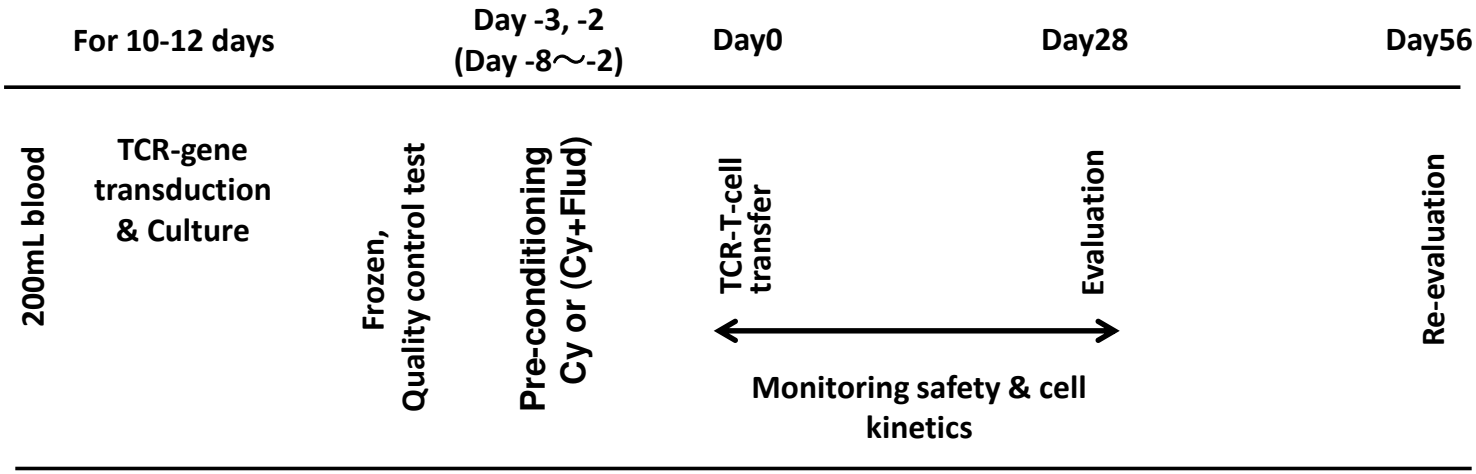
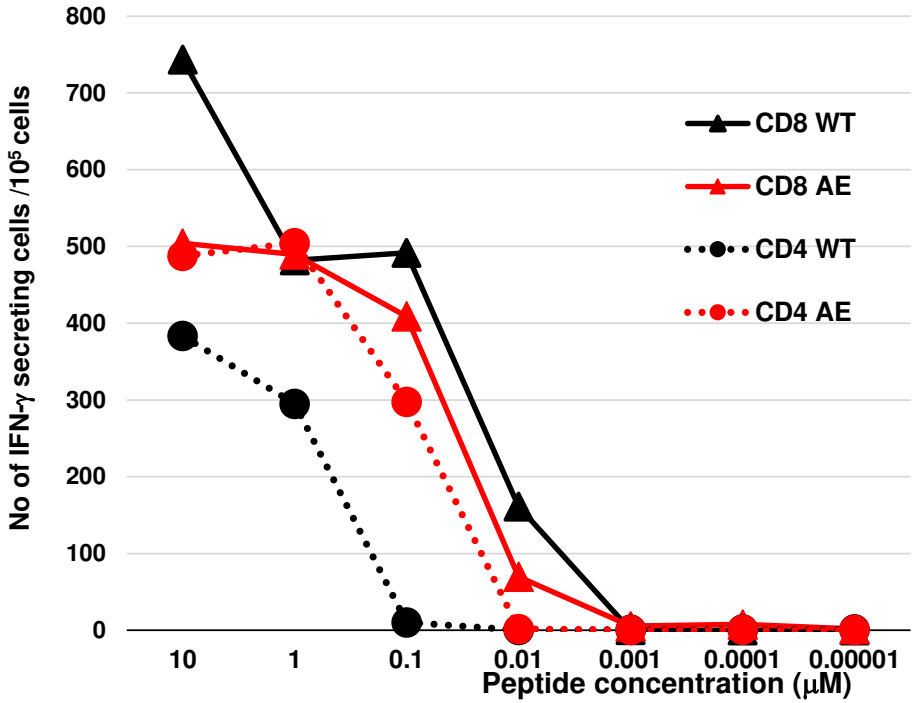
Supplemental Figure 1. **Treatment flow.** After TCR-transduced lymphocytes were prepared, patients were given the lymphocytes intravenously after the pre-conditioning treatment. On days 28 and 56, safety and clinical responses were assessed.
Cy, cyclophosphamide; Flud, fludarabine;



Supplemental Figure 2. Peptide titration of CD8⁺ T cells and CD4⁺ T cells by IFN-γ ELIPSOT assay. Affinity-enhanced TCR(G50A+A51E)-gene or wild-type TCR(1G4) was transduced to peripheral lymphocyte form volunteers. After 10-day culture, CD8⁺ T cells and CD4⁺ T cells were harvested and isolated. T2 cells pulsed with NY-ESO-1 peptide were used as targets in ELISPOT. Peptide concentration in cell pulses were ranged from 10 to 0.00001 μM.
CD8 WT, 1G4 wild-type TCR transduced CD8⁺ T cells CD4 WT, 1G4 wild-type TCR transduced CD8⁺ T cells CD8 AE, G50 affinity-enhanced TCR-transduced CD8⁺ T cells CD4 AE, G50 affinity-enhanced TCR-transduced CD4⁺ T cells



Supplemental Table 1. DNA microarray in T cells after TCR-gene transduction

Genes	No. of spots	
	HD1/HD2	HD3/HD4
Analyzed	43,376	43,376
1 or more signal strength	41,200	40,374
Significantly changed expression	7,791	5,212
Up-regulated after TCR-gene transduction	49*	7*
Down-rgulated after TCR-gene tranduction	10**	2**

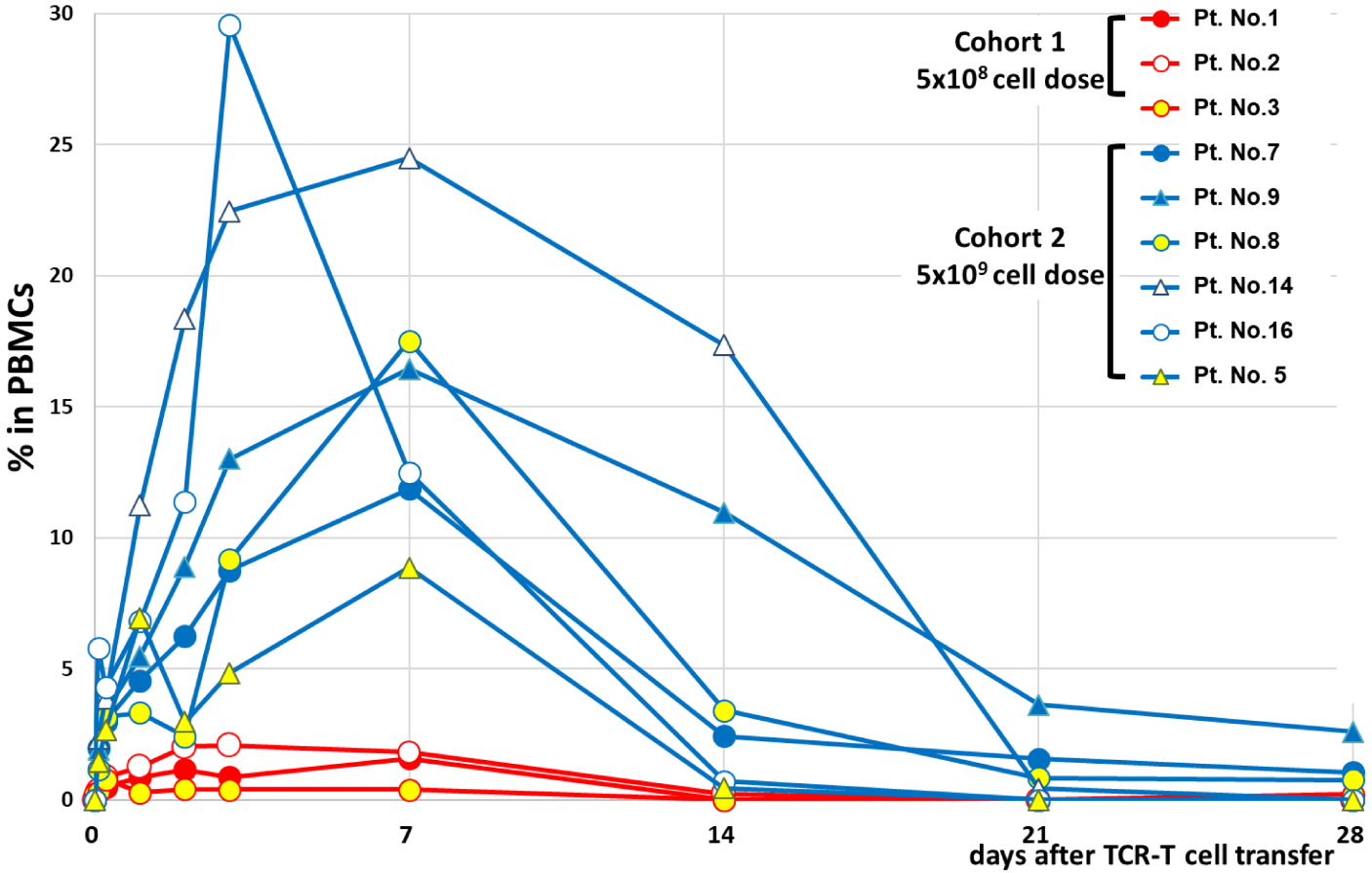
HD, healthy donor

*, **, no overlapping genes that were upregulated or down regulated among the HD1/HD2 and HD3/HD4 groups

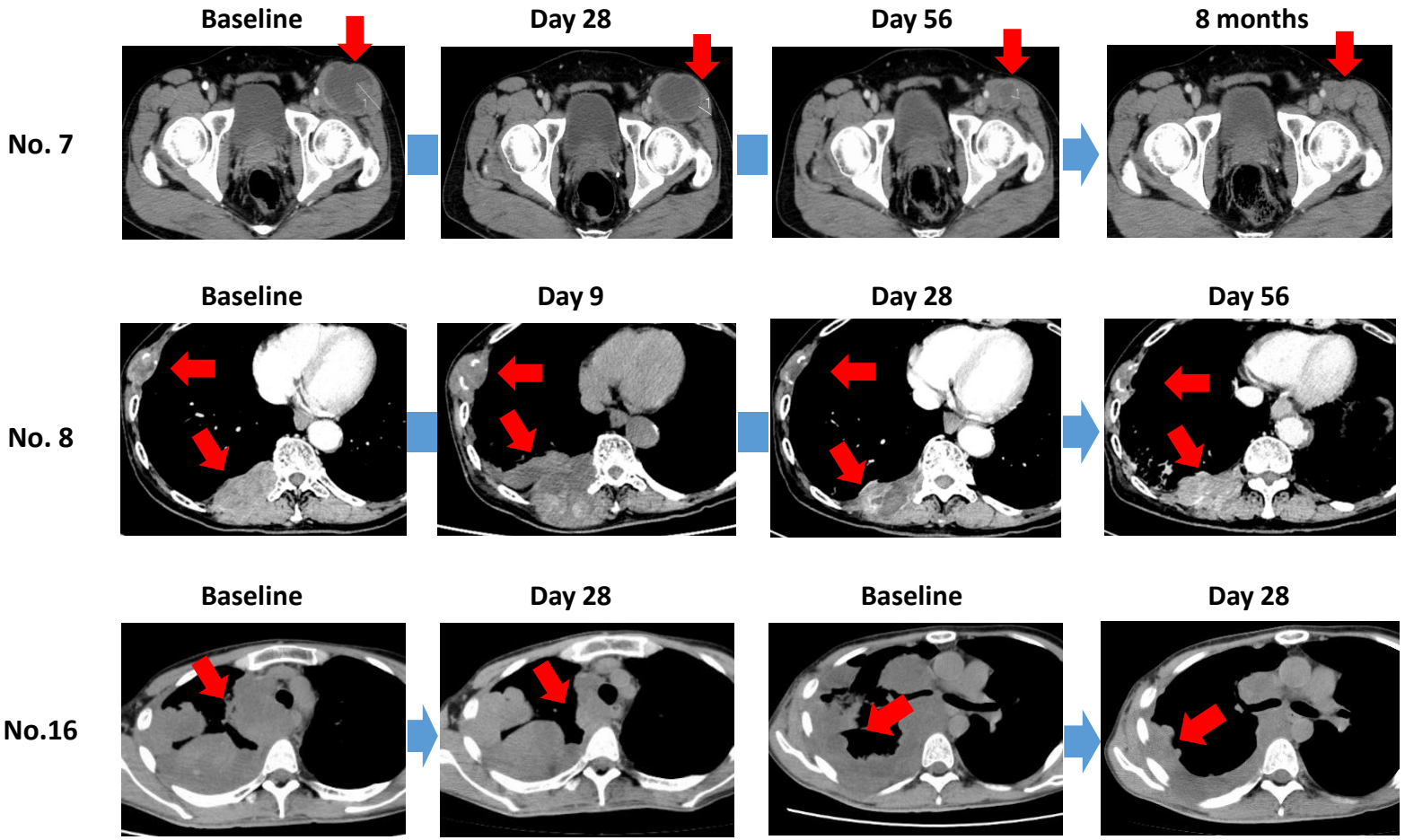
Supplemental Table 2. T cell phenotypes of the infusion product

patient ID	CD3 (%)	CD4 (%)	CD8 (%)	IFN-γ(+)/CD8 (%)	tetramer(+)/CD8 (%)
1	99.6	36.9	63.2	47.8	65.9
2	99.4	22.5	78.3	53.1	71.9
3	98.5	19.7	84.3	57.6	71.7
7	98.5	11.3	79.6	52.6	70.3
9	99.2	42.9	59.7	52.7	69.7
8	96.8	31.3	64.5	45.6	61.4
14	99.3	39.2	54.7	48.7	60.0
16	99.8	21.9	75.3	41.4	53.2
15	99.9	20.2	78	25.9	60.7

Supplemental Figure 3. Cell kinetics after adoptive transfer of TCR-T cells. The panel shows kinetics of 3 patients who received 5×10^8 cells (Cohort 1), 6 patients who received 5×10^9 cells (Cohort 2). Peripheral blood was collected at baseline and at pre-determined time points over a period of 28 days. DNA samples were extracted from the PBMCs, and TCR gene copy numbers were measured by quantitative PCR. The number of copies of TCR divided by the number of transgenes per cell is shown as a percentage in PBMC.



Supplemental Figure 4. Tumor responses after TBI-1301 infusion. Chronological CT images from 3 patients (No. 7, 8 and 16). Representative lesions of each patient were shown (red arrow).



Supplemental Table 3. Phenotypic analysis in manufactured T cells

patient No.	1	2	3	7	9	8	14	16	15
Phenotypic analysis in CD8⁺ T cells (%)									
Stem cell-like memory T cell (CD3+/CD45RA+/CCR7+)	34.4	34.5	39.3	40.3	19.0	41.1	30.5	33.5	77.3
Central Memory T cell (CD3+/CD45RA-/CCR7+)	6.2	4.9	7.7	3.7	8.3	5.0	1.8	1.6	1.0
Effector Memory T cell (CD3+/CD45RA-/CCR7-)	8.7	8.6	25.5	5.0	25.4	32.5	5.3	18.0	3.7
Terminal differentiated T cell (CD3+/CD45RA+/CCR7-)	50.8	52.0	27.5	51.0	47.4	21.5	62.4	46.9	18.0
Phenotypic analysis in non-CD8⁺ T cells (%)									
Stem cell-like memory T cell (CD3+/CD45RA+/CCR7+)	34.1	23.3	20.4	12.5	22.9	14.1	27.9	8.1	37.7
Central Memory T cell (CD3+/CD45RA-/CCR7+)	20.9	18.4	27.4	12.1	23.5	28.7	18.1	7.8	18.7
Effector Memory T cell (CD3+/CD45RA-/CCR7-)	20.5	26.8	39.6	52.9	30.6	47.7	34.7	75.8	28.4
Terminal differentiated T cell (CD3+/CD45RA+/CCR7-)	24.5	31.5	12.6	22.5	23.0	9.6	19.3	8.3	15.3

Supplemental Figure 5. NY-ESO-1-specific T cells in the peripheral blood on day 14 from CRS patients show high expression of CD244 compared to circulating NY-ESO-1-specific T cells from non-CRS patients.