

Clinical, tumor and product features associated with outcomes after axicabtagene ciloleucel therapy in follicular lymphoma

Poddar et al.

Supplemental Material

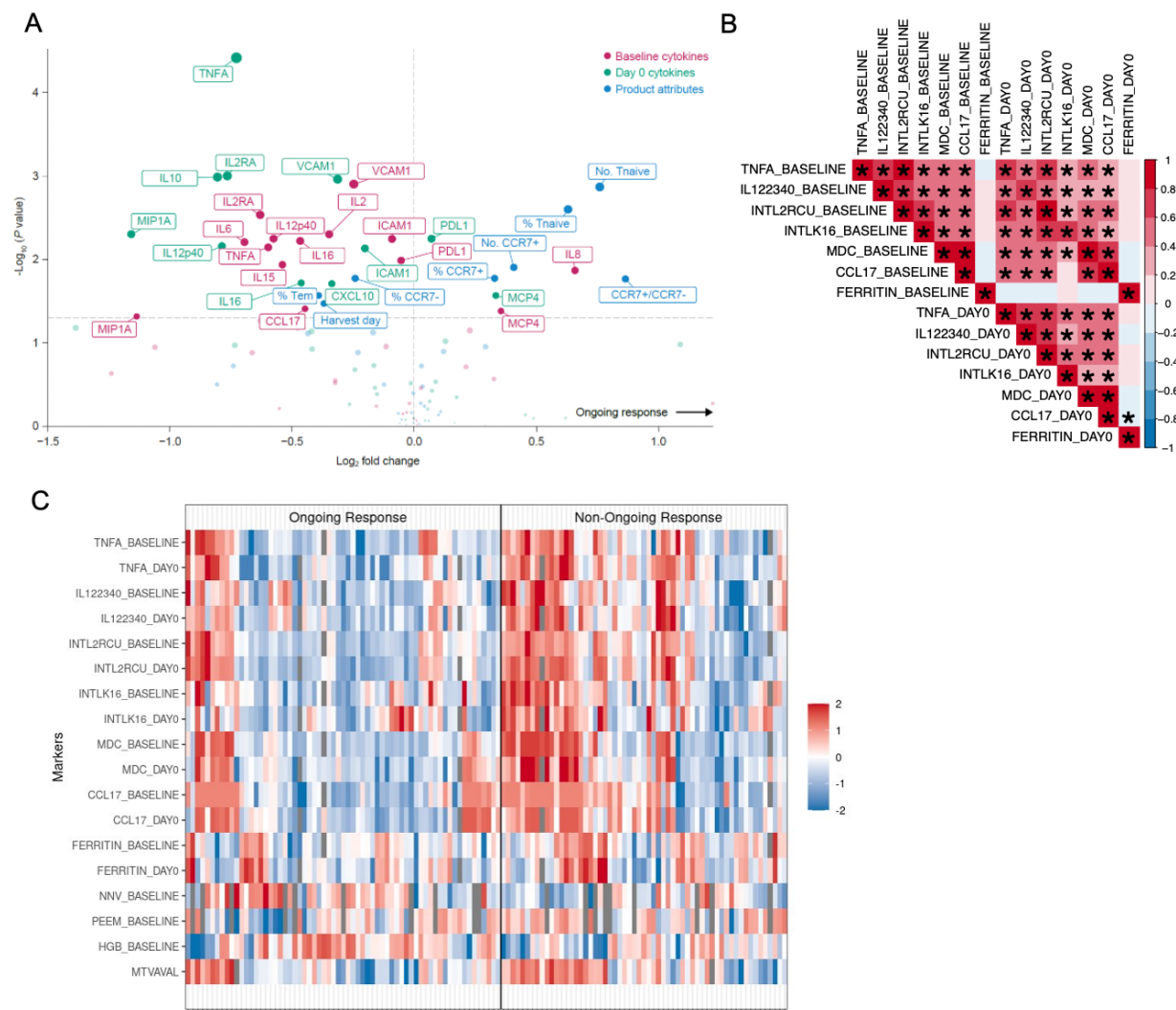


Figure S1. Univariate analysis of covariates showing association with ongoing response and PFS

(A) Volcano plot showing univariate associations of pre-treatment serum cytokines and product attributes with ongoing response; Wilcoxon rank sum test was used for assessment of p value, $p < 0.05$ was considered significant. (B) Correlation plot showing cross-correlation between TNFa, IL12 p40, IL2Ra, IL-16, MDC, CCL17 and Ferritin at baseline and day 0. (C) Heatmap showing subject-level pre-treatment values of covariates identified by multivariate analysis between ongoing responders vs. relapsed and non-responders.

FLIPI, follicular lymphoma International prognostic index; HGB, hemoglobin; MDC, macrophage-derived chemokine; MIP, macrophage inflammatory protein; MCP, monocyte chemoattractant protein; PDL1, programmed death ligand 1; PFS, progression-free survival; TMTV, total metabolic tumor volume; Tnaive, naive T cells; TNF, Tumor necrosis factor; IL122340, Interleukin 12+23 p40; INTL2RCU, Interleukin 2 receptor alpha; MDC, macrophage-derived chemokine; INTLK16, Interleukin 16; CCL17, C-C motif chemokine ligand

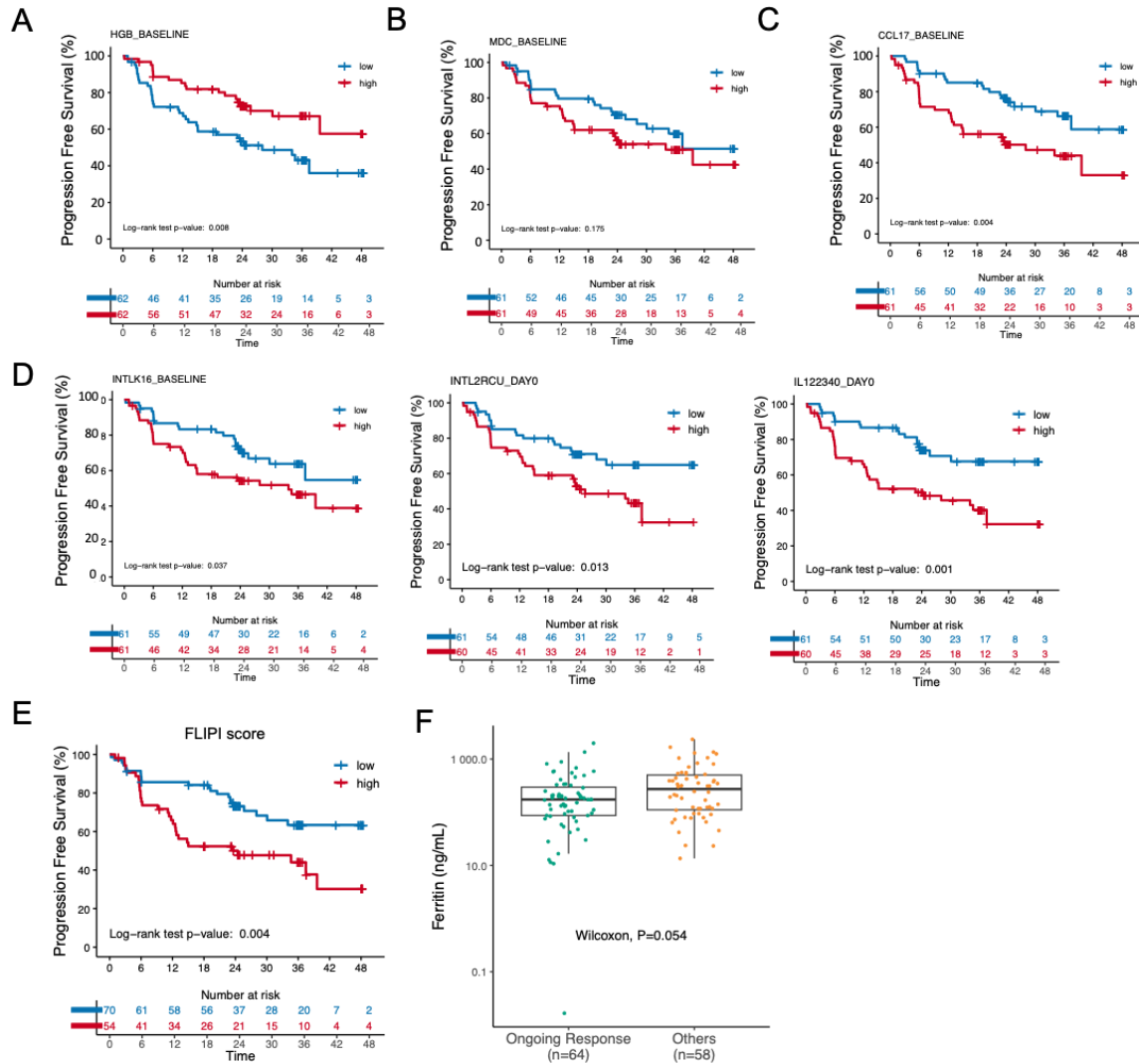


Figure S2. KM-estimated PFS curves of pre-treatment covariates associated with response in multivariate analysis

(A) KM estimated PFS by baseline Hemoglobin. (B) KM estimated PFS by baseline CCL22. (C) KM estimated PFS by baseline CCL17. (D) KM estimated PFS by immunomodulatory IL-16 (baseline) and inflammatory markers IL2Ra (day 0), IL-12 p40 (day 0). (E) KM estimated PFS by FLIPI score (>2 vs. ≤2). (F) Boxplot of inflammatory marker Ferritin by ongoing response. For panels A, B, C, and D, high vs. low is defined by above median and below median respectively. Log-rank test is performed to assess p value.

FLIPI, follicular lymphoma International prognostic index; HGB, hemoglobin; MDC, macrophage-derived chemokine; IL122340, Interleukin 12+23 p40; INTL2RCU, Interleukin 2 receptor alpha; INTLK16, Interleukin 16; MTVAVAL, Total metabolic tumor volume.

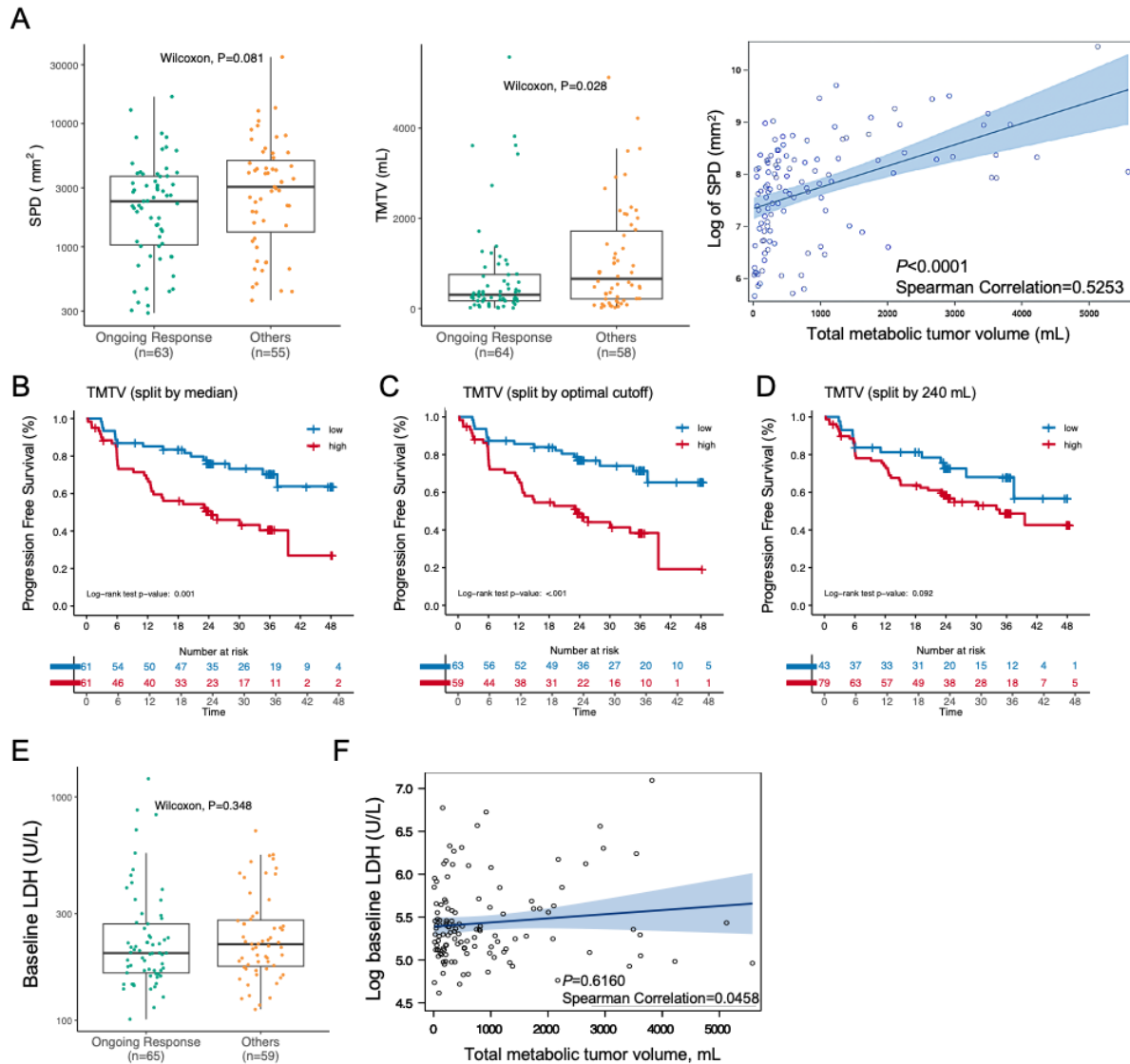


Figure S3. Association of serum inflammatory markers at baseline with ongoing response and TMTV

(A) (left) Box plots of baseline SPD and TMTV in patients with ongoing response vs. relapsed and non-response. (Right) Scatter plot showing spearman correlation (95% CI) of SPD and TMTV. (B) KM estimated PFS by TMTV, split by median (C) KM estimated PFS by TMTV, split by optimal cutoff. (D) KM estimated PFS by 240 mL TMTV. (E) Box plot of baseline LDH in patients with ongoing response vs. relapsed and non-response. (F) Spearman correlation (95% CI) between baseline LDH and TMTV.

LDH, lactate dehydrogenase; SPD, sum of product diameters; TMTV, total metabolic tumor volume.

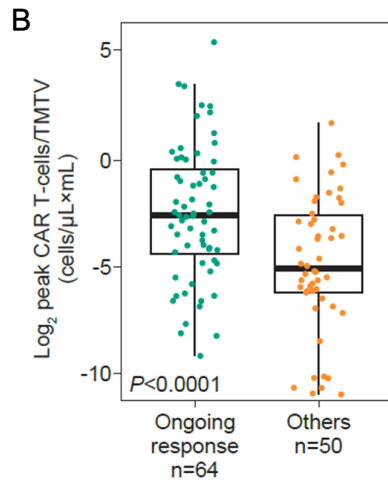
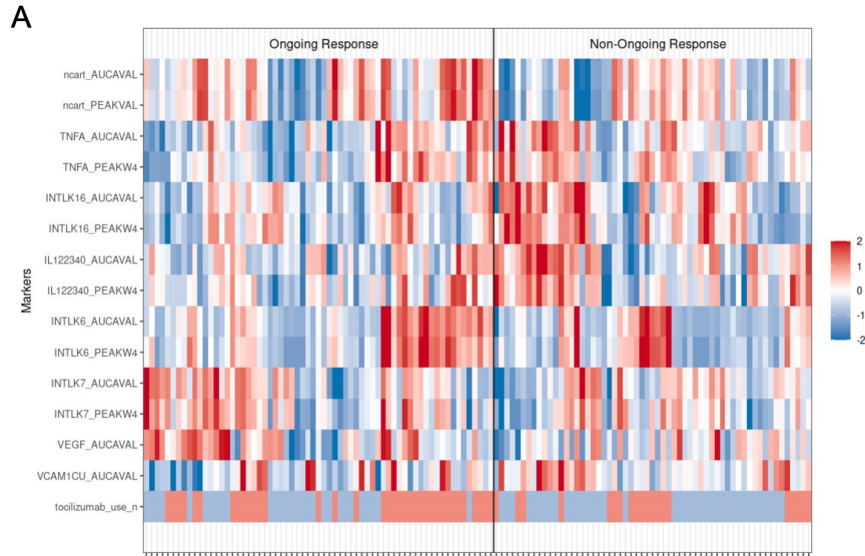


Figure S4. Subject level information of post-infusion covariates associated with clinical response

(A) Heatmap comparing post-infusion levels of covariates ranked by multivariate analysis between ongoing responders vs. relapsed and non-responders. (B) Boxplot showing CAR T cells peak/TMTV for ongoing response vs. others; Wilcoxon rank sum test was used to assess p value.

ncart, number of CAR T cells; VEGF, Vascular endothelial growth factor; TNF, Tumor necrosis factor; IL122340, Interleukin 12+23 p40; INTLK16, Interleukin 16; INTLK6, Interleukin 6; INTLK7, Interleukin 7; VEGF, Vascular endothelial growth factor; VCAM1CU, Vascular cell adhesion molecule 1; tocilizumab_use_n, Patients administered tocilizumab.

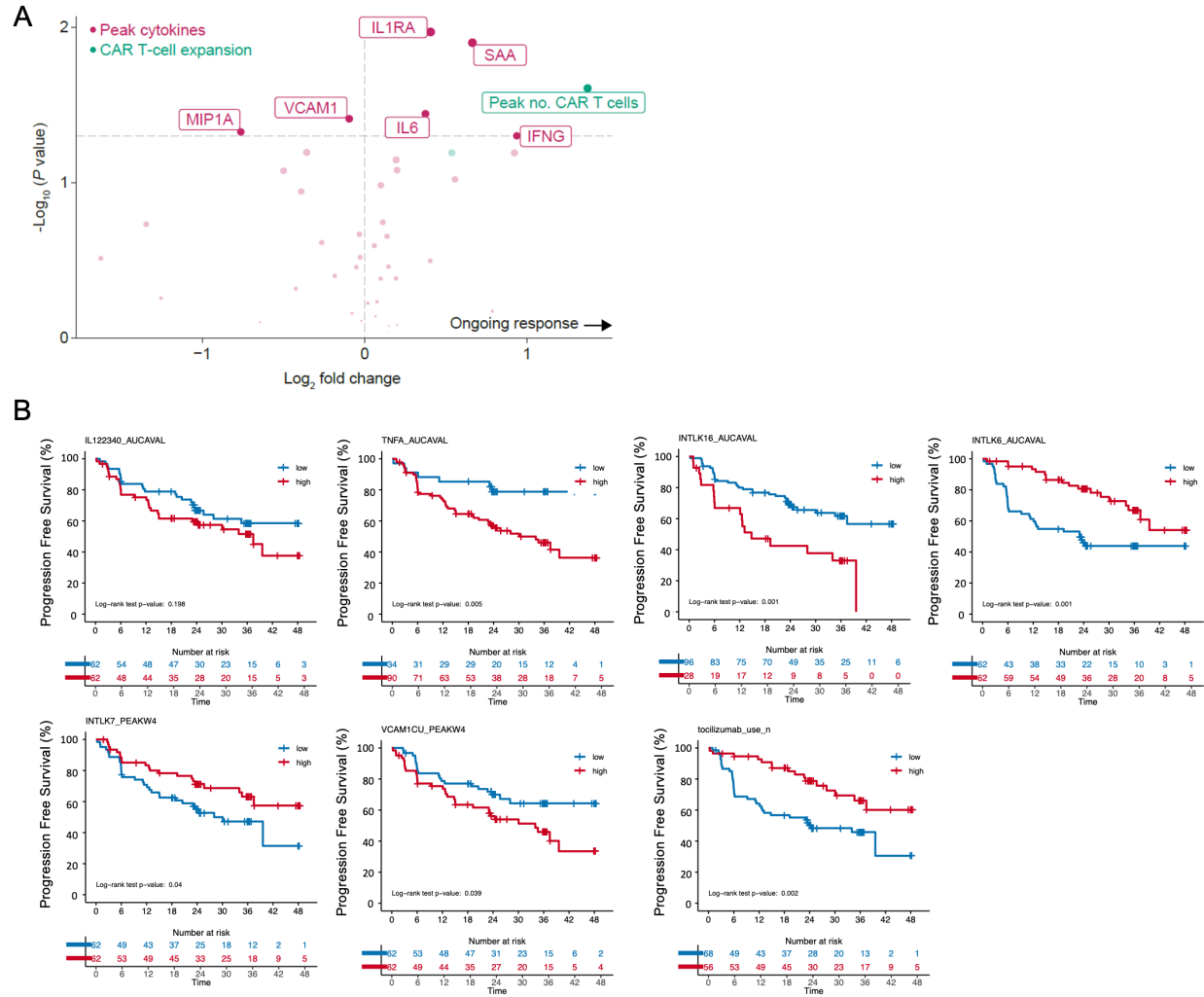


Figure S5. Univariate analysis of post-infusion covariates associated with clinical response

(A) Volcano plot showing univariate associations of post-infusion serum analytes and CAR T cell PK with ongoing response. (B) KM-estimated PFS by IL12p40 AUC, TNF α AUC, IL16 AUC, IL6 AUC, IL7 Peak, VCAM1 (above and below median) and Tocilizumab use (Y vs. N).

ncart, number of CAR T cells; VEGF, Vascular endothelial growth factor; TNF, Tumor necrosis factor; IL122340, Interleukin 12+23 p40; INTLK16, Interleukin 16; INTLK6, Interleukin 6; INTLK7, Interleukin 7; VEGF, Vascular endothelial growth factor; VCAM1CU, Vascular cell adhesion molecule 1; tocilizumab_use_n, Patients administered tocilizumab; PFS, progression-free survival.

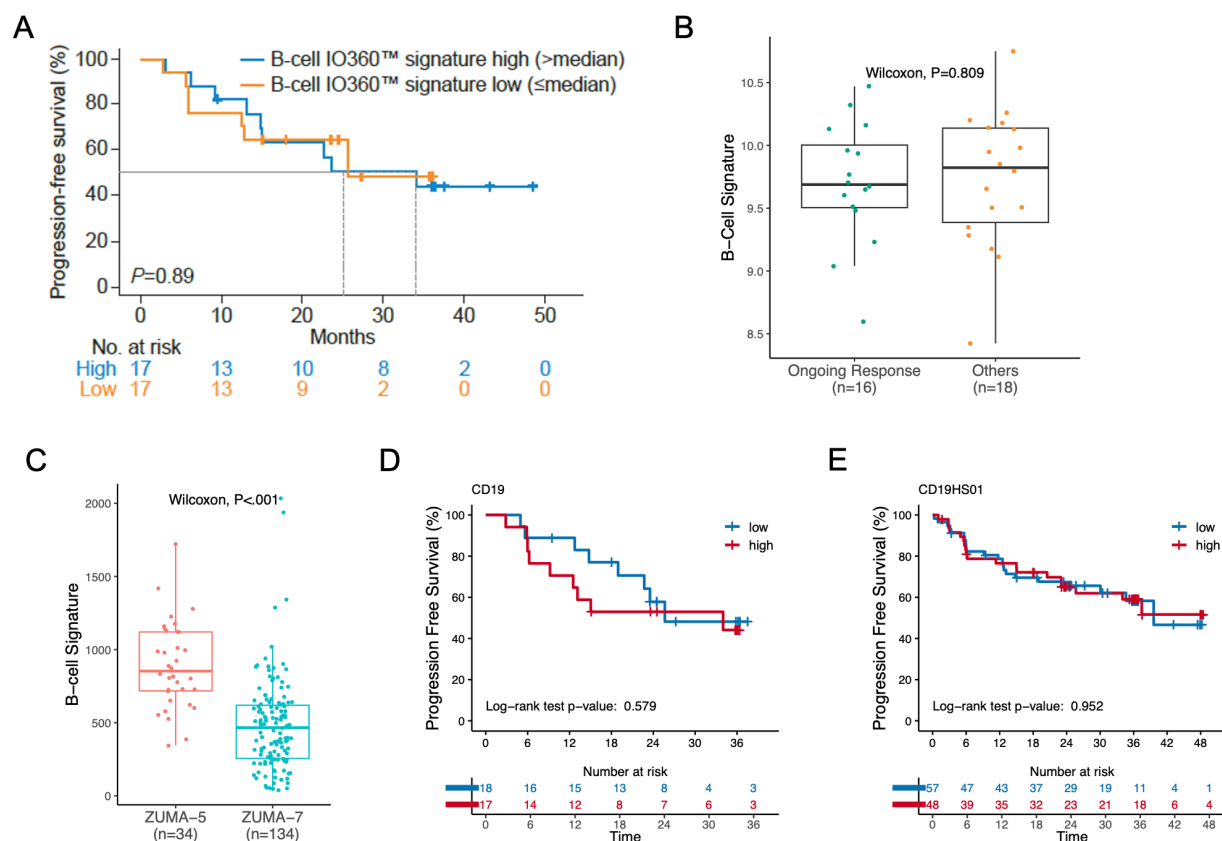


Figure S6. B-cell signature does not associate with clinical response

(A) KM-estimated PFS by median B-cell IO360TM signature score. (B) Boxplot of B-cell IO360 score by ongoing response in r/r FL patients. (C) Comparison of B-cell IO360 score between axi-cel treated r/r FL patients in ZUMA-5 (3L FL) and r/r LBCL patients in ZUMA-7 (2L LBCL) studies. (D) KM-estimated PFS by median CD19 gene expression in r/r FL patients. (E) KM-estimated PFS by median CD19 H-score in r/r FL patients.

KM, Kaplan-Meier; PFS, Progression-free survival; r/r, Relapsed/refractory; FL, Follicular lymphoma; LBCL, Large B-cell lymphoma.

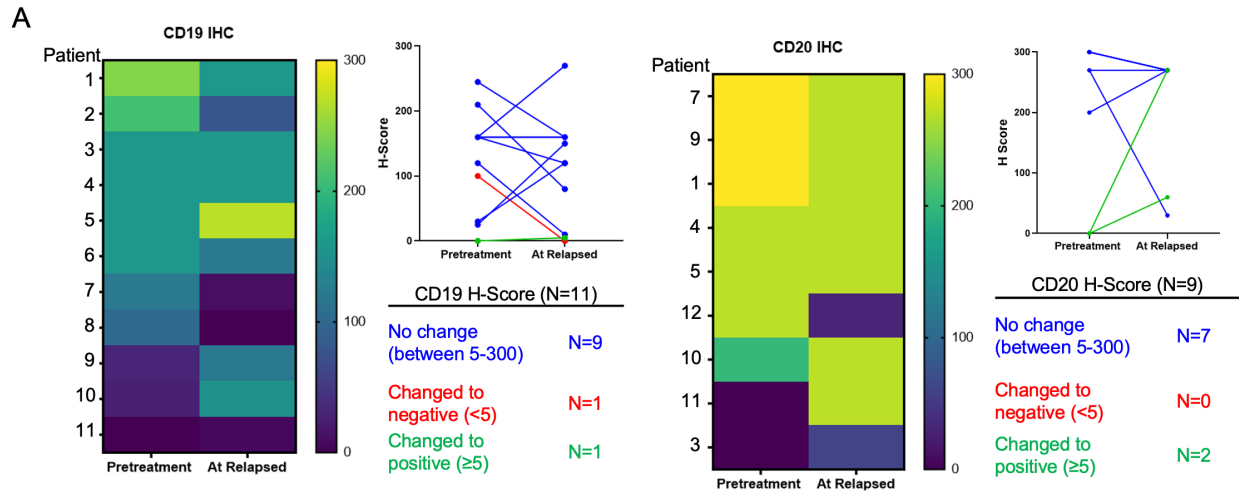


Figure S7. CD19 loss is unlikely a resistance mechanism of r/r FL patients treated with axi-cel
 (A) Paired CD19 and CD20 expression in pre-treatment and progression biopsies in relapsed FL patients.

FL, follicular lymphoma; IHC, immunohistochemistry; PFS, Progression-free survival.

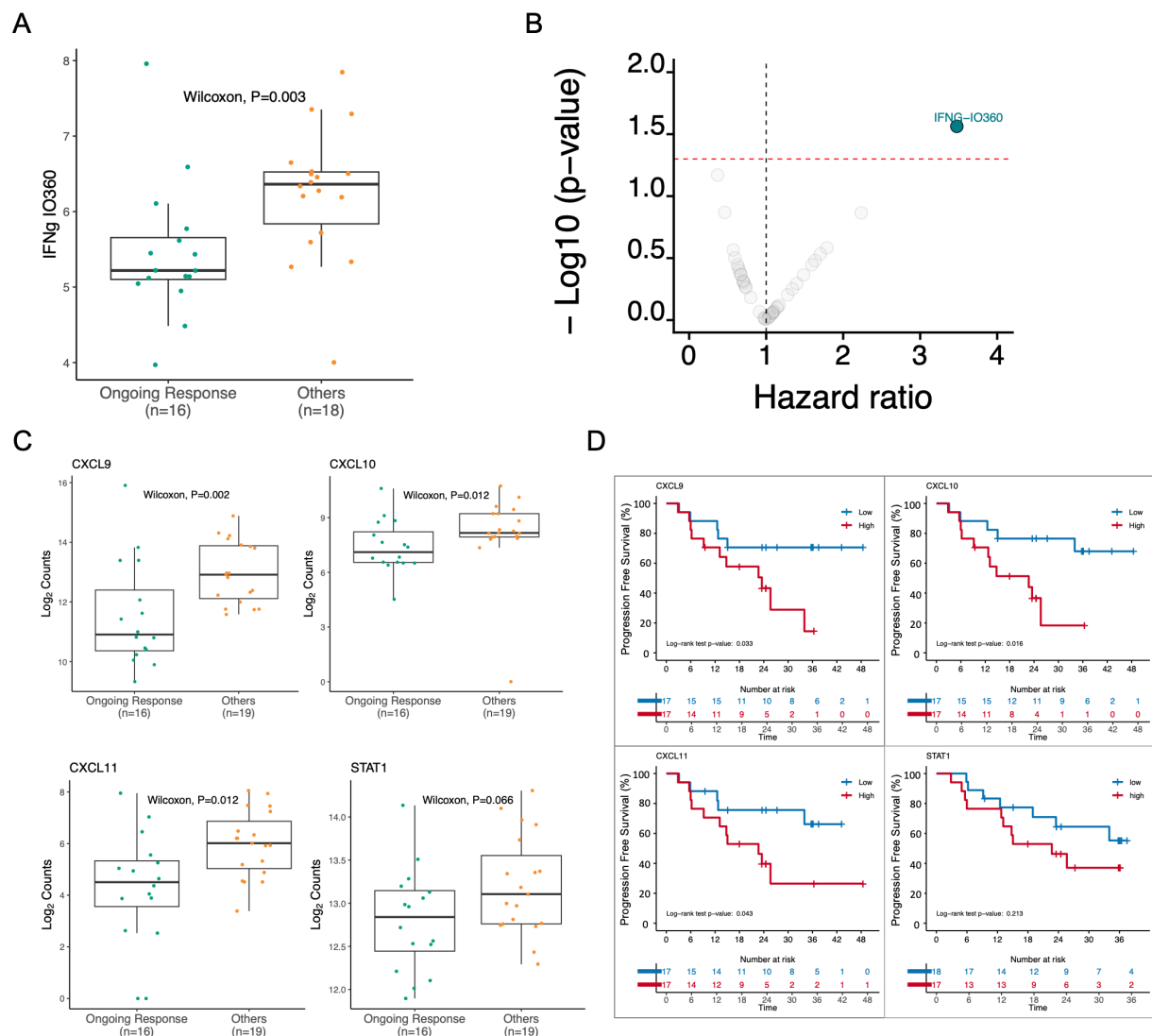
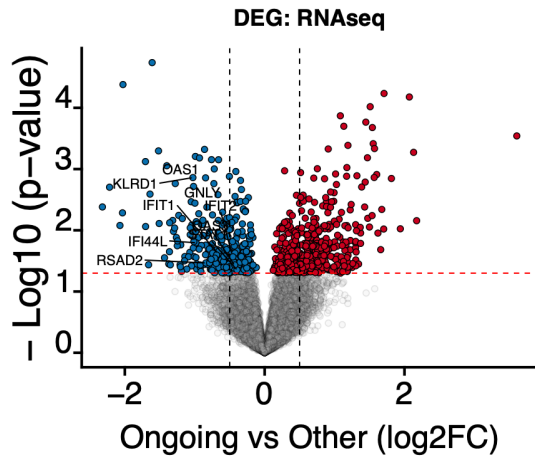


Figure S8. Association of genes in IFNg IO360 signature with ongoing response and PFS.

(A) Boxplot of IFNg IO360 score stratified by ongoing response status. (B) Volcano plot of IO360 gene expression signatures and associated Cox proportional hazards statistics. (C) Boxplots of CXCL9, CXCL10, CXCL11 and STAT1 gene expression stratified by ongoing response status. (D) KM-estimated PFS by median expression of CXCL9, CXCL10, CXCL11 and STAT1 genes.

KM, Kaplan-Meier; PFS, Progression-free survival.

A



B

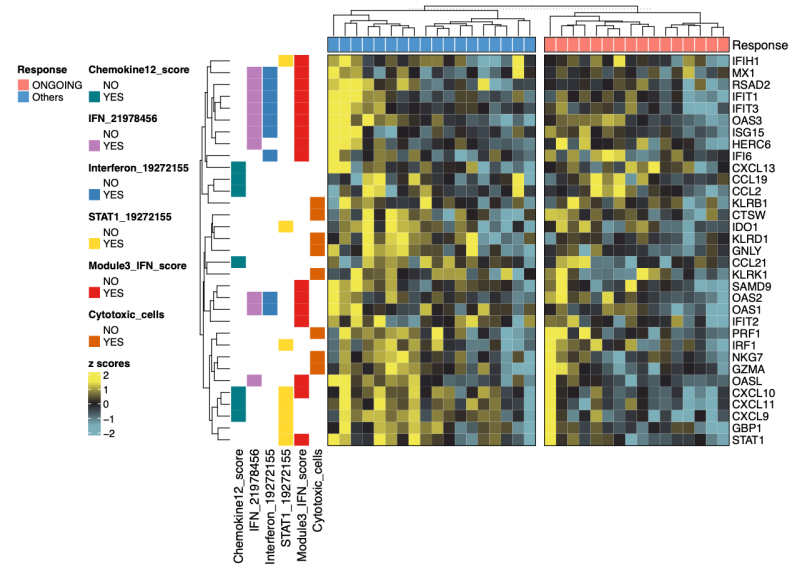
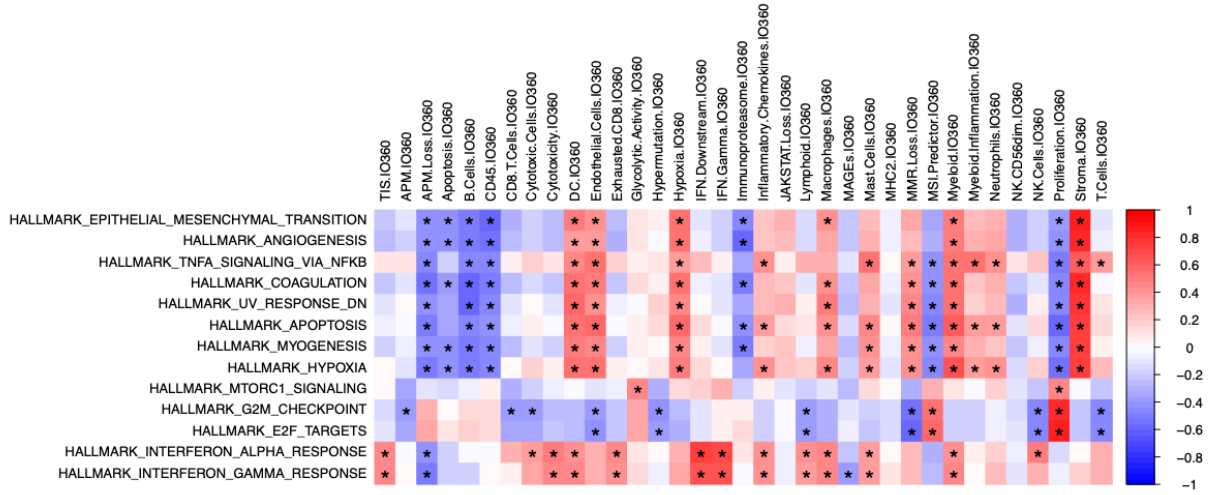


Figure S9. Validation of Nanostring gene expression using RNAseq analysis.

(A) Volcano plot showing differential gene expression of RNAseq dataset by ongoing response. (B) Heatmap showing expression of IFN signaling genes that are included in the presented signatures in Nanostring dataset by ongoing response status.

ISG, Interferon stimulating genes; DEG, differentially expressed genes; FC, fold change.

A



B

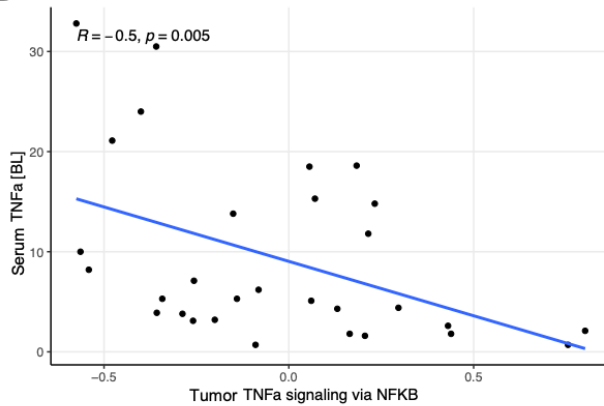


Figure S10. Correlation of GSEA hallmark pathways and TNF inducible genes with IO360 scores and serum TNF α respectively

(A) Heatmap showing correlation between GSVA score of significant hallmark pathways and Nanostring IO360 scores (B) Correlation of hallmark TNF α signaling via NFKB pathway with baseline serum TNF α

TNF, Tumor necrosis factor; IO360, Immuno-oncology 360.

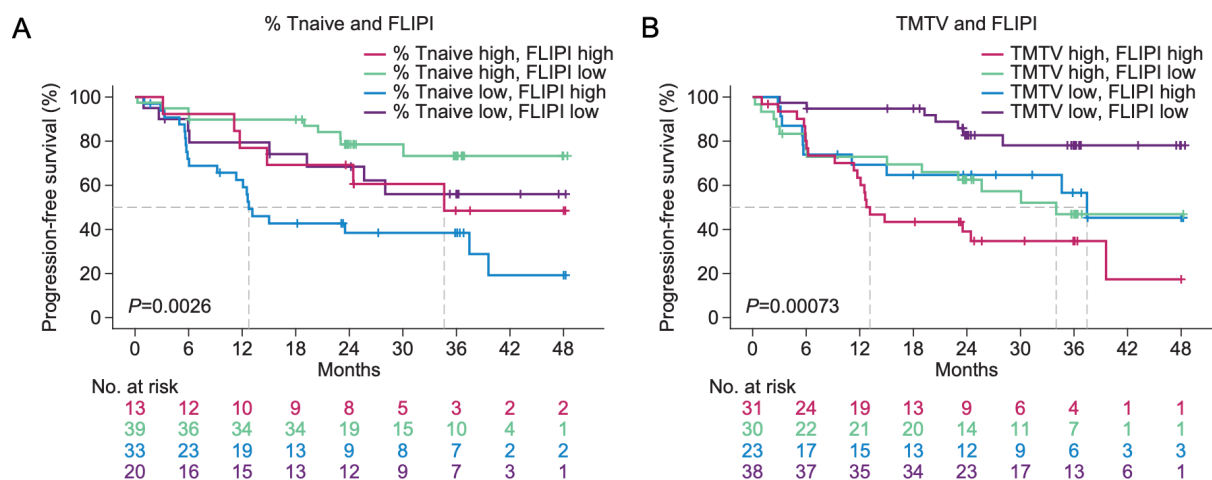


Figure S11. Risk stratification of FL patients using percent naïve or TMTV with FLIPI score
 (A) KM-estimated PFS by median of percentage of naïve CAR T cells in product and FLIPI score. (B) KM-estimated PFS by median of baseline TMTV and FLIPI score.

FLIPI, follicular lymphoma International Prognostic Index; KM, Kaplan Meier; PFS, progression-free survival; TMTV, total metabolic tumor volume. FLIPI high: FLIPI score >2 ; FLIPI low: FLIPI score ≤ 2 ; Medians were used for all other variables for high vs. low.

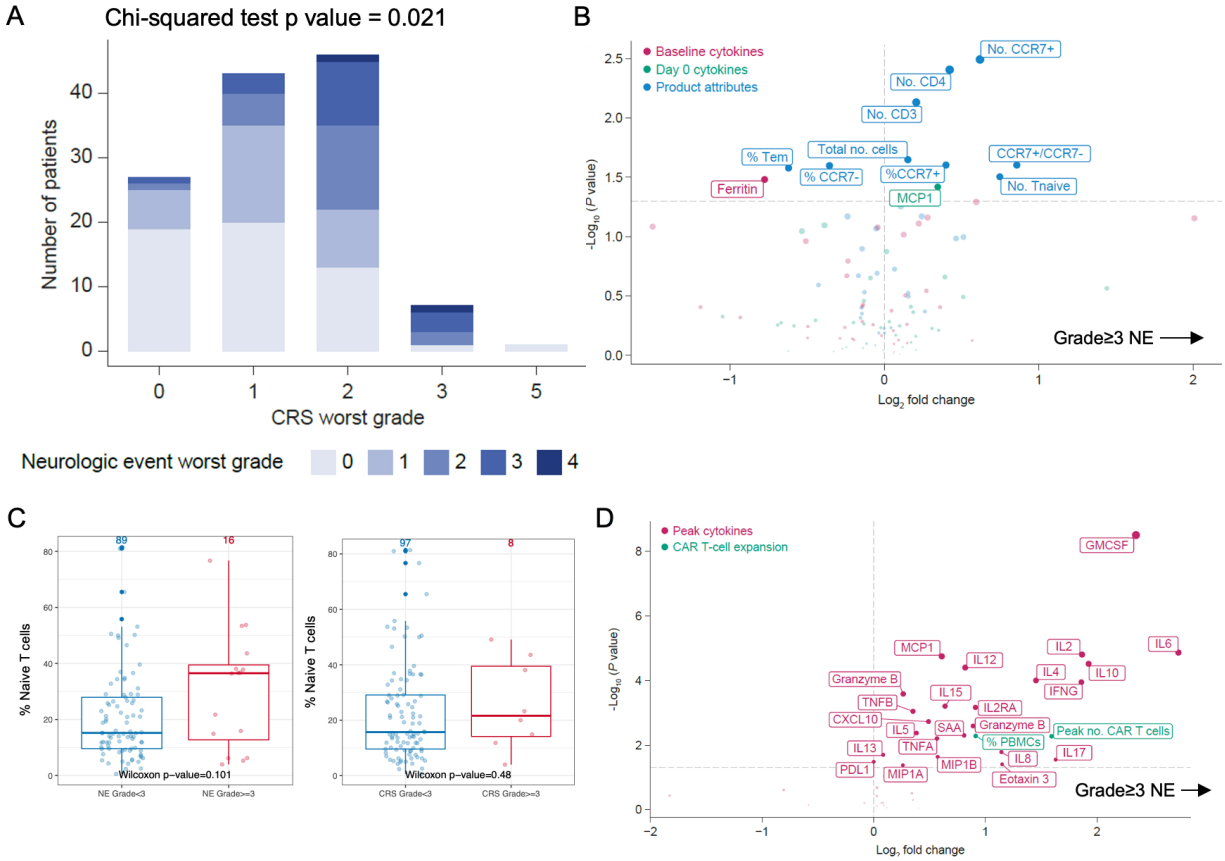


Figure S12. Univariate analysis of pre-treatment and post-infusion covariates associated with grade ≥3 neurologic events

(A) Association between neurologic events and CRS by grade. (B) Volcano plot showing association of pre-treatment serum cytokines and product attributes with grade ≥3 neurologic events. (C) Percentage of naive T cells in the product by grade of neurologic events or grade of CRS. (D) Volcano plot showing association of post-infusion serum cytokines and peak CAR T-cell levels with grade ≥3 neurologic events.

AE, adverse event; AUC, area under the curve; CAR, chimeric antigen receptor; CCL, C-C motif chemokine ligand; CRS, cytokine release syndrome; CXCL, C-X-C motif chemokine ligand; GM-CSF, granulocyte-macrophage colony-stimulating factor; IFN, interferon; IL, interleukin; MCP-1, monocyte chemoattractant protein-1; NE, neurologic events; PD-L1, programmed death-ligand 1; PMBC, peripheral blood mononuclear cell; SAA, serum amyloid A; SPD, sum of the product of diameters; Tcm, central memory T cells; Teff, effector memory T cells; TNF, tumor necrosis factor; VCAM, vascular cell adhesion molecule.

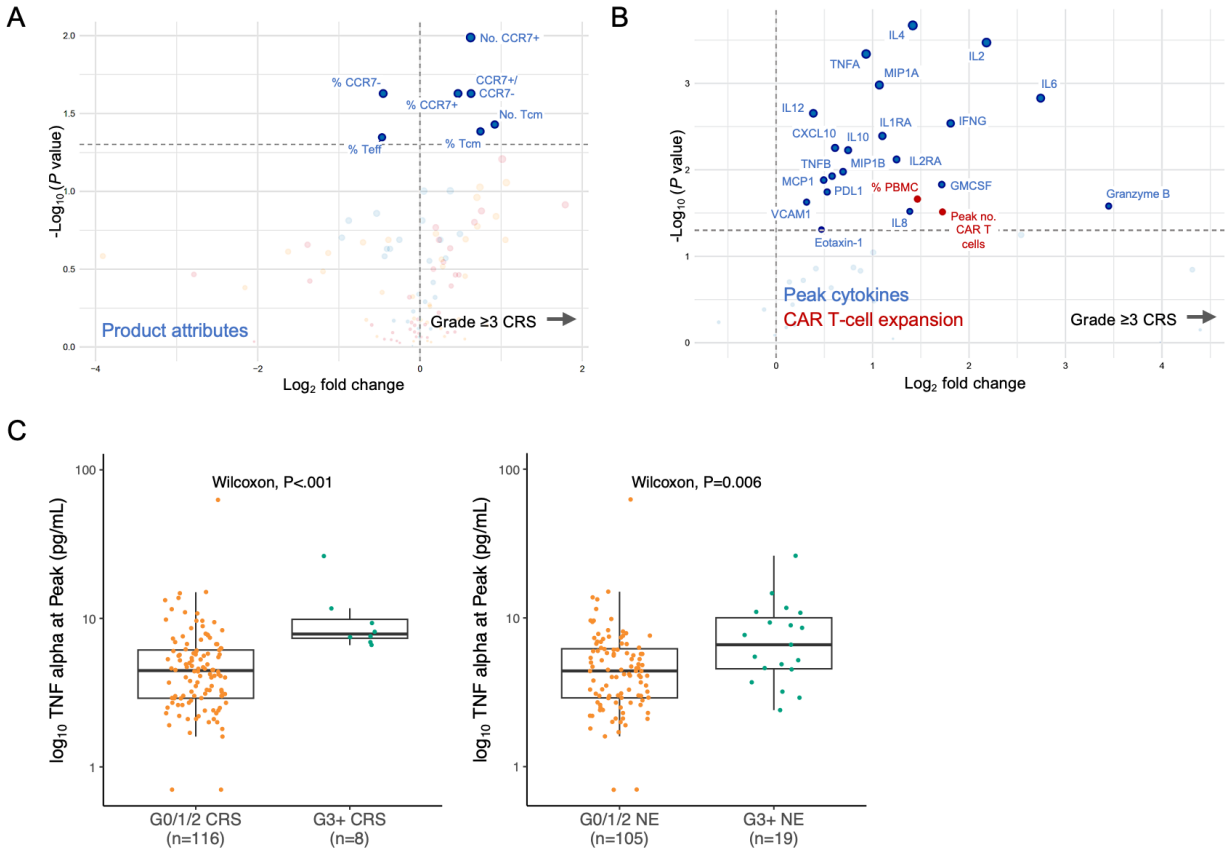


Fig. S13. Univariate analysis of pre-treatment and post-infusion covariates associated with grade ≥ 3 cytokine release syndrome

(A) Volcano plot showing associations of pre-treatment serum cytokines and product attributes with grade ≥ 3 CRS. (B) Volcano plot showing associations of serum cytokines and peak CAR T-cell levels with grade ≥ 3 CRS. (C) Peak TNF α levels in serum within first 28 days by grade of neurologic events and CRS.

AE, adverse event; AUC, area under the curve; CAR, chimeric antigen receptor; CCL, C-C motif chemokine ligand; CRS, cytokine release syndrome; CXCL, C-X-C motif chemokine ligand; GM-CSF, granulocyte-macrophage colony-stimulating factor; IFN, interferon; IL, interleukin; MCP-1, monocyte chemoattractant protein-1; NE, neurologic events; PD-L1, programmed death-ligand 1; PMBC, peripheral blood mononuclear cell; SAA, serum amyloid A; SPD, sum of the product of diameters; Tcm, central memory T cells; Teff, effector memory T cells; TNF, tumor necrosis factor; VCAM, vascular cell adhesion molecule.

Supplementary Table 1. List of pre-treatment covariates

variable	description
NOPRCC	Number of Prior Lines of Therapy (N)
BASEWT	Baseline Weight
BTBURC01	Baseline Tumor Bur (SPD) (mm ²) - Cen.01
CD19HS01	CD19 Antigen HSCORE period 01
stage_n	Disease Stage
score_n	International Prognostic Index (IPI)
blecog_n	Baseline ECOG Performance Status
bulkdis_n	Bulky Disease Y/N
steroid_use_n	Steroid usage (y/n)
tocilizumab_use_n	Tocilizumab usage (y/n)
AGE	Age
Male	Male
ALB_DAY0	Albumin (g/L) at day 0
ALP_DAY0	Alkaline Phosphatase (U/L) at day 0
ALT_DAY0	Alanine Aminotransferase (U/L) at day 0
AST_DAY0	Aspartate Aminotransferase (U/L) at day 0
BICARB_DAY0	Bicarbonate (mmol/L) at day 0
BILDIR_DAY0	Direct Bilirubin (umol/L) at day 0
BILI_DAY0	Bilirubin (umol/L) at day 0
CA_DAY0	Calcium (mmol/L) at day 0
CL_DAY0	Chloride (mmol/L) at day 0
CREAT_DAY0	Creatinine (umol/L) at day 0
CREATCLR_DAY0	Creatinine Clearance (mL/min) at day 0
GLUC_DAY0	Glucose (mmol/L) at day 0
K_DAY0	Potassium (mmol/L) at day 0
LDH_DAY0	Lactate Dehydrogenase (U/L) at day 0
MG_DAY0	Magnesium (mmol/L) at day 0
PHOS_DAY0	Phosphate (mmol/L) at day 0
SODIUM_DAY0	Sodium (mmol/L) at day 0
URATE_DAY0	Urate (mmol/L) at day 0
UREAN_DAY0	Urea Nitrogen (mmol/L) at day 0
HGB_DAY0	Hemoglobin (mmol/L) at day 0
LYM_DAY0	Lymphocytes (10 ⁹ /L) at day 0
LYMLE_DAY0	Lymphocytes/Leukocytes (fraction of 1) at day 0
MONO_DAY0	Monocytes (10 ⁹ /L) at day 0
MONOLE_DAY0	Monocytes/Leukocytes (fraction of 1) at day 0
NEUTLE_DAY0	Neutrophils/Leukocytes (fraction of 1) at day 0

PLAT_DAY0	Platelets (10 ⁹ /L) at day 0
WBC_DAY0	Leukocytes (10 ⁹ /L) at day 0
ALB_BASELINE	Albumin (g/L) at baseline
ALP_BASELINE	Alkaline Phosphatase (U/L) at baseline
ALT_BASELINE	Alanine Aminotransferase (U/L) at baseline
AST_BASELINE	Aspartate Aminotransferase (U/L) at baseline
BICARB_BASELINE	Bicarbonate (mmol/L) at baseline
BILDIR_BASELINE	Direct Bilirubin (umol/L) at baseline
BILI_BASELINE	Bilirubin (umol/L) at baseline
CA_BASELINE	Calcium (mmol/L) at baseline
CL_BASELINE	Chloride (mmol/L) at baseline
CREAT_BASELINE	Creatinine (umol/L) at baseline
CREATCLR_BASELINE	Creatinine Clearance (mL/min) at baseline
GLUC_BASELINE	Glucose (mmol/L) at baseline
K_BASELINE	Potassium (mmol/L) at baseline
LDH_BASELINE	Lactate Dehydrogenase (U/L) at baseline
MG_BASELINE	Magnesium (mmol/L) at baseline
PHOS_BASELINE	Phosphate (mmol/L) at baseline
SODIUM_BASELINE	Sodium (mmol/L) at baseline
URATE_BASELINE	Urate (mmol/L) at baseline
UREAN_BASELINE	Urea Nitrogen (mmol/L) at baseline
HGB_BASELINE	Hemoglobin (mmol/L) at baseline
LYM_BASELINE	Lymphocytes (10 ⁹ /L) at baseline
LYMLE_BASELINE	Lymphocytes/Leukocytes (fraction of 1) at baseline
MONO_BASELINE	Monocytes (10 ⁹ /L) at baseline
MONOLE_BASELINE	Monocytes/Leukocytes (fraction of 1) at baseline
NEUT_BASELINE	Neutrophils (10 ⁹ /L) at baseline
NEUTLE_BASELINE	Neutrophils/Leukocytes (fraction of 1) at baseline
PLAT_BASELINE	Platelets (10 ⁹ /L) at baseline
WBC_BASELINE	Leukocytes (10 ⁹ /L) at baseline
ALB_D0_FCHG_B	Albumin (g/L) fold change
ALP_D0_FCHG_B	Alkaline Phosphatase (U/L) fold change
ALT_D0_FCHG_B	Alanine Aminotransferase (U/L) fold change
AST_D0_FCHG_B	Aspartate Aminotransferase (U/L) fold change
BICARB_D0_FCHG_B	Bicarbonate (mmol/L) fold change
BILDIR_D0_FCHG_B	Direct Bilirubin (umol/L) fold change
BILI_D0_FCHG_B	Bilirubin (umol/L) fold change
CA_D0_FCHG_B	Calcium (mmol/L) fold change
CL_D0_FCHG_B	Chloride (mmol/L) fold change
CREAT_D0_FCHG_B	Creatinine (umol/L) fold change

CREATCLR_D0_FCHG_B	Creatinine Clearance (mL/min) fold change
GLUC_D0_FCHG_B	Glucose (mmol/L) fold change
K_D0_FCHG_B	Potassium (mmol/L) fold change
LDH_D0_FCHG_B	Lactate Dehydrogenase (U/L) fold change
MG_D0_FCHG_B	Magnesium (mmol/L) fold change
PHOS_D0_FCHG_B	Phosphate (mmol/L) fold change
SODIUM_D0_FCHG_B	Sodium (mmol/L) fold change
URATE_D0_FCHG_B	Urate (mmol/L) fold change
UREAN_D0_FCHG_B	Urea Nitrogen (mmol/L) fold change
HGB_D0_FCHG_B	Hemoglobin (mmol/L) fold change
LYM_D0_FCHG_B	Lymphocytes ($10^9/L$) fold change
LYMLE_D0_FCHG_B	Lymphocytes/Leukocytes (fraction of 1) fold change
NEUTLE_D0_FCHG_B	Neutrophils/Leukocytes (fraction of 1) fold change
PLAT_D0_FCHG_B	Platelets ($10^9/L$) fold change
WBC_D0_FCHG_B	Leukocytes ($10^9/L$) fold change
DOUBTIME_BASELINE	Doubling Time (days) at baseline
IFNGCOC_BASELINE	Interferon Gamma by coculture (pg/mL) at baseline
MFGDOSE_BASELINE	Manufacturing Dose Produced at baseline
NCD3_BASELINE	Number of CD3 Cells (10^6) at baseline
NCD3N_BASELINE	Number of CD3- Cells (10^6) at baseline
NCD3N_BASELINE	Number of CD3- Cells (10^6) at baseline
NCD4_BASELINE	Number of CD4 Cells (10^6) at baseline
NCD8_BASELINE	Number of CD8 Cells (10^6) at baseline
NCM_BASELINE	Number of Central Memory Cells (10^6) at baseline
NEEM_BASELINE	Number of Effector and Effector Memory T Cells (10^6) at baseline
NEF_BASELINE	Number of Effector T Cells (10^6) at baseline
NEM_BASELINE	Number of Effector Memory T Cells (10^6) at baseline
NNCM_BASELINE	Number of Naïve Cells and Central Memory Cells (10^6) at baseline
NNV_BASELINE	Number of Naïve Cells (10^6) at baseline
PCD4_BASELINE	Percentage of CD4 in viable CD3 cells (%) at baseline
PCD4_BASELINE	Percentage of CD4 in viable CD3 cells (%) at baseline
PCM_BASELINE	Percentage of Central Memory Cells in viable CD3 cells (%) at baseline
PEEM_BASELINE	Percent of Effector and Effector Memory T Cells (%) at baseline
PEEM_BASELINE	Percent of Effector and Effector Memory T Cells (%) at baseline
PEF_BASELINE	Effector Cells at baseline
TRDEFF_BASELINE	Transduction Efficiency at baseline
VECTCPNM_BASELINE	Vector Copy Number at baseline
VIABILITY_BASELINE	Viability at baseline
CRP_BASELINE	C Reactive Protein (mg/L) at baseline
CXCL10_BASELINE	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) at baseline

EOTAXIN1_BASELINE	Eotaxin-1 (pg/mL) at baseline
EOTAXIN3_BASELINE	Eotaxin-3 (pg/mL) at baseline
FERRITIN_BASELINE	Ferritin (ng/mL) at baseline
GRZA_BASELINE	Granzyme A (pg/mL) at baseline
GRZAE_BASELINE	Granzyme A Ella (pg/mL) at baseline
GRZB_BASELINE	Granzyme B (pg/mL) at baseline
GRZBE_BASELINE	Granzyme B Ella (pg/mL) at baseline
ICAM1CU_BASELINE	Intercellular Adhesion Molecule 1 (ng/mL) at baseline
IFNG_BASELINE	Interferon Gamma (pg/mL) at baseline
INTLK1RA_BASELINE	Interleukin 1 Receptor Antagonist (pg/mL) at baseline
INTLK10_BASELINE	Interleukin 10 (pg/mL) at baseline
IL122340_BASELINE	Interleukin 12+23 p40 (pg/mL) at baseline
INTLK15_BASELINE	Interleukin 15 (pg/mL) at baseline
INTLK16_BASELINE	Interleukin 16 (pg/mL) at baseline
INTLK17_BASELINE	Interleukin 17 (pg/mL) at baseline
INTLK2_BASELINE	Interleukin 2 (pg/mL) at baseline
INTLK6_BASELINE	Interleukin 6 (pg/mL) at baseline
INTLK7_BASELINE	Interleukin 7 (pg/mL) at baseline
INTLK8_BASELINE	Interleukin 8 (pg/mL) at baseline
MCP1_BASELINE	Monocyte Chemotactic Protein 1 (pg/mL) at baseline
MCP4_BASELINE	Monocyte Chemotactic Protein 4 (pg/mL) at baseline
MDC_BASELINE	Macrophage-Derived Chemokine (pg/mL) at baseline
MIP1A_BASELINE	Macrophage Inflammatory Protein 1 Alpha (pg/mL) at baseline
MIP1B_BASELINE	Macrophage Inflammatory Protein 1 Beta (pg/mL) at baseline
PRFCU_BASELINE	Perforin (ng/mL) at baseline
AMYLOIDA_BASELINE	Amyloid A (pg/mL) at baseline
SFASL_BASELINE	CD95 Ligand (pg/mL) at baseline
CCL17_BASELINE	Chemokine (C-C Motif) Ligand 17 (pg/mL) at baseline
TNFA_BASELINE	Tumor Necrosis Factor Alpha (pg/mL) at baseline
TNFB_BASELINE	Tumor Necrosis Factor Beta (pg/mL) at baseline
VCAM1CU_BASELINE	Vascular Cell Adhesion Molecule 1 (ng/mL) at baseline
VEGF_BASELINE	Vascular Endothelial Growth Factor (pg/mL) at baseline
CRP_DAY0	C Reactive Protein (mg/L) at day 0
CXCL10_DAY0	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) at day 0
EOTAXIN1_DAY0	Eotaxin-1 (pg/mL) at day 0
EOTAXIN3_DAY0	Eotaxin-3 (pg/mL) at day 0
FERRITIN_DAY0	Ferritin (ng/mL) at day 0
GRZA_DAY0	Granzyme A (pg/mL) at day 0
GRZAE_DAY0	Granzyme A Ella (pg/mL) at day 0
GRZB_DAY0	Granzyme B (pg/mL) at day 0

GRZBE_DAY0	Granzyme B Ella (pg/mL) at day 0
ICAM1CU_DAY0	Intercellular Adhesion Molecule 1 (ng/mL) at day 0
IFNG_DAY0	Interferon Gamma (pg/mL) at day 0
INTLK1RA_DAY0	Interleukin 1 Receptor Antagonist (pg/mL) at day 0
INTLK10_DAY0	Interleukin 10 (pg/mL) at day 0
IL122340_DAY0	Interleukin 12+23 p40 (pg/mL) at day 0
INTLK15_DAY0	Interleukin 15 (pg/mL) at day 0
INTLK16_DAY0	Interleukin 16 (pg/mL) at day 0
INTLK17_DAY0	Interleukin 17 (pg/mL) at day 0
INTLK2_DAY0	Interleukin 2 (pg/mL) at day 0
INTL2RCU_DAY0	Interleukin 2 Receptor Alpha (ng/mL) at day 0
INTLK6_DAY0	Interleukin 6 (pg/mL) at day 0
INTLK7_DAY0	Interleukin 7 (pg/mL) at day 0
INTLK8_DAY0	Interleukin 8 (pg/mL) at day 0
MCP1_DAY0	Monocyte Chemotactic Protein 1 (pg/mL) at day 0
MCP4_DAY0	Monocyte Chemotactic Protein 4 (pg/mL) at day 0
MDC_DAY0	Macrophage-Derived Chemokine (pg/mL) at day 0
MIP1A_DAY0	Macrophage Inflammatory Protein 1 Alpha (pg/mL) at day 0
MIP1B_DAY0	Macrophage Inflammatory Protein 1 Beta (pg/mL) at day 0
PDL1_DAY0	Programmed Death Ligand 1 (pg/mL) at day 0
PRFCU_DAY0	Perforin (ng/mL) at day 0
AMYLOIDA_DAY0	Amyloid A (pg/mL) at day 0
SFASL_DAY0	CD95 Ligand (pg/mL) at day 0
CCL17_DAY0	Chemokine (C-C Motif) Ligand 17 (pg/mL) at day 0
TNFA_DAY0	Tumor Necrosis Factor Alpha (pg/mL) at day 0
VCAM1CU_DAY0	Vascular Cell Adhesion Molecule 1 (ng/mL) at day 0
VEGF_DAY0	Vascular Endothelial Growth Factor (pg/mL) at day 0
CRP_D0_FCHG_B	C Reactive Protein (mg/L) fold change
CXCL10_D0_FCHG_B	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) fold change
EOTAXIN1_D0_FCHG_B	Eotaxin-1 (pg/mL) fold change
EOTAXIN3_D0_FCHG_B	Eotaxin-3 (pg/mL) fold change
FERRITIN_D0_FCHG_B	Ferritin (ng/mL) fold change
GRZA_D0_FCHG_B	Granzyme A (pg/mL) fold change
GRZAE_D0_FCHG_B	Granzyme A Ella (pg/mL) fold change
GRZB_D0_FCHG_B	Granzyme B (pg/mL) fold change
GRZBE_D0_FCHG_B	Granzyme B Ella (pg/mL) fold change
ICAM1CU_D0_FCHG_B	Intercellular Adhesion Molecule 1 (ng/mL) fold change
IFNG_D0_FCHG_B	Interferon Gamma (pg/mL) fold change
INTLK1RA_D0_FCHG_B	Interleukin 1 Receptor Antagonist (pg/mL) fold change
INTLK10_D0_FCHG_B	Interleukin 10 (pg/mL) fold change

IL122340_D0_FCHG_B	Interleukin 12+23 p40 (pg/mL) fold change
INTLK15_D0_FCHG_B	Interleukin 15 (pg/mL) fold change
INTLK16_D0_FCHG_B	Interleukin 16 (pg/mL) fold change
INTLK17_D0_FCHG_B	Interleukin 17 (pg/mL) fold change
INTLK2_D0_FCHG_B	Interleukin 2 (pg/mL) fold change
INTL2RCU_D0_FCHG_B	Interleukin 2 Receptor Alpha (ng/mL) fold change
INTLK6_D0_FCHG_B	Interleukin 6 (pg/mL) fold change
INTLK7_D0_FCHG_B	Interleukin 7 (pg/mL) fold change
INTLK8_D0_FCHG_B	Interleukin 8 (pg/mL) fold change
MCP1_D0_FCHG_B	Monocyte Chemotactic Protein 1 (pg/mL) fold change
MCP4_D0_FCHG_B	Monocyte Chemotactic Protein 4 (pg/mL) fold change
MDC_D0_FCHG_B	Macrophage-Derived Chemokine (pg/mL) fold change
MIP1A_D0_FCHG_B	Macrophage Inflammatory Protein 1 Alpha (pg/mL) fold change
MIP1B_D0_FCHG_B	Macrophage Inflammatory Protein 1 Beta (pg/mL) fold change
PDL1_D0_FCHG_B	Programmed Death Ligand 1 (pg/mL) fold change
PRFCU_D0_FCHG_B	Perforin (ng/mL) fold change
AMYLOIDA_D0_FCHG_B	Amyloid A (pg/mL) fold change
SFASL_D0_FCHG_B	CD95 Ligand (pg/mL) fold change
CCL17_D0_FCHG_B	Chemokine (C-C Motif) Ligand 17 (pg/mL) fold change
TNFA_D0_FCHG_B	Tumor Necrosis Factor Alpha (pg/mL) fold change
VCAM1CU_D0_FCHG_B	Vascular Cell Adhesion Molecule 1 (ng/mL) fold change
VEGF_D0_FCHG_B	Vascular Endothelial Growth Factor (pg/mL) fold change
PRASCT	Prior Auto. Stem Cell Transplant (ASCT)
PI3KIHFL	Prior PI3K inhibitor
PBTkihFL	Prior BTK inhibitor
OBIMABFL	Prior Med-Obinutuzumab
BENTINFL	Prior Med-Bendamustine
ANTAGFL	Prior Med-Anti-CD20 single agent
ALKFL	Prior Med-Alkylating Agent
ANTALKFL	Prior Med-Anti-CD20 + Alkylating Agent
LENDFL	Prior Med-Lenalidomide
HRVSTDY_PROD	Harvest day
MTVAVAL	Metabolic Tumor Volume Results

Supplementary Table 2. All covariates included/excluded in the multivariate analysis

Variable	Description	n missing	high missing	zero variance	High corr	Corr var	Cor	Included
NOPRCC	Number of Prior Lines of Therapy (N)	1						Yes
BASEWT	Baseline Weight	0						Yes
BTBURC01	Baseline Tumor Bur (SPD) (mm^2) - Cen.01	6						Yes
CD19HS01	CD19 Antigen HSCORE period 01	19						Yes
stage_n	Disease Stage	0						Yes
score_n	International Prognostic Index (IPI)	0						Yes
blecog_n	Baseline ECOG Performance Status	0						Yes
bulkdis_n	Bulky Disease Y/N	0						Yes
steroid_use_n	Steroid usage (y/n)	0						Yes
tocilizumab_use_n	Tocilizumab usage (y/n)	0						Yes
AGE	Age	0						Yes
Male	Male	0						Yes
ALB_DAY0	Albumin (g/L) at day 0	1						Yes
ALP_DAY0	Alkaline Phosphatase (U/L) at day 0	1						Yes
ALT_DAY0	Alanine Aminotransferase (U/L) at day 0	1						Yes
AST_DAY0	Aspartate Aminotransferase (U/L) at day 0	1						Yes
BICARB_DAY0	Bicarbonate (mmol/L) at day 0	0						Yes

BILDIR_DAY0	Direct Bilirubin (umol/L) at day 0	19						Yes
BILI_DAY0	Bilirubin (umol/L) at day 0	1						Yes
CA_DAY0	Calcium (mmol/L) at day 0	0						Yes
CL_DAY0	Chloride (mmol/L) at day 0	0						Yes
CREAT_DAY0	Creatinine (umol/L) at day 0	0						Yes
CREATCLR_DAY0	Creatinine Clearance (mL/min) at day 0	13						Yes
GLUC_DAY0	Glucose (mmol/L) at day 0	0						Yes
K_DAY0	Potassium (mmol/L) at day 0	0						Yes
LDH_DAY0	Lactate Dehydrogenase (U/L) at day 0	3						Yes
MG_DAY0	Magnesium (mmol/L) at day 0	4						Yes
PHOS_DAY0	Phosphate (mmol/L) at day 0	5						Yes
SODIUM_DAY0	Sodium (mmol/L) at day 0	0						Yes
URATE_DAY0	Urate (mmol/L) at day 0	4						Yes
UREA_DAY0	Urea (mmol/L) at day 0	114	Y					No
UREAN_DAY0	Urea Nitrogen (mmol/L) at day 0	10						Yes
HCT_DAY0	Hematocrit (fraction of 1) at day 0	0			Y	HGB_DAY0	0.97 610 915 3	No

HGB_DAY0	Hemoglobin (mmol/L) at day 0	0						Yes
LYM_DAY0	Lymphocytes (10 ⁹ /L) at day 0	5						Yes
LYMLE_DAY0	Lymphocytes/Leukocytes (fraction of 1) at day 0	5						Yes
MONO_DAY0	Monocytes (10 ⁹ /L) at day 0	7						Yes
MONOLE_DAY0	Monocytes/Leukocytes (fraction of 1) at day 0	5						Yes
NEUT_DAY0	Neutrophils (10 ⁹ /L) at day 0	5				Y	WBC_DAY0 0.96 202 658 1	No
NEUTLE_DAY0	Neutrophils/Leukocytes (fraction of 1) at day 0	5						Yes
PLAT_DAY0	Platelets (10 ⁹ /L) at day 0	1						Yes
WBC_DAY0	Leukocytes (10 ⁹ /L) at day 0	0						Yes
ALB_BASELINE	Albumin (g/L) at baseline	0						Yes
ALP_BASELINE	Alkaline Phosphatase (U/L) at baseline	0						Yes
ALT_BASELINE	Alanine Aminotransferase (U/L) at baseline	0						Yes
AST_BASELINE	Aspartate Aminotransferase (U/L) at baseline	0						Yes
BICARB_BASELINE	Bicarbonate (mmol/L) at baseline	0						Yes
BILDIR_BASELINE	Direct Bilirubin (umol/L) at baseline	10						Yes

BILI_BASELINE	Bilirubin (umol/L) at baseline	0						Yes
CA_BASELINE	Calcium (mmol/L) at baseline	0						Yes
CL_BASELINE	Chloride (mmol/L) at baseline	0						Yes
CREAT_BASELINE	Creatinine (umol/L) at baseline	0						Yes
CREATCLR_BASELINE	Creatinine Clearance (mL/min) at baseline	0						Yes
GLUC_BASELINE	Glucose (mmol/L) at baseline	0						Yes
K_BASELINE	Potassium (mmol/L) at baseline	0						Yes
LDH_BASELINE	Lactate Dehydrogenase (U/L) at baseline	0						Yes
MG_BASELINE	Magnesium (mmol/L) at baseline	0						Yes
PHOS_BASELINE	Phosphate (mmol/L) at baseline	1						Yes
SODIUM_BASELINE	Sodium (mmol/L) at baseline	0						Yes
URATE_BASELINE	Urate (mmol/L) at baseline	1						Yes
UREA_BASELINE	Urea (mmol/L) at baseline	114	Y					No
UREAN_BASELINE	Urea Nitrogen (mmol/L) at baseline	10						Yes
HCT_BASELINE	Hematocrit (fraction of 1) at baseline	0			Y	HGB_BASELINE	0.95 652 914	No
HGB_BASELINE	Hemoglobin (mmol/L) at baseline	0						Yes

LYM_BASELINE	Lymphocytes (10 ⁹ /L) at baseline	0						Yes
LYMLE_BASELINE	Lymphocytes/Leukocytes (fraction of 1) at baseline	0						Yes
MONO_BASELINE	Monocytes (10 ⁹ /L) at baseline	2						Yes
MONOLE_BASSELINE	Monocytes/Leukocytes (fraction of 1) at baseline	0						Yes
NEUT_BASELINE	Neutrophils (10 ⁹ /L) at baseline	0						Yes
NEUTLE_BASSELINE	Neutrophils/Leukocytes (fraction of 1) at baseline	0						Yes
PLAT_BASELINE	Platelets (10 ⁹ /L) at baseline	0						Yes
WBC_BASELINE	Leukocytes (10 ⁹ /L) at baseline	0						Yes
ALB_D0_FCHG_B	Albumin (g/L) fold change	1						Yes
ALP_D0_FCHG_B	Alkaline Phosphatase (U/L) fold change	1						Yes
ALT_D0_FCHG_B	Alanine Aminotransferase (U/L) fold change	1						Yes
AST_D0_FCHG_B	Aspartate Aminotransferase (U/L) fold change	1						Yes
BICARB_D0_FCHG_B	Bicarbonate (mmol/L) fold change	0						Yes
BILDIR_D0_FCHG_B	Direct Bilirubin (umol/L) fold change	21						Yes
BILI_D0_FCHG_B	Bilirubin (umol/L) fold change	1						Yes

CA_D0_FCHG_B	Calcium (mmol/L) fold change	0						Yes
CL_D0_FCHG_B	Chloride (mmol/L) fold change	0						Yes
CREAT_D0_FCHG_B	Creatinine (umol/L) fold change	0						Yes
CREATCLR_D0_FCHG_B	Creatinine Clearance (mL/min) fold change	13						Yes
GLUC_D0_FC_HG_B	Glucose (mmol/L) fold change	0						Yes
K_D0_FCHG_B	Potassium (mmol/L) fold change	0						Yes
LDH_D0_FCHG_B	Lactate Dehydrogenase (U/L) fold change	3						Yes
MG_D0_FCHG_B	Magnesium (mmol/L) fold change	4						Yes
PHOS_D0_FC_HG_B	Phosphate (mmol/L) fold change	6						Yes
SODIUM_D0_FCHG_B	Sodium (mmol/L) fold change	0						Yes
URATE_D0_FCHG_B	Urate (mmol/L) fold change	5						Yes
UREA_D0_FC_HG_B	Urea (mmol/L) fold change	114	Y					No
UREAN_D0_FCHG_B	Urea Nitrogen (mmol/L) fold change	10						Yes
HCT_D0_FCHG_B	Hematocrit (fraction of 1) fold change	0			Y	HGB_D0_FC_HG_B	0.95 483 558 3	No
HGB_D0_FCHG_B	Hemoglobin (mmol/L) fold change	0						Yes
LYM_D0_FCHG_B	Lymphocytes (10 ⁹ /L) fold change	5						Yes

LYMLE_D0_FCHG_B	Lymphocytes/Leukocytes (fraction of 1) fold change	5						Yes
MONO_D0_FCHG_B	Monocytes (10 ⁹ /L) fold change	7			Y	MONO_DAY0	0.94 930 326 6	No
MONOLE_D0_FCHG_B	Monocytes/Leukocytes (fraction of 1) fold change	5			Y	MONOLE_DAY0	0.92 533 817 9	No
NEUT_D0_FCHG_B	Neutrophils (10 ⁹ /L) fold change	5			Y	WBC_D0_FCHG_B	0.96 220 647 1	No
NEUTLE_D0_FCHG_B	Neutrophils/Leukocytes (fraction of 1) fold change	5						Yes
PLAT_D0_FCHG_B	Platelets (10 ⁹ /L) fold change	1						Yes
WBC_D0_FCHG_B	Leukocytes (10 ⁹ /L) fold change	0						Yes
ncart_PEAKVAL	at peak	0			Y	ncart_AUCAVAL	0.97 708 890 6	No
ncart_AUCAVAL	AUC	0						Yes
ncart_AUCAVAL	AUC	0						Yes
ppbmc_PEAKVAL	at peak	0			Y	ppbmc_AUCAVAL	0.97 609 902 2	No
ppbmc_AUCAVAL	AUC	0			Y	ppbmc_PEAKVAL	0.97 609 902 2	No

DOUBTIME_B ASELINE	Doubling Time (days) at baseline	0						Yes
FLDEXPDY_B ASELINE	Fold Expansion per Day at baseline	0			Y	DOUB TIME_ BASEL INE	- 0.97 410 727 9	No
IFNGCOC_BA SELINE	Interferon Gamma by coculture (pg/mL) at baseline	0						Yes
IFNGTRDR_B ASELINE	IFN-gamma Normalized by Transduction Efficiency (pg/mL) at baseline	0			Y	IFNGC OC_B ASELI NE	0.90 420 141 6	No
MFGDOSE_B ASELINE	Manufacturing Dose Produced at baseline	14						Yes
NCD3_BASEL INE	Number of CD3 Cells (10 ⁶) at baseline	19						Yes
NCD3N_BASE LINE	Number of CD3- Cells (10 ⁶) at baseline	19						Yes
NCD3N_BASE LINE	Number of CD3- Cells (10 ⁶) at baseline	19						Yes
NCD4_BASEL INE	Number of CD4 Cells (10 ⁶) at baseline	19						Yes
NCD8_BASEL INE	Number of CD8 Cells (10 ⁶) at baseline	19						Yes
NCM_BASELI NE	Number of Central Memory Cells (10 ⁶) at baseline	19						Yes
NEEM_BASEL INE	Number of Effector and Effector Memory T Cells (10 ⁶) at baseline	19						Yes
NEF_BASELI NE	Number of Effector T Cells (10 ⁶) at baseline	19						Yes

NEM_BASELINE	Number of Effector Memory T Cells (10 ⁶) at baseline	19						Yes
NNCM_BASELINE	Number of Naïve Cells and Central Memory Cells (10 ⁶) at baseline	19						Yes
NNV_BASELINE	Number of Naïve Cells (10 ⁶) at baseline	19						Yes
PCD3_BASELINE	CD3 Cells at baseline	19			Y	PCD3N_BASELINE	-1	No
PCD3N_BASELINE	Percent of CD3- Cells (%) at baseline	19			Y	NCD3N_BASELINE	0.929009208	No
PCD3N_BASELINE	Percent of CD3- Cells (%) at baseline	19			Y	PCD3_BASELINE	-1	No
PCD4_BASELINE	Percentage of CD4 in viable CD3 cells (%) at baseline	19						Yes
PCD4_BASELINE	Percentage of CD4 in viable CD3 cells (%) at baseline	19						Yes
PCD8_BASELINE	Percentage of CD8 in viable CD3 cells (%) at baseline	19			Y	RCD4CD8_BASELINE	-0.999831959	No
PCM_BASELINE	Percentage of Central Memory Cells in viable CD3 cells (%) at baseline	19						Yes
PEEM_BASELINE	Percent of Effector and Effector Memory T Cells (%) at baseline	19						Yes

PEEM_BASELINE	Percent of Effector and Effector Memory T Cells (%) at baseline	19						Yes
PEF_BASELINE	Effector Cells at baseline	19						Yes
PEM_BASELINE	Effector Memory Cells at baseline	19			Y	NEM_BASELINE	0.910772326	No
PNCM_BASELINE	Percent of Naïve Cells and Central Memory Cells in Viable CD3 Cells (%) at baseline	19			Y	RNCMEEM_BASELINE	0.999992225	No
PNV_BASELINE	Naive Cells (%) at baseline	19			Y	NNV_BASELINE	0.933409708	No
RCD4CD8_BASELINE	CD4/CD8 at baseline	20			Y	PCD4_BASELINE	0.999919981	No
RCD4CD8_BASELINE	CD4/CD8 at baseline	20			Y	PCD8_BASELINE	-0.999831959	No
RNCMEEM_BASELINE	Ratio of Naïve and Central Memory Cells to Effector and Effector Memory Cells at baseline	19			Y	PNCM_BASELINE	0.999992225	No
RNCMEEM_BASELINE	Ratio of Naïve and Central Memory Cells to Effector and Effector Memory Cells at baseline	19			Y	PEEM_BASELINE	-0.99997149	No
TOTCELL_BASELINE	Total CAR + T cells in Product Bag at baseline	0			Y	BASEWT	0.96207151	No

TOTTCELL_B ASELINE	Total T Cells (10 ⁶) at baseline	0			Y	NCD3 BASEL INE	0.96 031 330 6	No
TRDEFF_BAS ELINE	Transduction Efficiency at baseline	0						Yes
VECTCPNM_ BASELINE	Vector Copy Number at baseline	7						Yes
VIABILITY_B ASELINE	Viability at baseline	0						Yes
CRP_BASELI NE		2						Yes
CXCL10_BAS ELINE	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) at baseline	2						Yes
EOTAXIN1_B ASELINE	Eotaxin-1 (pg/mL) at baseline	2						Yes
EOTAXIN3_B ASELINE	Eotaxin-3 (pg/mL) at baseline	2						Yes
FERRITIN_BA SELINE	Ferritin (ng/mL) at baseline	2						Yes
GMCSF_BASE LINE	Granulocyte Macrophage Colony Stm Factor (pg/mL) at baseline	2		Y				No
GRZA_BASEL INE	Granzyme A (pg/mL) at baseline	2						Yes
GRZAE_BASE LINE	Granzyme A Ella (pg/mL) at baseline	2						Yes
GRZB_BASEL INE	Granzyme B (pg/mL) at baseline	2						Yes
GRZBE_BASE LINE	Granzyme B Ella (pg/mL) at baseline	2						Yes
ICAM1CU_BA SELINE	Intercellular Adhesion Molecule 1 (ng/mL) at baseline	2						Yes

IFNG_BASELINE	Interferon Gamma (pg/mL) at baseline	2						Yes
INTLK1RA_BASELINE	Interleukin 1 Receptor Antagonist (pg/mL) at baseline	2						Yes
INTLK1A_BASELINE	Interleukin 1 Alpha (pg/mL) at baseline	2		Y				No
INTLK1B_BASELINE	Interleukin 1 Beta (pg/mL) at baseline	2		Y				No
INTLK10_BASELINE	Interleukin 10 (pg/mL) at baseline	2						Yes
IL122340_BASELINE	Interleukin 12+23 p40 (pg/mL) at baseline	2						Yes
INTLK12_BASELINE	Interleukin 12 (pg/mL) at baseline	2		Y				No
INTLK13_BASELINE	Interleukin 13 (pg/mL) at baseline	2		Y				No
INTLK15_BASELINE	Interleukin 15 (pg/mL) at baseline	2						Yes
INTLK16_BASELINE	Interleukin 16 (pg/mL) at baseline	2						Yes
INTLK17_BASELINE	Interleukin 17 (pg/mL) at baseline	2						Yes
INTLK2_BASELINE	Interleukin 2 (pg/mL) at baseline	2						Yes
INTL2RCU_BASELINE	Interleukin 2 Receptor Alpha (ng/mL) at baseline	2			Y	INTL2 RCU_DAY0	0.93 779 376 2	No
INTLK4_BASELINE	Interleukin 4 (pg/mL) at baseline	2		Y				No
INTLK5_BASELINE	Interleukin 5 (pg/mL) at baseline	2		Y				No
INTLK6_BASELINE	Interleukin 6 (pg/mL) at baseline	2						Yes

INTLK7_BASE LINE	Interleukin 7 (pg/mL) at baseline	2						Yes
INTLK8_BASE LINE	Interleukin 8 (pg/mL) at baseline	2						Yes
MCP1_BASE LINE	Monocyte Chemotactic Protein 1 (pg/mL) at baseline	2						Yes
MCP4_BASE LINE	Monocyte Chemotactic Protein 4 (pg/mL) at baseline	2						Yes
MDC_BASE LINE	Macrophage-Derived Chemokine (pg/mL) at baseline	2						Yes
MIP1A_BASE LINE	Macrophage Inflammatory Protein 1 Alpha (pg/mL) at baseline	2						Yes
MIP1B_BASE LINE	Macrophage Inflammatory Protein 1 Beta (pg/mL) at baseline	2						Yes
PDL1_BASE LINE	Programmed Death Ligand 1 (pg/mL) at baseline	2			Y	PDL1_ DAY0	0.90 284 939	No
PRFCU_BASE LINE	Perforin (ng/mL) at baseline	2						Yes
AMYLOIDA_ BASELINE	Amyloid A (pg/mL) at baseline	2						Yes
SFASL_BASE LINE	CD95 Ligand (pg/mL) at baseline	2						Yes
CCL17_BASE LINE	Chemokine (C-C Motif) Ligand 17 (pg/mL) at baseline	2						Yes
TNFA_BASE LINE	Tumor Necrosis Factor Alpha (pg/mL) at baseline	2						Yes

TNFB_BASELINE	Tumor Necrosis Factor Beta (pg/mL) at baseline	2						Yes
VCAM1CU_BASELINE	Vascular Cell Adhesion Molecule 1 (ng/mL) at baseline	2						Yes
VEGF_BASELINE	Vascular Endothelial Growth Factor (pg/mL) at baseline	2						Yes
GP130_BASELINE	Glycoprotein 130 (pg/mL) at baseline	124	Y					No
INTLK6RA_BASELINE	Interleukin 6 Receptor Alpha (pg/mL) at baseline	124	Y					No
RANTES_BASELINE	Regulated upon Activation, Normal T Cell Expressed and Presumably Secreted (pg/mL) at baseline	124	Y					No
CRP_DAY0	C Reactive Protein (mg/L) at day 0	3						Yes
CXCL10_DAY0	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) at day 0	3						Yes
EOTAXIN1_DAY0	Eotaxin-1 (pg/mL) at day 0	3						Yes
EOTAXIN3_DAY0	Eotaxin-3 (pg/mL) at day 0	3						Yes
FERRITIN_DAY0	Ferritin (ng/mL) at day 0	3						Yes
GMCSF_DAY0	Granulocyte Macrophage Colony Stim Factor (pg/mL) at day 0	3		Y				No
GRZA_DAY0	Granzyme A (pg/mL) at day 0	3						Yes

GRZAE_DAY0	Granzyme A Ella (pg/mL) at day 0	3						Yes
GRZB_DAY0	Granzyme B (pg/mL) at day 0	3						Yes
GRZBE_DAY0	Granzyme B Ella (pg/mL) at day 0	3						Yes
ICAM1CU_D Y0	Intercellular Adhesion Molecule 1 (ng/mL) at day 0	3						Yes
IFNG_DAY0	Interferon Gamma (pg/mL) at day 0	3						Yes
INTLK1RA_D AY0	Interleukin 1 Receptor Antagonist (pg/mL) at day 0	3						Yes
INTLK1A_DA Y0	Interleukin 1 Alpha (pg/mL) at day 0	3		Y				No
INTLK1B_DA Y0	Interleukin 1 Beta (pg/mL) at day 0	3		Y				No
INTLK10_DA Y0	Interleukin 10 (pg/mL) at day 0	3						Yes
IL122340_DA Y0	Interleukin 12+23 p40 (pg/mL) at day 0	3						Yes
INTLK12_DA Y0	Interleukin 12 (pg/mL) at day 0	3		Y				No
INTLK13_DA Y0	Interleukin 13 (pg/mL) at day 0	3		Y				No
INTLK15_DA Y0	Interleukin 15 (pg/mL) at day 0	3						Yes
INTLK16_DA Y0	Interleukin 16 (pg/mL) at day 0	3						Yes
INTLK17_DA Y0	Interleukin 17 (pg/mL) at day 0	3						Yes
INTLK2_DAY 0	Interleukin 2 (pg/mL) at day 0	3						Yes

INTL2RCU_D AY0	Interleukin 2 Receptor Alpha (ng/mL) at day 0	3						Yes
INTLK4_DAY 0	Interleukin 4 (pg/mL) at day 0	3		Y				No
INTLK5_DAY 0	Interleukin 5 (pg/mL) at day 0	3		Y				No
INTLK6_DAY 0	Interleukin 6 (pg/mL) at day 0	3						Yes
INTLK7_DAY 0	Interleukin 7 (pg/mL) at day 0	3						Yes
INTLK8_DAY 0	Interleukin 8 (pg/mL) at day 0	3						Yes
MCP1_DAY0	Monocyte Chemotactic Protein 1 (pg/mL) at day 0	3						Yes
MCP4_DAY0	Monocyte Chemotactic Protein 4 (pg/mL) at day 0	3						Yes
MDC_DAY0	Macrophage-Derived Chemokine (pg/mL) at day 0	3						Yes
MIP1A_DAY0	Macrophage Inflammatory Protein 1 Alpha (pg/mL) at day 0	3						Yes
MIP1B_DAY0	Macrophage Inflammatory Protein 1 Beta (pg/mL) at day 0	3						Yes
PDL1_DAY0	Programmed Death Ligand 1 (pg/mL) at day 0	3						Yes
PRFCU_DAY0	Perforin (ng/mL) at day 0	3						Yes
AMYLOIDA_ DAY0	Amyloid A (pg/mL) at day 0	3						Yes

SFASL_DAY0	CD95 Ligand (pg/mL) at day 0	3						Yes
CCL17_DAY0	Chemokine (C-C Motif) Ligand 17 (pg/mL) at day 0	3						Yes
TNFA_DAY0	Tumor Necrosis Factor Alpha (pg/mL) at day 0	3						Yes
TNFB_DAY0	Tumor Necrosis Factor Beta (pg/mL) at day 0	3		Y				No
VCAM1CU_D AY0	Vascular Cell Adhesion Molecule 1 (ng/mL) at day 0	3						Yes
VEGF_DAY0	Vascular Endothelial Growth Factor (pg/mL) at day 0	3						Yes
GP130_DAY0	Glycoprotein 130 (pg/mL) at day 0	124	Y					No
INTLK6RA_D AY0	Interleukin 6 Receptor Alpha (pg/mL) at day 0	124	Y					No
RANTES_DAY 0	Regulated upon Activation, Normal T Cell Expressed and Presumably Secreted (pg/mL) at day 0	124	Y					No
CRP_D0_FCH G B	C Reactive Protein (mg/L) fold change	5						Yes
CXCL10_D0_F CHG_B	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) fold change	5						Yes
EOTAXIN1_D 0 FCHG B	Eotaxin-1 (pg/mL) fold change	5						Yes
EOTAXIN3_D 0 FCHG B	Eotaxin-3 (pg/mL) fold change	5						Yes
FERRITIN_D0 FCHG B	Ferritin (ng/mL) fold change	5						Yes

GMCSF_D0_F CHG_B	Granulocyte Macrophage Colony Stm Factor (pg/mL) fold change	5		Y				No
GRZA_D0_FC HG_B	Granzyme A (pg/mL) fold change	5						Yes
GRZAE_D0_F CHG_B	Granzyme A Ella (pg/mL) fold change	5						Yes
GRZB_D0_FC HG_B	Granzyme B (pg/mL) fold change	5						Yes
GRZBE_D0_F CHG_B	Granzyme B Ella (pg/mL) fold change	5						Yes
ICAM1CU_D0 _FCHG_B	Intercellular Adhesion Molecule 1 (ng/mL) fold change	5						Yes
IFNG_D0_FCH G_B	Interferon Gamma (pg/mL) fold change	5						Yes
INTLK1RA_D 0_FCHG_B	Interleukin 1 Receptor Antagonist (pg/mL) fold change	5						Yes
INTLK1A_D0_ FCHG_B	Interleukin 1 Alpha (pg/mL) fold change	5		Y				No
INTLK1B_D0_ FCHG_B	Interleukin 1 Beta (pg/mL) fold change	5		Y				No
INTLK10_D0_ FCHG_B	Interleukin 10 (pg/mL) fold change	5						Yes
IL122340_D0_ FCHG_B	Interleukin 12+23 p40 (pg/mL) fold change	5						Yes
INTLK12_D0_ FCHG_B	Interleukin 12 (pg/mL) fold change	5		Y				No
INTLK13_D0_ FCHG_B	Interleukin 13 (pg/mL) fold change	5		Y				No
INTLK15_D0_ FCHG_B	Interleukin 15 (pg/mL) fold change	5						Yes

INTLK16_D0_FCHG_B	Interleukin 16 (pg/mL) fold change	5						Yes
INTLK17_D0_FCHG_B	Interleukin 17 (pg/mL) fold change	5						Yes
INTLK2_D0_FCHG_B	Interleukin 2 (pg/mL) fold change	5						Yes
INTL2RCU_D0_FCHG_B	Interleukin 2 Receptor Alpha (ng/mL) fold change	5						Yes
INTLK4_D0_FCHG_B	Interleukin 4 (pg/mL) fold change	5		Y				No
INTLK5_D0_FCHG_B	Interleukin 5 (pg/mL) fold change	5		Y				No
INTLK6_D0_FCHG_B	Interleukin 6 (pg/mL) fold change	5						Yes
INTLK7_D0_FCHG_B	Interleukin 7 (pg/mL) fold change	5						Yes
INTLK8_D0_FCHG_B	Interleukin 8 (pg/mL) fold change	5						Yes
MCP1_D0_FC_HG_B	Monocyte Chemotactic Protein 1 (pg/mL) fold change	5						Yes
MCP4_D0_FC_HG_B	Monocyte Chemotactic Protein 4 (pg/mL) fold change	5						Yes
MDC_D0_FCHG_B	Macrophage-Derived Chemokine (pg/mL) fold change	5						Yes
MIP1A_D0_FC_HG_B	Macrophage Inflammatory Protein 1 Alpha (pg/mL) fold change	5						Yes
MIP1B_D0_FC_HG_B	Macrophage Inflammatory Protein 1 Beta (pg/mL) fold change	5						Yes

PDL1_D0_FCH G_B	Programmed Death Ligand 1 (pg/mL) fold change	5						Yes
PRFCU_D0_F CHG_B	Perforin (ng/mL) fold change	5						Yes
AMYLOIDA_ D0_FCHG_B	Amyloid A (pg/mL) fold change	5						Yes
SFASL_D0_FC HG_B	CD95 Ligand (pg/mL) fold change	5						Yes
CCL17_D0_FC HG_B	Chemokine (C-C Motif) Ligand 17 (pg/mL) fold change	5						Yes
TNFA_D0_FC HG_B	Tumor Necrosis Factor Alpha (pg/mL) fold change	5						Yes
TNFB_D0_FC HG_B	Tumor Necrosis Factor Beta (pg/mL) fold change	5			Y	TNFB_ BASEL INE	-1	No
VCAM1CU_D 0_FCHG_B	Vascular Cell Adhesion Molecule 1 (ng/mL) fold change	5						Yes
VEGF_D0_FC HG_B	Vascular Endothelial Growth Factor (pg/mL) fold change	5						Yes
GP130_D0_FC HG_B	Glycoprotein 130 (pg/mL) fold change	124	Y					No
INTLK6RA_D 0_FCHG_B	Interleukin 6 Receptor Alpha (pg/mL) fold change	124	Y					No
RANTES_D0_ FCHG_B	Regulated upon Activation, Normal T Cell Expressed and Persumably Secreted (pg/mL) fold change	124	Y					No
CRP_PEAKW4	C Reactive Protein (mg/L) at peak	0			Y	CRP_A UCAV AL	0.91 060 840 7	No

CXCL10_PEA KW4	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) at peak	0						Yes
EOTAXIN1_P EAKW4	Eotaxin-1 (pg/mL) at peak	0			Y	EOTA XIN1_ AUC VAL	0.93 822 463 1	No
EOTAXIN3_P EAKW4	Eotaxin-3 (pg/mL) at peak	0						Yes
FERRITIN_PE AKW4	Ferritin (ng/mL) at peak	0			Y	FERRI TIN_A UCAV AL	0.95 648 780 5	No
GMCSF_PEA W4	Granulocyte Macrophage Colony Stm Factor (pg/mL) at peak	0						Yes
GRZA_PEA W4	Granzyme A (pg/mL) at peak	0			Y	GRZA_ AUC VAL	0.94 245 306 3	No
GRZAE_PEA W4	Granzyme A Ella (pg/mL) at peak	0						Yes
GRZB_PEA W4	Granzyme B (pg/mL) at peak	0			Y	GRZB_ AUC VAL	0.97 244 893 7	No
GRZBE_PEA W4	Granzyme B Ella (pg/mL) at peak	0			Y	GRZB E_AUC AVAL	0.94 720 973 9	No
ICAM1CU_PE AKW4	Intercellular Adhesion Molecule 1 (ng/mL) at peak	0						Yes
IFNG_PEA W4	Interferon Gamma (pg/mL) at peak	0			Y	IFNG_ AUC VAL	0.92 790 913 2	No

INTLK1RA_PE AKW4	Interleukin 1 Receptor Antagonist (pg/mL) at peak	0			Y	INTLK 1RA_A UCAV AL	0.90 185 131 3	No
INTLK1A_PE AKW4	Interleukin 1 Alpha (pg/mL) at peak	0		Y				No
INTLK1B_PEA KW4	Interleukin 1 Beta (pg/mL) at peak	0		Y				No
INTLK10_PEA KW4	Interleukin 10 (pg/mL) at peak	0			Y	INTLK 10_AU CAVA L	0.91 682 090 7	No
IL122340_PEA KW4	Interleukin 12+23 p40 (pg/mL) at peak	0						Yes
INTLK12_PEA KW4	Interleukin 12 (pg/mL) at peak	0						Yes
INTLK13_PEA KW4	Interleukin 13 (pg/mL) at peak	0						Yes
INTLK15_PEA KW4	Interleukin 15 (pg/mL) at peak	0						Yes
INTLK16_PEA KW4	Interleukin 16 (pg/mL) at peak	0			Y	INTLK 16_AU CAVA L	0.90 649 709 9	No
INTLK17_PEA KW4	Interleukin 17 (pg/mL) at peak	0						Yes
INTLK2_PEA KW4	Interleukin 2 (pg/mL) at peak	0			Y	INTLK 2_AUC AVAL	0.96 076 303 7	No
INTL2RCU_PE AKW4	Interleukin 2 Receptor Alpha (ng/mL) at peak	0			Y	INTL2 RCU_ AUCA VAL	0.93 979 543 7	No
INTLK4_PEA KW4	Interleukin 4 (pg/mL) at peak	0						Yes

INTLK5_PEA KW4	Interleukin 5 (pg/mL) at peak	0			Y	INTLK 5_AUC AVAL	0.94 430 105 4	No
INTLK6_PEA KW4	Interleukin 6 (pg/mL) at peak	0			Y	INTLK 6_AUC AVAL	0.97 125 079 6	No
INTLK7_PEA KW4	Interleukin 7 (pg/mL) at peak	0						Yes
INTLK8_PEA KW4	Interleukin 8 (pg/mL) at peak	0						Yes
MCP1_PEA W4	Monocyte Chemotactic Protein 1 (pg/mL) at peak	0						Yes
MCP4_PEA W4	Monocyte Chemotactic Protein 4 (pg/mL) at peak	0						Yes
MDC_PEA W4	Macrophage-Derived Chemokine (pg/mL) at peak	0			Y	MDC AUC AVAL	0.95 673 163 9	No
MDC_PEA W4	Macrophage-Derived Chemokine (pg/mL) at peak	0			Y	MDC DAY0	0.91 920 208 5	No
MIP1A_PEA W4	Macrophage Inflammatory Protein 1 Alpha (pg/mL) at peak	0						Yes
MIP1B_PEA W4	Macrophage Inflammatory Protein 1 Beta (pg/mL) at peak	0						Yes
PDL1_PEA W4	Programmed Death Ligand 1 (pg/mL) at peak	0						Yes

PRFCU_PEAK_W4	Perforin (ng/mL) at peak	0			Y	PRFCU_AUC_AVAL	0.917476003	No
AMYLOIDA_P_EAKW4	Amyloid A (pg/mL) at peak	0			Y	AMYLOIDA_AUCAVAL	0.939883242	No
SFASL_PEAK_W4	CD95 Ligand (pg/mL) at peak	0						Yes
CCL17_PEAK_W4	Chemokine (C-C Motif) Ligand 17 (pg/mL) at peak	0			Y	CCL17_AUC_AVAL	0.919075827	No
TNFA_PEAK_W4	Tumor Necrosis Factor Alpha (pg/mL) at peak	0						Yes
TNFB_PEAK_W4	Tumor Necrosis Factor Beta (pg/mL) at peak	0						Yes
VCAM1CU_PEA_KW4	Vascular Cell Adhesion Molecule 1 (ng/mL) at peak	0						Yes
VEGF_PEAK_W4	Vascular Endothelial Growth Factor (pg/mL) at peak	0			Y	VEGF_AUCAVAL	0.947758916	No
GP130_PEAK_W4	Glycoprotein 130 (pg/mL) at peak	124	Y					No
INTLK6RA_PEA_KW4	Interleukin 6 Receptor Alpha (pg/mL) at peak	124	Y					No
RANTES_PEA_KW4	Regulated upon Activation, Normal T Cell Expressed and Presumably Secreted (pg/mL) at peak	124	Y					No
CRP_AUCAVAL	C Reactive Protein (mg/L) AUC	0						Yes

CXCL10_AUC AVAL	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) AUC	0						Yes
EOTAXIN1_A UCAVAL	Eotaxin-1 (pg/mL) AUC	0						Yes
EOTAXIN3_A UCAVAL	Eotaxin-3 (pg/mL) AUC	0						Yes
FERRITIN_AU CAVAL	Ferritin (ng/mL) AUC	0						Yes
GMCSF_AUC AVAL	Granulocyte Macrophage Colony Stm Factor (pg/mL) AUC	0						Yes
GRZA_AUCA VAL	Granzyme A (pg/mL) AUC	0						Yes
GRZAE_AUC AVAL	Granzyme A Ella (pg/mL) AUC	0						Yes
GRZB_AUCA VAL	Granzyme B (pg/mL) AUC	0						Yes
GRZBE_AUC AVAL	Granzyme B Ella (pg/mL) AUC	0						Yes
ICAM1CU_AU CAVAL	Intercellular Adhesion Molecule 1 (ng/mL) AUC	0						Yes
IFNG_AUCAV AL	Interferon Gamma (pg/mL) AUC	0						Yes
INTLK1RA_A UCAVAL	Interleukin 1 Receptor Antagonist (pg/mL) AUC	0						Yes
INTLK1A_AU CAVAL	Interleukin 1 Alpha (pg/mL) AUC	0						Yes
INTLK1A_AU CAVAL	Interleukin 1 Alpha (pg/mL) AUC	0						Yes

INTLK1B_AU CAVAL	Interleukin 1 Beta (pg/mL) AUC	0			Y	INTLK 1A_AU CAVAL	1	No
INTLK10_AU CAVAL	Interleukin 10 (pg/mL) AUC	0						Yes
IL122340_AUC AVAL	Interleukin 12+23 p40 (pg/mL) AUC	0						Yes
INTLK12_AU CAVAL	Interleukin 12 (pg/mL) AUC	0						Yes
INTLK13_AU CAVAL	Interleukin 13 (pg/mL) AUC	0			Y	INTLK 1A_AU CAVAL	0.94 668 762 6	No
INTLK15_AU CAVAL	Interleukin 15 (pg/mL) AUC	0						Yes
INTLK16_AU CAVAL	Interleukin 16 (pg/mL) AUC	0						Yes
INTLK17_AU CAVAL	Interleukin 17 (pg/mL) AUC	0						Yes
INTLK2_AUC AVAL	Interleukin 2 (pg/mL) AUC	0						Yes
INTL2RCU_A UCAVAL	Interleukin 2 Receptor Alpha (ng/mL) AUC	0						Yes
INTLK4_AUC AVAL	Interleukin 4 (pg/mL) AUC	0						Yes
INTLK5_AUC AVAL	Interleukin 5 (pg/mL) AUC	0						Yes
INTLK6_AUC AVAL	Interleukin 6 (pg/mL) AUC	0						Yes
INTLK7_AUC AVAL	Interleukin 7 (pg/mL) AUC	0						Yes
INTLK8_AUC AVAL	Interleukin 8 (pg/mL) AUC	0						Yes

MCP1_AUCA VAL	Monocyte Chemotactic Protein 1 (pg/mL) AUC	0						Yes
MCP4_AUCA VAL	Monocyte Chemotactic Protein 4 (pg/mL) AUC	0						Yes
MDC_AUCAV AL	Macrophage-Derived Chemokine (pg/mL) AUC	0			Y	MDC PEAK W4	0.95 673 163 9	No
MIP1A_AUCA VAL	Macrophage Inflammatory Protein 1 Alpha (pg/mL) AUC	0						Yes
MIP1B_AUCA VAL	Macrophage Inflammatory Protein 1 Beta (pg/mL) AUC	0						Yes
PDL1_AUCAV AL	Programmed Death Ligand 1 (pg/mL) AUC	0						Yes
PRFCU_AUCA VAL	Perforin (ng/mL) AUC	0						Yes
AMYLOIDA_ AUCAVAL	Amyloid A (pg/mL) AUC	0						Yes
SFASL_AUCA VAL	CD95 Ligand (pg/mL) AUC	0						Yes
CCL17_AUCA VAL	Chemokine (C-C Motif) Ligand 17 (pg/mL) AUC	0						Yes
TNFA_AUCA VAL	Tumor Necrosis Factor Alpha (pg/mL) AUC	0						Yes
TNFB_AUCA VAL	Tumor Necrosis Factor Beta (pg/mL) AUC	0						Yes
VCAM1CU_A UCAVAL	Vascular Cell Adhesion Molecule 1 (ng/mL) AUC	0						Yes

VEGF_AUCA VAL	Vascular Endothelial Growth Factor (pg/mL) AUC	0						Yes
GP130_AUCA VAL	Glycoprotein 130 (pg/mL) AUC	124	Y					No
INTLK6RA_A UCAVAL	Interleukin 6 Receptor Alpha (pg/mL) AUC	124	Y					No
RANTES_AUC AVAL	Regulated upon Activation, Normal T Cell Expressed and Presumably Secreted (pg/mL) AUC	124	Y					No
DREFA2FL	Double refractory	0						Yes
PRASCT	Prior Auto. Stem Cell Transplant (ASCT)	0						Yes
PRSCTFL	Prior Stem Cell Transplant (Y/N)	0			Y	PRASC T	1	No
PI3KIHFL	Prior PI3K inhibitor	0						Yes
PBTkIHFL	Prior BTK inhibitor	0						Yes
OBIMABFL	Prior Med- Obinutuzumb	0						Yes
ANTAGFL	Prior Med-Anti-CD20 single agent	0						Yes
ALKFL	Prior Med-Alkylating Agent	0						Yes
ANTALKFL	Prior Med-Anti-CD20 + Alkylating Agent	0						Yes
LENDFL	Prior Med- Lenalidomide	0						Yes
POD24_Y	Progression of disease within 24 months	0						Yes
POD24_N	Progression of disease not within 24 months	0						Yes

BENCAT_LE1 2	Prior Med- Bendamustine within 12 months	0						Yes
BENCAT_GT1 2	Prior Med- Bendamustine over 12 months	0						Yes
HRVSTDY_PR OD	Harvest day	0						Yes
MTVAVAL	Metabolic Tumor Volume Results	2						Yes
ncart_spd_PEA KVAL	Number of CART peak normalized to SPD	6						Yes
nnv_spd_BASE LINE	Number of Naïve cells normalized to SPD	25						Yes

Supplementary Table 3. List of post-infusion covariates

variable	description
ncart_AUCAVAL	ncart AUC
CXCL10_PEAKW4	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) at peak
EOTAXIN3_PEAKW4	Eotaxin-3 (pg/mL) at peak
GMCSF_PEAKW4	Granulocyte Macrophage Colony Stim Factor (pg/mL) at peak
GRZAE_PEAKW4	Granzyme A Ella (pg/mL) at peak
ICAM1CU_PEAKW4	Intercellular Adhesion Molecule 1 (ng/mL) at peak
IL122340_PEAKW4	Interleukin 12+23 p40 (pg/mL) at peak
INTLK12_PEAKW4	Interleukin 12 (pg/mL) at peak
INTLK13_PEAKW4	Interleukin 13 (pg/mL) at peak
INTLK15_PEAKW4	Interleukin 15 (pg/mL) at peak
INTLK17_PEAKW4	Interleukin 17 (pg/mL) at peak
INTLK4_PEAKW4	Interleukin 4 (pg/mL) at peak
INTLK7_PEAKW4	Interleukin 7 (pg/mL) at peak
INTLK8_PEAKW4	Interleukin 8 (pg/mL) at peak
MCP1_PEAKW4	Monocyte Chemotactic Protein 1 (pg/mL) at peak
MCP4_PEAKW4	Monocyte Chemotactic Protein 4 (pg/mL) at peak
MIP1A_PEAKW4	Macrophage Inflammatory Protein 1 Alpha (pg/mL) at peak
MIP1B_PEAKW4	Macrophage Inflammatory Protein 1 Beta (pg/mL) at peak
PDL1_PEAKW4	Programmed Death Ligand 1 (pg/mL) at peak
SFASL_PEAKW4	CD95 Ligand (pg/mL) at peak
TNFA_PEAKW4	Tumor Necrosis Factor Alpha (pg/mL) at peak
TNFB_PEAKW4	Tumor Necrosis Factor Beta (pg/mL) at peak
VCAM1CU_PEAKW4	Vascular Cell Adhesion Molecule 1 (ng/mL) at peak
CRP_AUCAVAL	C Reactive Protein (mg/L) AUC
CXCL10_AUCAVAL	Chemokine (C-X-C Motif) Ligand 10 (pg/mL) AUC
EOTAXIN1_AUCAVAL	Eotaxin-1 (pg/mL) AUC
EOTAXIN3_AUCAVAL	Eotaxin-3 (pg/mL) AUC
FERRITIN_AUCAVAL	Ferritin (ng/mL) AUC
GMCSF_AUCAVAL	Granulocyte Macrophage Colony Stim Factor (pg/mL) AUC
GRZA_AUCAVAL	Granzyme A (pg/mL) AUC
GRZAE_AUCAVAL	Granzyme A Ella (pg/mL) AUC
GRZB_AUCAVAL	Granzyme B (pg/mL) AUC
GRZBE_AUCAVAL	Granzyme B Ella (pg/mL) AUC
ICAM1CU_AUCAVAL	Intercellular Adhesion Molecule 1 (ng/mL) AUC
IFNG_AUCAVAL	Interferon Gamma (pg/mL) AUC
INTLK1RA_AUCAVAL	Interleukin 1 Receptor Antagonist (pg/mL) AUC
INTLK1A_AUCAVAL	Interleukin 1 Alpha (pg/mL) AUC

INTLK1A_AUCAVAL	Interleukin 1 Alpha (pg/mL) AUC
INTLK10_AUCAVAL	Interleukin 10 (pg/mL) AUC
IL122340_AUCAVAL	Interleukin 12+23 p40 (pg/mL) AUC
INTLK12_AUCAVAL	Interleukin 12 (pg/mL) AUC
INTLK15_AUCAVAL	Interleukin 15 (pg/mL) AUC
INTLK16_AUCAVAL	Interleukin 16 (pg/mL) AUC
INTLK17_AUCAVAL	Interleukin 17 (pg/mL) AUC
INTLK2_AUCAVAL	Interleukin 2 (pg/mL) AUC
INTL2RCU_AUCAVAL	Interleukin 2 Receptor Alpha (ng/mL) AUC
INTLK4_AUCAVAL	Interleukin 4 (pg/mL) AUC
INTLK5_AUCAVAL	Interleukin 5 (pg/mL) AUC
INTLK6_AUCAVAL	Interleukin 6 (pg/mL) AUC
INTLK7_AUCAVAL	Interleukin 7 (pg/mL) AUC
INTLK8_AUCAVAL	Interleukin 8 (pg/mL) AUC
MCP1_AUCAVAL	Monocyte Chemotactic Protein 1 (pg/mL) AUC
MCP4_AUCAVAL	Monocyte Chemotactic Protein 4 (pg/mL) AUC
MIP1A_AUCAVAL	Macrophage Inflammatory Protein 1 Alpha (pg/mL) AUC
MIP1B_AUCAVAL	Macrophage Inflammatory Protein 1 Beta (pg/mL) AUC
PDL1_AUCAVAL	Programmed Death Ligand 1 (pg/mL) AUC
PRFCU_AUCAVAL	Perforin (ng/mL) AUC
AMYLOIDA_AUCAVAL	Amyloid A (pg/mL) AUC
SFASL_AUCAVAL	CD95 Ligand (pg/mL) AUC
CCL17_AUCAVAL	Chemokine (C-C Motif) Ligand 17 (pg/mL) AUC
TNFA_AUCAVAL	Tumor Necrosis Factor Alpha (pg/mL) AUC
TNFB_AUCAVAL	Tumor Necrosis Factor Beta (pg/mL) AUC
VCAM1CU_AUCAVAL	Vascular Cell Adhesion Molecule 1 (ng/mL) AUC
VEGF_AUCAVAL	Vascular Endothelial Growth Factor (pg/mL) AUC
ncart_spd_PEAKVAL	Number of CART peak normalized to SPD
nnv_spd_BASELINE	Number of Naïve cells normalized to SPD

Supplementary Table 4. Multivariate analysis of combined pre-treatment and post-infusion covariates

rank	PFS			Ongoing Response			NTx G3+ w/o toci or steroid			CRS G3+ w/o toci or steroid		
	PARAM	std.vi.mean	Direction	PARAM	vi.std.mean	Direction	PARAM	vi.std.mean	Direction	PARAM	vi.std.mean	Direction
1	TNFA_DAY0	100	-	TNFA_DAY0	100	-	GMCSF_PEAkW4	100	+	INTLK6_AUCAVAL	100	+
2	IL122340_DAY0	46.7	-	IL122340_DAY0	78	-	GMCSF_AUCAVAL	70.3	+	TNFA_PEAkW4	33.3	+
3	HGB_BASELINE	21.8	+	NNV_BASELINE	51.5	+	MCP1_PEAkW4	20.9	+	INTLK2_AUCAVAL	15.6	+
4	INTL2RCU_DAY0	20.9	-	INTL2RCU_DAY0	34.8	-	INTLK6_AUCAVAL	16.5	+	NNCM_BASELINE	11.8	+
5	NNV_BASELINE	20.1	+	HGB_BASELINE	12.6	+	INTLK2_AUCAVAL	13.7	+	ncart_spd_PEAKVAL	11.7	+
6	tocilizumab_use_n	17.1	+	INTLK16_DAY0	11.3	-	INTLK15_PEAkW4	9.6	+	CXCL10_PEAkW4	7.3	+
7	MDC_DAY0	16.5	-	score_n	10.7	-	INTLK10_AUCAVAL	5.4	+	VEGF_BASELINE	2.7	+
8	CCL17_BASELINE	13.1	-	INTLK8_BASELINE	9.5	+	NNCM_BASELINE	5.2	+	PEF_BASELINE	2.4	-
9	INTLK16_DAY0	12.2	-	IL122340_AUCAVAL	9	-	ncart_AUCAVAL	4.8	+	NNCM_BASELINE	1.8	+
10	HGB_DAY0	12	+	INTLK15_BASELINE	8.1	-	MIP1B_PEAkW4	2.3	+	GRZBE_AUCAVAL	1	+
11	ncart_AUCAVAL	11.5	+	INTLK16_BASELINE	6.6	-	BICARB_BASELINE	1.3	+	PEEM_BASELINE	0.6	-
12	PEEM_BASELINE	11.4	-	CXCL10_DAY0	5.9	-	AST_DAY0	0.9	+	IFNG_AUCAVAL	0.3	+
13	MDC_BASELINE	10.9	-	MCP4_BASELINE	5	+	INTL2RCU_AUCAVAL	0.9	+	INTLK8_D0_FCHG_B	0.2	-
14	TNFA_BASELINE	10.4	-	HGB_DAY0	5	+	NCD4_BASELINE	0.7	+	INTLK4_PEAkW4	0	+
15	MTVAVAL	10.3	-	FERRITIN_BASELINE	5	-	GRZB_AUCAVAL	0.7	+	INTLK4_AUCAVAL	0	+
16	IL122340_BASELINE	7.3	-	AGE	3.7	-	CD19HS01	0.6	+	CXCL10_DAY0	-0.1	+
17	FERRITIN_BASELINE	6.1	-	ALT_DAY0	3.4	+	NNV_BASELINE	0.6	+	INTLK8_PEAkW4	-0.2	+
18	score_n	4.8	-	PLAT_BASELINE	3.4	+	NCD3_BASELINE	0.4	+	MIP1A_PEAkW4	-0.4	+
19	NNCM_BASELINE	4.4	+	VEGF_AUCAVAL	3	+	INTLK4_PEAkW4	0.4	+	VCAM1CU_BASELINE	-0.8	+
20	PHOS_DAY0	4.2	-	VCAM1CU_BASELINE	2.3	-	IL122340_AUCAVAL	0.2	-	TNFA_DAY0	-0.8	+
21	INTLK16_BASELINE	3.8	-	GRZB_AUCAVAL	2.2	+	PRFCU_D0_FCHG_B	0.1	-	VCAM1CU_PEAkW4	-0.9	+
22	MIP1B_BASELINE	3.1	-	MCP4_DAY0	1.7	+	MCP1_AUCAVAL	0.1	+	ncart_AUCAVAL	-2.3	+
23	bulkdls_n	2.7	-	INTLK1RA_AUCAVAL	1.4	+	IFNG_AUCAVAL	0	+	PCM_BASELINE	-3.2	+
24	CRP_BASELINE	2.3	-	EOTAXIN1_D0_FCHG_B	1.2	-	FERRITIN_BASELINE	-0.1	-	GMCSF_PEAkW4	-4.7	+
25	BTBURC01	2	-	CL_D0_FCHG_B	0.9	+	ncart_spd_PEAKVAL	-0.1	+	GRZAE_PEAkW4	-5.6	+
26	NEM_BASELINE	1.7	-	VCAM1CU_AUCAVAL	0.5	-	AGE	-0.1	+			
27	NEEM_BASELINE	1.6	-	ICAM1CU_DAY0	0.2	-						
28	INTLK7_PEAkW4	1.4	+	ICAM1CU_BASELINE	0.2	-						
29	INTLK8_BASELINE	1.3	+	INTLK6_AUCAVAL	0.1	+						
30	ALT_DAY0	0.9	+	INTLK6_BASELINE	0	+						
31	nnv_spd_BASELINE	0.7	+	PRASCT	0	+						
32	UREAN_D0_FCHG_B	0.7	-	URATE_DAY0	-0.6	-						
33	URATE_DAY0	0.6	-									
34	INTLK16_AUCAVAL	0.1	-									
35	INTLK10_DAY0	0	-									

PFS, Progression-free survival; NTx, Neurologic events; CRS, Cytokine release syndrome; Toci, Tocilizumab.

Supplementary Table 5. Nanostring IO360 signatures and Immunosign 21 (IS21) values for association with ongoing response

Gene expression signature	pvalue	log2FC
TIS	0.117352	-0.275167
APM	0.52324	-0.081861
APM-Loss	0.851471	0.079201
Apoptosis	0.670233	-0.024903
B-Cells	0.809136	-0.033625
B7-H3	0.329942	0.23535
CD8-T-Cells	0.932182	0.046847
Cytotoxic-Cells	0.198455	-0.330299
Cytotoxicity	0.117352	-0.345194
DC	0.645548	-0.110667
Endothelial-Cells	0.645548	0.086167
Exhausted-CD8	0.313107	-0.173826
Glycolytic-Activity	0.972472	0.007931
Hypermutation	0.506008	-0.240892
Hypoxia	0.313107	-0.120931
IFN-Downstream	0.463197	-0.157306
IFNG-IO360	0.003063	-0.795868
Immunoproteasome	0.573822	-0.056938
Inflammatory-Chemokines	0.38379	-0.262715
JAKSTAT-Loss	0.352661	0.223216
Lymphoid	0.720635	-0.019535
Macrophages	0.851471	-0.069125
MAGEs	0.905162	-0.000662
Mast-Cells	0.388295	-0.270836
MHC2	0.292602	-0.203646
MMR-Loss	0.107112	0.192823
MSI-Predictor	0.091151	-0.039757
Myeloid	0.986421	-0.072139
Myeloid-Inflammation	0.746302	0.082244
Neutrophils	0.720635	-0.187715
NK-CD56dim	0.186568	-0.329021
NK-Cells	0.69527	-0.090403
PD-1	0.720635	0.248188
PD-L1	1	-0.027333

PD-L2	0.905162	0.046924
Proliferation	0.137874	-0.320819
Stroma	0.38379	0.253764
T-Cells	0.506008	0.202188
TGF-Beta	0.281118	0.139458
IS21	0.690015	-0.402778

Supplementary Table 6. Enrichment scores evaluated using RNAseq dataset for association with ongoing response

Signatures	FDR	ES ratio
STAT1 19272155	0.015796075	0.972350261
Chemokine12 score	0.023522955	0.965709615
Interferon 19272155	0.034935176	0.96308741
Cytotoxic cells	0.035824249	0.964547899
Module3 IFN score	0.04098717	0.972156832
IFN 21978456	0.043164285	0.966575515
ICRscore	0.072242044	0.975758321
Minterferon Cluster 21214954	0.073658348	0.984574443
Interferon Cluster 21214954	0.100401334	0.981214991
CD103neg mean 25446897	0.113525214	0.975674074
TAMsurr score	0.139933482	0.967009456
Inhibitory	0.150376349	0.987222995
Module5 TcellBcell score	0.162037366	0.988933403
Module11 Prolif score	0.17527999	0.979300311
TIS_genes	0.182085556	0.985339332
ISG RS	0.200663323	0.984863771
STAT1 score	0.206071154	0.990887621
PD1 PDL1 score	0.209961075	0.976813411
Exhaustion	0.210018885	0.979562348
IL2 score 21050467	0.210597328	1.006337592
IFNG GS	0.233248943	0.994120078
Th1 cells	0.248030029	0.973045094
IL13 score 21050467	0.255387194	0.993050889
Co-stimulatory	0.29658677	1.010845088
NHI 5gene score	0.305041618	0.97991582
IGG Cluster 21214954	0.332415847	0.993433237
Mast cells	0.33334021	0.975966678
IL12 score 21050467	0.346673777	0.991743216
Immune Score	0.365077967	0.994426242
MHC1 21978456	0.367724401	0.96611976
MHC I 19272155	0.367724401	0.96611976
TGFB score 21050467	0.383223235	1.009680323
Neutrophils	0.391029189	0.986292421
IFNG score 21050467	0.462927744	0.996479647

NK CD56dim cells	0.468408649	1.008392949
Immune cell Cluster 21214954	0.482014188	0.994525941
MHC2 21978456	0.577931037	0.98356525
CD8Exhaustion	0.614976439	0.985731021
Bcell_receptors_score	0.615983737	0.995638735
CD45	0.623708748	0.9987023
CD103pos mean 25446897	0.62546691	0.994843357
Troester WoundSig 19887484	0.642303108	1.003617188
IL4_score 21050467	0.66388871	0.998650317
Macrophages	0.68543736	0.991236483
Bcell 21978456	0.725258298	0.992724421
T-cells	0.756147376	1.005905206
MHC II 19272155	0.776687446	1.002948751
Exhausted CD8	0.802287172	1.004715779
IL8 21978456	0.812656702	1.00781775
CD8 T cells	0.864125645	0.99423134
Tcell_receptors_score	0.886269998	0.997124909
DC	0.908566168	0.994205458
Tcell 21978456	0.909106417	1.000975653
B-cells	0.921094097	0.998835478
Module4_TcellBcell_score	0.946395397	0.999473825
Treg	0.990573186	0.999727395