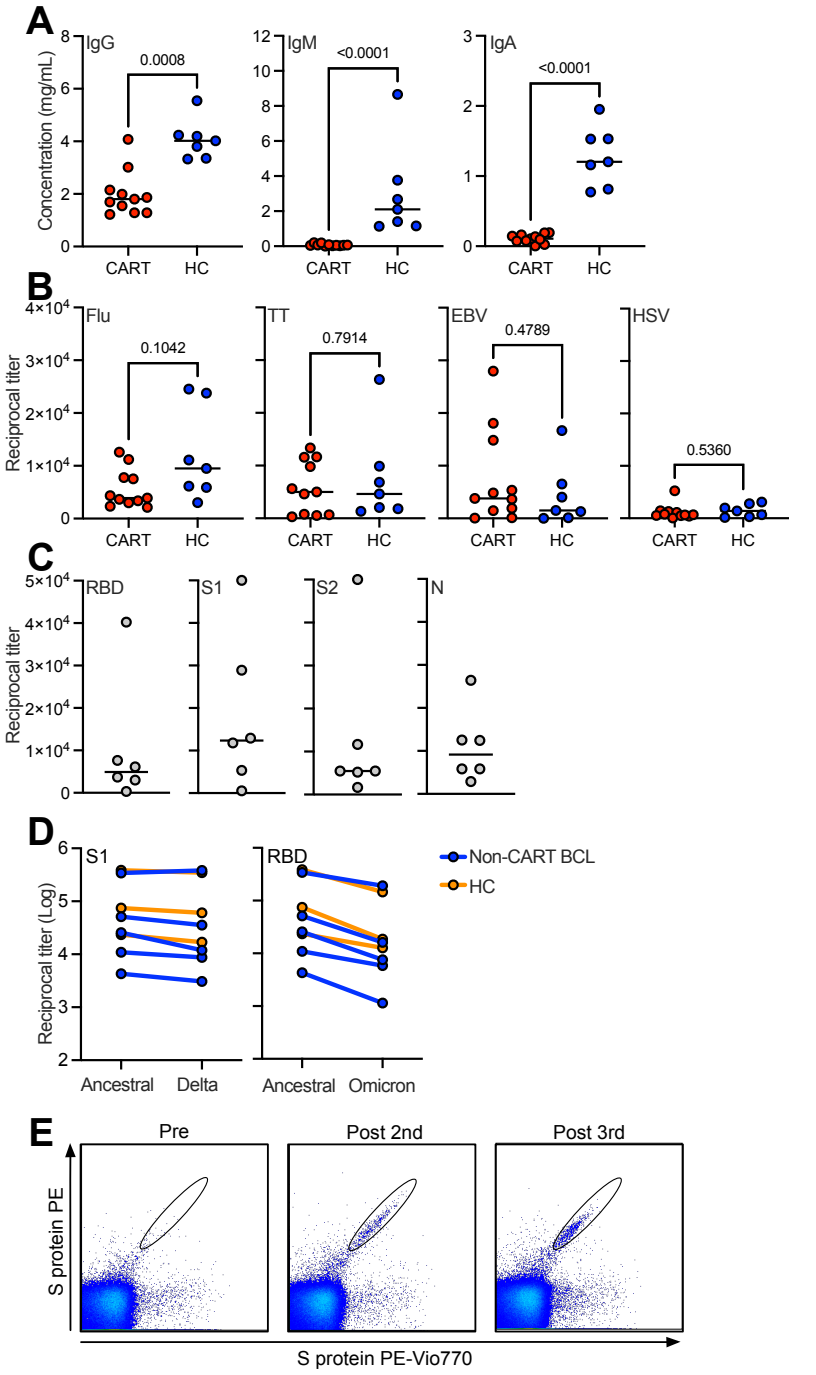
Supplemental Figure 1



<u>Supplemental Figure 1:</u> Swimmers plot to describe key events as it relates to COVID vaccine administration and CART Therapy

A total of 5 of 18 patients had developed COVID-19 at the time of data-cut. Two patients developed COVID-19 prior to receiving their third shot of the vaccine (vs three who developed COVID-19 at a timepoint afterwards). Three of these patients were treated with COVID-directed therapies (including monoclonal antibodies). One of the five patients required hospitalization and unfortunately passed away due to COVID-19 complications.

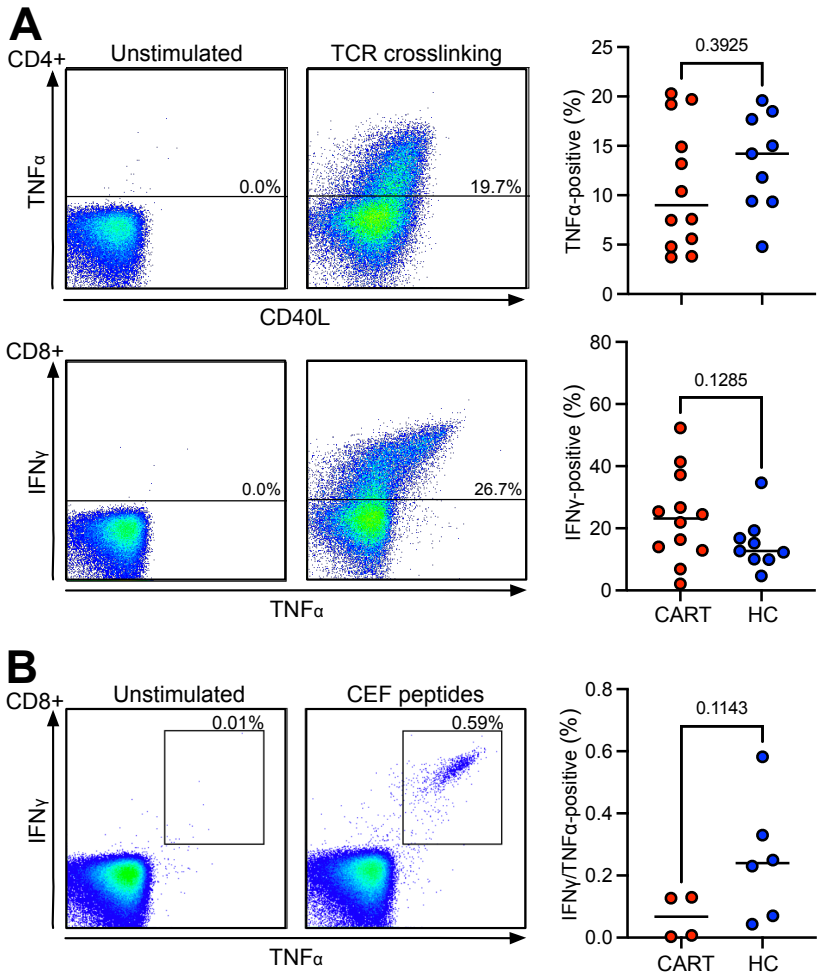
Supplemental Figure 2



<u>Supplemental Figure 2:</u> B cell responses in patients with B cell lymphoma after CART treatment and healthy controls.

(A) Absolute levels of IgG, IgM, and IgA antibodies in our study subjects were measured at baseline using a commercially available ELISA. Concentrations are shown in mg/mL for healthy vaccinated controls (blue) and CART patients (red). **(B)** Titers of IgG antibodies against full-length recombinant Influenza A nucleoprotein (Flu), tetanus toxoid (TT), Epstein-Barr virus (EBV), and Herpes Simplex Virus Type 1 (HSV) proteins were measured in an ELISA. Lines indicate median values. Differences between groups were analyzed for statistical significance using the Mann–Whitney U test **(C)** IgG antibody titers against 4 different SARS-CoV-2 proteins in a group of 6 patients with active COVID-19. **(D)** IgG antibody titers against the ancestral and omicron S1 and RBD proteins, respectively, in 3 B cell lymphoma patients without prior CART treatment and 5 healthy vaccinated controls. (E) Anti-S antibody-secreting B cells in a B cell lymphoma patient (2123-021) without prior CART treatment before vaccination and after the 2nd and 3rd dose, respectively.

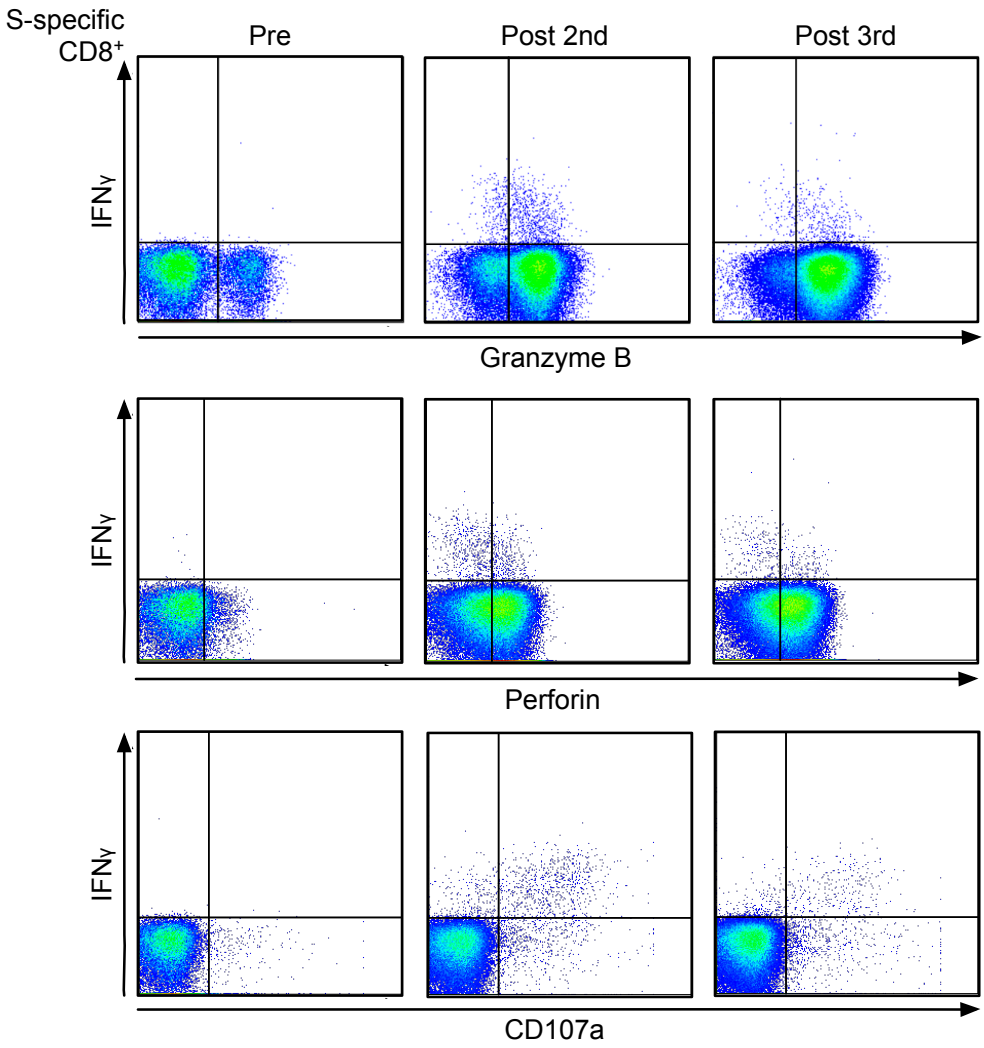
Supplemental Figure 3



<u>Supplemental Figure 3:</u> T cell responses to TCR crosslinking or stimulation with a mix of cytomegalovirus (HCMV), Epstein-Barr virus (EBV), and influenza virus peptides

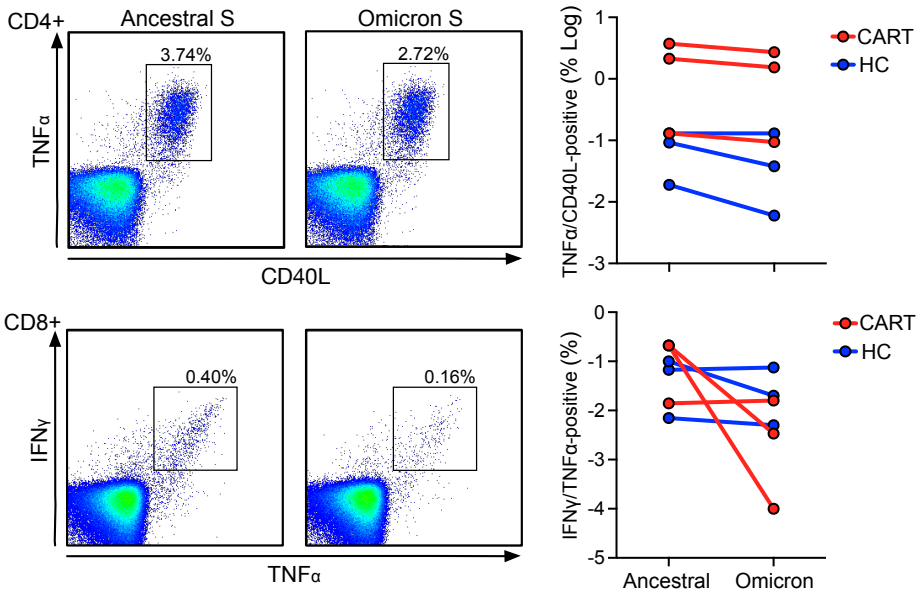
(A) T cells responding to TCR crosslinking were identified by co-expression of TNFα and CD40L (CD154) for $CD3^+CD4^+$ T cells and IFNγ / TNFα for CD3+CD8+ T cells. Scatter plots indicate levels of responding $CD4^+$ (upper right) and $CD8^+$ T cells (lower right) prior to vaccination (12 CART patients, 9 HC). Lines indicate median values. Differences between groups were analyzed for statistical significance using the Mann–Whitney U test. **(B)** Levels of $CD8^+$ T cells responding to stimulation with a mix of cytomegalovirus (CMV), Epstein-Barr virus (EBV), and influenza virus peptides in 4 CART patients and 6 HC prior to COVID-19 vaccination.

Supplemental Figure 4



<u>Supplemental Figure 4:</u> Cytotoxic potential of vaccine-induced CD8+ T cells
T cells specific for the S protein of the SARS-CoV-2 at three timepoints (pre vaccination, post 2nd dose, post 3rd dose) were identified ex vivo after short-term stimulation of total PBMC using libraries of overlapping peptides covering the complete sequence of the protein. Intracellular staining of cytokines followed by flow cytometry served as a read-out assay. SARS-CoV-2-specific CD8+ T cells were defined as IFNγ–positive CD3+CD8+ T cells. To determine the cytotoxic potential of the vaccine-induced T cells, co-staining was performed for granzyme B, perforin, and CD107a. Dot plots show examples of CART patient 2123-034. Background levels were typically <0.01% of all CD8+ T cells.

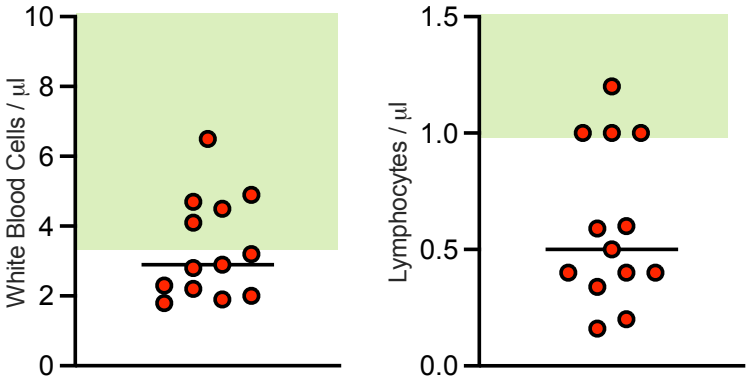
Supplemental Figure 5



<u>Supplemental Figure 5:</u> Recognition of ancestral vs. omicron SARS-CoV-2 S protein by vaccine-induced T cells

The dot plots on the left show an example of a CART patient's (2123-067) vaccine-induced antiviral $CD4^+$ (upper panel) and $CD8^+$ T cells (lower panel) recognizing peptide pools covering the complete sequence of ancestral vs. omicron SARS-CoV-2 S protein. Numbers indicate percentages of S protein-specific T cells out of all $CD4^+$ and $CD8^+$ T cells, respectively. Lines on the right summarize similar findings in 3 CART patients and 3 healthy vaccinated controls.

Supplemental Figure 6



<u>Supplemental Figure 6:</u> Absolute leukocyte and lymphocyte counts in CAR T cell patients at 4 weeks after the 2nd dose of the COVID-19 vaccine

Absolute white blood cell counts and lymphocyte counts were measured in CD19 CAR T cell patients (N=13) at 4 weeks after the the 2nd dose of the COVID-19 vaccine. The line indicates median values and the green area indicates normal reference ranges.