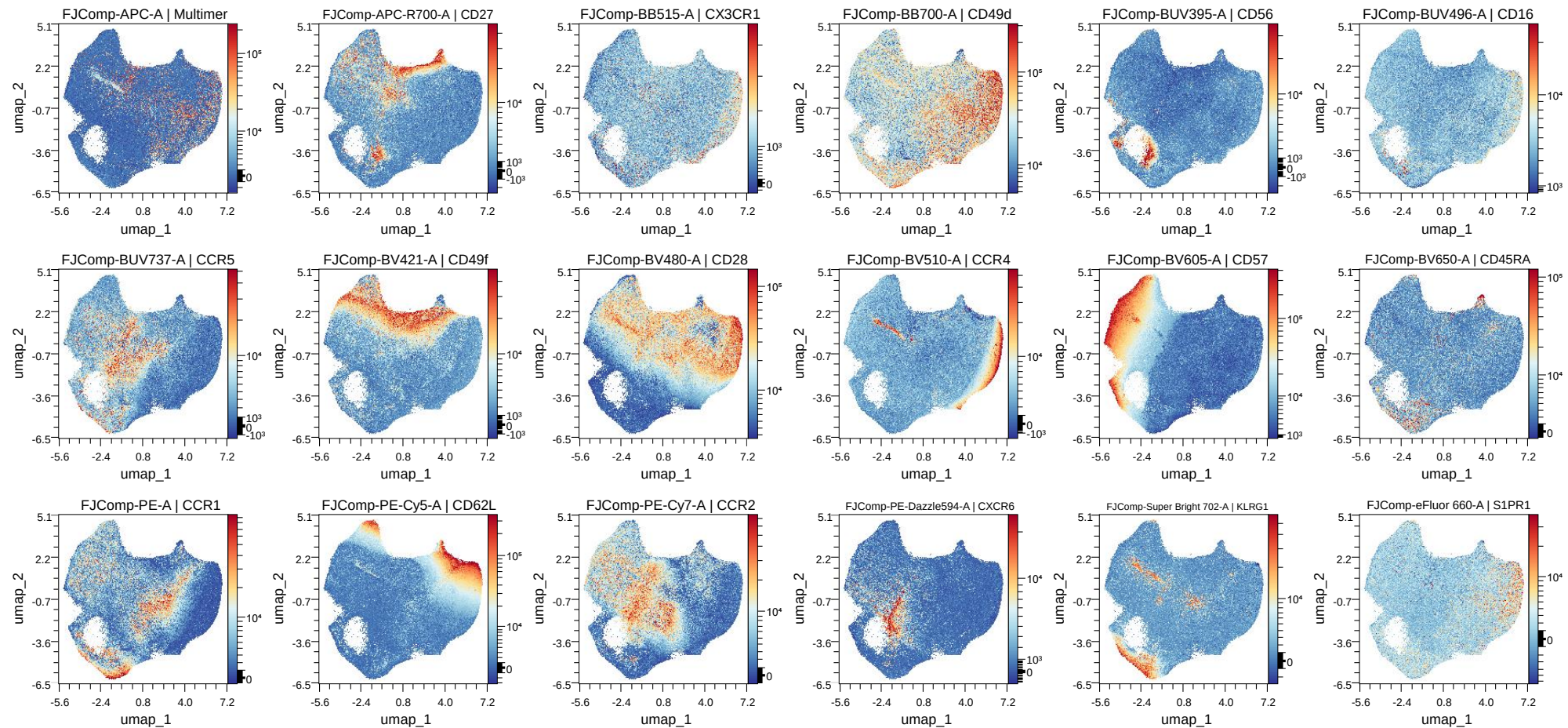
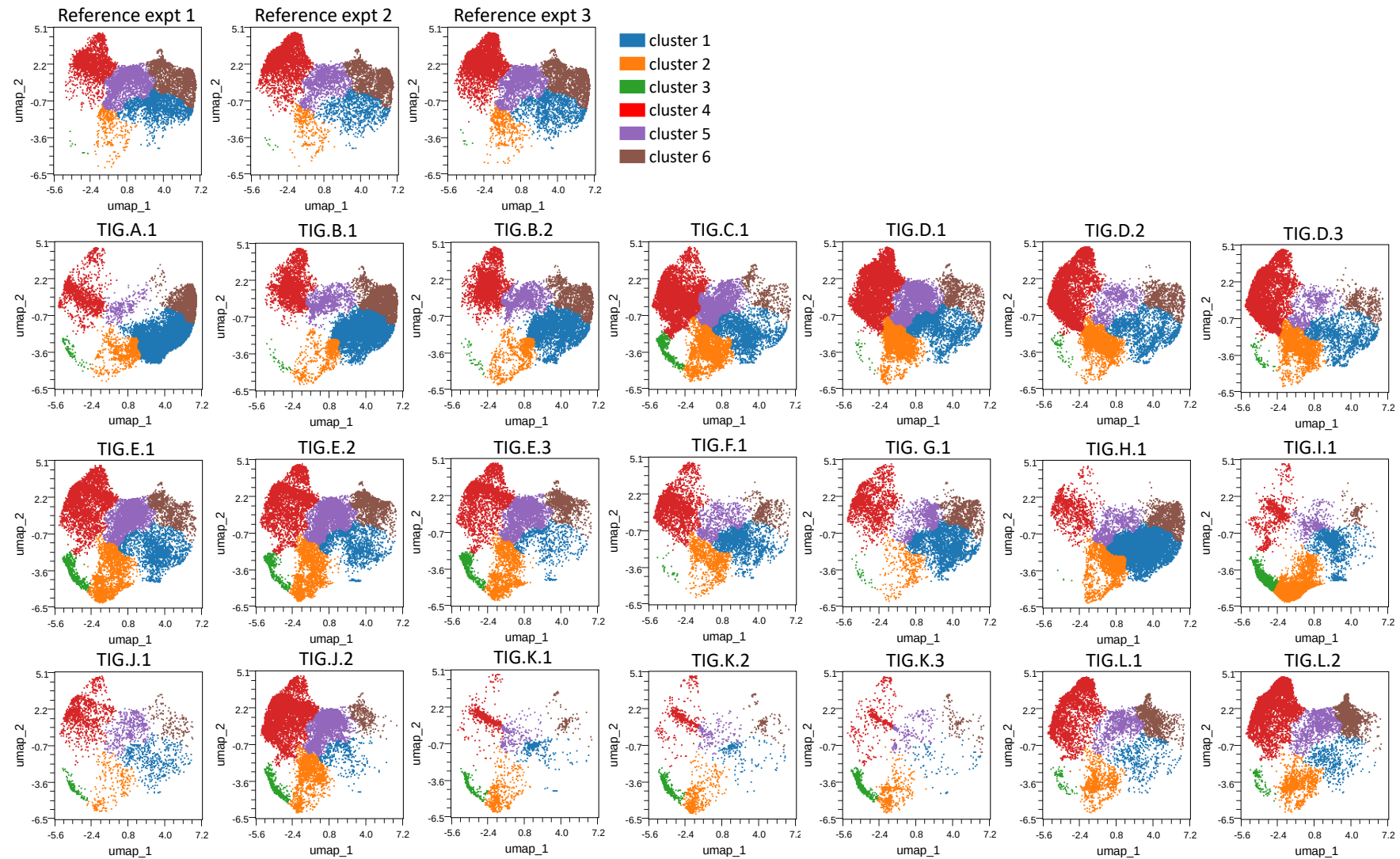
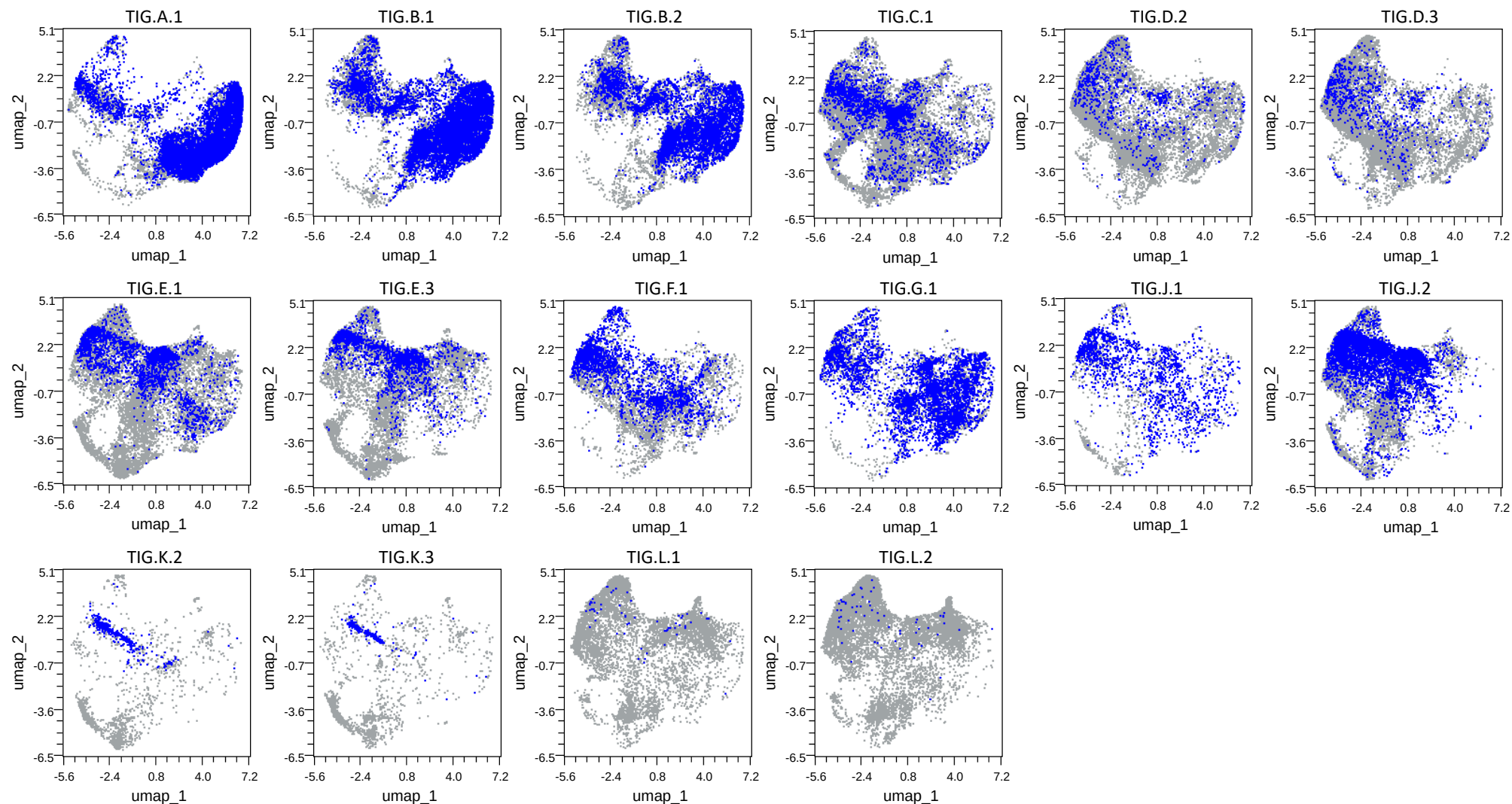




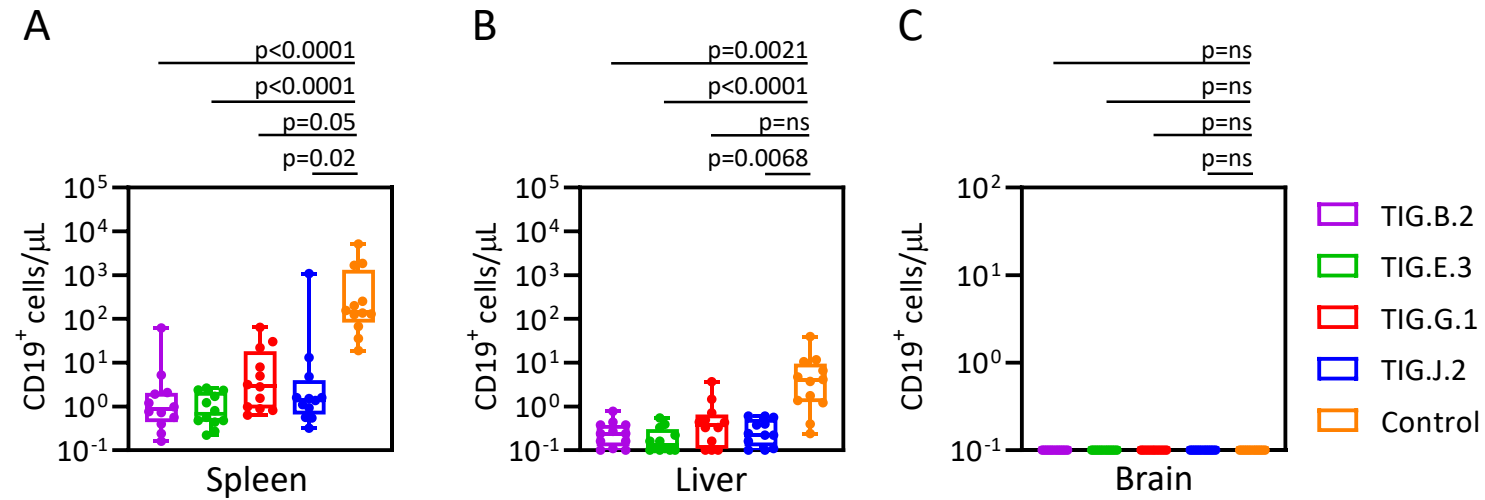
Supplementary Figure 1: T-cell associated marker expression in EBV-specific T cell products. EBV-specific T cell lots (n=21) were assessed for the expression of T-cell associated markers and epitope specificity using MHC-Multimer on a Cytex Aurora. Samples were gated on CD45⁺CD3⁺CD8⁺ viable cells using Flowjo software, then Uniform Manifold Approximation and Projection (UMAP) and FlowSOM clustering analysis performed using OMIQ. Each UMAP plots shows distribution and expression level (low to high expression by colour-scale of blue to red) of various T-cell associated markers on total CD8⁺ T Cells for concatenated ATA188 lots.



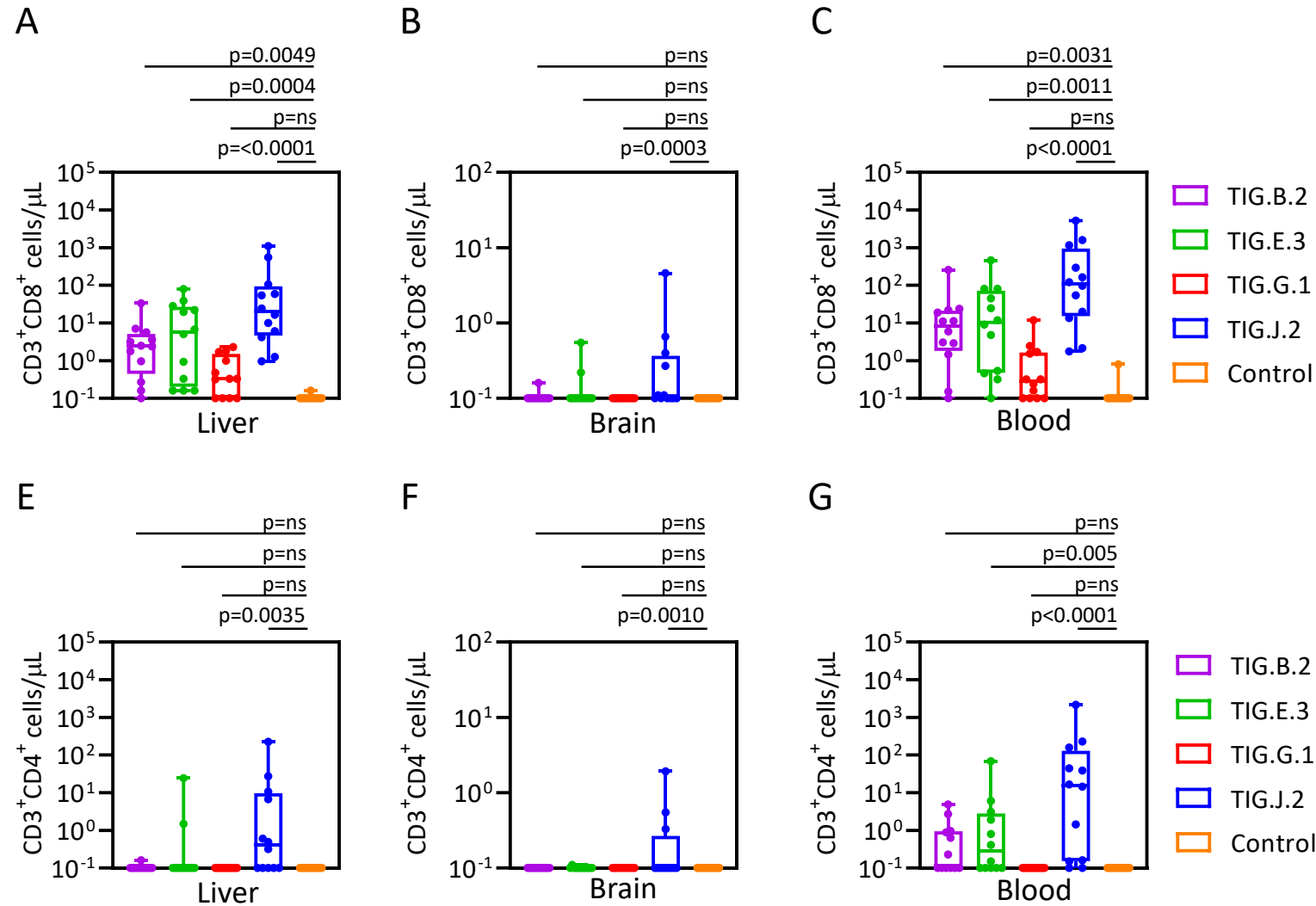
Supplementary Figure 2: Clustering Analysis of EBV-specific T cell Products. UMAP plots showing distribution of FlowSOM clusters C1-C6 on total CD8⁺ T Cells across ATA188 lots (n=21). Samples were gated on CD45⁺CD3⁺CD8⁺ viable cells using Flowjo software, then Uniform Manifold Approximation and Projection (UMAP) and FlowSOM clustering analysis performed using OMIQ.



Supplementary Figure 3: MHC-multimer⁺ T cell distribution in EBV-specific T cell Products. EBV-specific T cell lots (n=21) were assessed for epitope specificity using MHC-Multimer on a Cytex Aurora. Samples were gated on CD45⁺CD3⁺CD8⁺ viable cells using Flowjo software, then Uniform Manifold Approximation and Projection (UMAP) and FlowSOM clustering analysis performed using OMIQ. UMAP plots of ATA188 lots (n=21) showing total CD8⁺ T Cells (Grey) overlaid with MHC-Multimer⁺ CD8⁺ T cells (Blue).



Supplementary Figure 4: B cell frequency in mice following adoptive T cell therapy. Single cell suspensions were prepared from mouse organs and the proportion of human cell populations enumerated using flow cytometry. Data represents the number of CD19⁺ B cells in the spleen (**A**), liver (**B**) and brain (**C**). Box and whisker plots represent median (horizontal line) with minimum to maximum range.



Supplementary Figure 5: Reconstitution of T cells in mice following adoptive T cell therapy. Single cell suspensions were prepared from mouse organs and the proportion of human cell populations enumerated using flow cytometry. Data represents the number of CD8⁺ T cells in the liver (**A**), brain (**B**) and peripheral blood (**C**) or CD4⁺ T cells in the liver (**D**), brain (**E**) and peripheral blood (**F**). Box and whisker plots represent median (horizontal line) with minimum to maximum range.

Supplementary Table 1: List of CD8⁺ T cell epitopes used in this study

Peptide Sequence	HLA-Restriction	Antigen
CLGGLTMV	A*02:01	LMP2
YLLEMLWRL	A*02:01	LMP1
YLQQNWWTL	A*02:01	LMP1
FLYALALL	A*02:01	LMP2
PYLFWLAAI	A*23:01 & A*24:02	LMP2
TYGPVFMCL	A*23:01 & A*24:02	LMP2
RPQKRPSICG	B*07:02	EBNA1
IPQCRLTPL	B*07:02	EBNA1
CPLSKILL	B*08:01	LMP2
YNLRRGTAL	B*08:01	EBNA1
YNLRRGIAL	B*08:01	EBNA1
RRRWRLTV	B*27:05	LMP2
HPVGEADYFEY	B*35:01	EBNA1
IEDPPFNSL	B*40:01	LMP2
IALYLQQNW	B*57:01	LMP1
LSRLPFGMA	B*57:01	EBNA1
FVYGGSKTSL	C*03:03/04	EBNA1

Supplementary Table 2: List of LCL used in the proliferation assay

TIG.C.1						
LCL-AT0021-B958	A*02:01	A*02:01	B*08:01	B*40:01	C*03:04	C*07:01
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-028 -B958	A*24:02	A*24:10	B*38:02	B*40:01	C*03:04	C*07:02
LCL-013-B958	A*11:01	A*24:02	B*13:01	B*35:05	C*03:04	C*04:01
LCL-059-B958	A*03:01	A*23:01	B*07:02	B*08:01	C*07:19	C*07:27
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
TIG.A.1						
LCL-AT0019-B958	A*02:01	A*11:01	B*08:01	B*55:01	C*03:03	C*07:01
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-AT0067-B958	A*24:02	A*24:02	B*15:01	B*15:01	C*03:03	C*03:03
LCL-047-B958	A*03:02	A*24:02	B*27:07	B*35:01	C*04:01	C*15:02
LCL-060-B958	A*24:02	A*29:01	B*07:05	B*39:09	C*07:02	C*15:05
TIG.E.1, TIG.E.2, TIG.E.3						
LCL-027-B958	A*02:01	A*02:01	B*15:01	B*57:01	C*03:03	C*06:02
LCL-AT0021 -B958	A*02:01	A*02:01	B*08:01	B*40:01	C*03:04	C*07:01
LCL-032-B958	A*11:01	A*32:01	B*44:02	B*57:01	C*05:01	C*06:02
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
LCL-044-B958	A*01:01	A*31:01	B*08:01	B*51:01	C*07:01	C*15:02
TIG.G.1						
LCL-038 -B958	A*11:01	A*24:02	B*35:01	B*40:01	C*03:04	C*04:01
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-047-B958	A*03:02	A*24:02	B*27:07	B*35:01	C*04:01	C*15:02
LCL-028-B958	A*24:02	A*24:10	B*38:02	B*40:01	C*03:04	C*07:02
LCL-AT0076-B958	A*68:02	A*68:02	B*08:01	B*57:03	C*03:04	C*07:01
LCL-044 -B958	A*01:01	A*01:01	B*08:01	B*18:01	C*07:01	C*07:02
LCL-041 -B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
TIG.I.1						
LCL-028-B958	A*24:02	A*24:10	B*38:02	B*40:01	C*03:04	C*07:02
LCL-045 -B958	A*02:01	A*29:02	B*40:01	B*44:03	C*03:04	C*16:01
LCL-032-B958	A*11:01	A*32:01	B*44:02	B*57:01	C*05:01	C*06:02
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
TIG.H.1						
LCL-AT0021-B958	A*02:01	A*02:01	B*08:01	B*40:01	C*03:04	C*07:01
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-028-B958	A*24:02	A*24:10	B*38:02	B*40:01	C*03:04	C*07:02
LCL-044-B958	A*01:01	A*31:01	B*08:01	B*51:01	C*07:01	C*15:02
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
TIG.D.1, TIG.D.2, TIG.D.3						
GR060-LCL-MABA	A*03:01	A*32:01	B*47:01	B*08:01	C*06:02	C*07:01
GR053-LCL-MABA	A*11:01	A*11:01	B*40:01	B*40:10	C*04:03	C*07:02
TIG.J.1, TIG.J.2						
LCL-AT0065	A*02:01	A*23:01	B*41:02	B*44:02	C*5:01	C*17:01
LCL-051	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02

LCL-059	A*03:01	A*23:01	B*07:02	B*08:01	C*07:19	C*07:27
LCL-041	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
LCL-029	A*01:01	A*33:03	B*37:01	B*58:01	C*03:02	C*06:02
TIG.K.1, TIG.K.2, TIG.K.3						
LCL-AT0088-B958	A*03:01	A*03:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-044-B958	A*01:01	A*31:01	B*08:01	B*51:01	C*07:01	C*15:02
LCL- 032-B958	A*11:01	A*32:01	B*57:01	B*44:02	C*05:01	C*06:02
TIG.B.1, TIG.B.2						
LCL-AT0021-B958	A*02:01	A*02:01	B*40:01	B*40:01	C*03:04	C*03:04
LCL-040-B958	A*02:01	A*02:01	B*35:08	B*57:01	C*04:01	C*06:02
LCL-066-B958	A*11:01	A*11:01	B*40:01	B*40:10	C*04:03	C*07:02
LCL-013-B958	A*11:01	A*24:02	B*13:01	B*35:05	C*03:04	C*04:01
LCL-060-B958	A*24:02	A*29:01	B*07:05	B*39:09	C*07:02	C*15:05
LCL-047 -B958	A*03:02	A*24:02	B*27:07	B*35:01	C*04:01	C*15:02
TIG.F.1						
LCL-AT0087-B958	A*11:01	A*24:02	B*07:02	B*35:01	C*04:01	C*07:02
LCL-AT0092-B958	A*03:01	A*11:01	B*15:01	B*35:01	C*03:03	C*04:01
LCL-027-B958	A*02:01	A*02:01	B*15:01	B*57:01	C*03:03	C*06:02
LCL-029-B958	A*01:01	A*33:03	B*37:01	B*58:01	C*03:02	C*06:02
TIG.L.1, TIG.L.2						
LCL-007-B958	A*02:01	A*11:01	B*13:02	B*27:05	C*01:02	C*06:02
LCL-028 -B958	A*24:02	A*24:10	B*38:02	B*40:01	C*03:04	C*07:02
LCL-AT0021-B958	A*02:01	A*02:01	B*08:01	B*40:01	C*03:04	C*07:01
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01

Red bolded HLA types correspond to alleles through which T-cell responses were detected

Supplementary Table 3: List of LCL used in the cytotoxicity assay

TIC.C.1						
LCL-045-B958	A*02:01	A*29:02	B*40:01	B*44:03	C*03:04	C*16:01
LCL-064-B958	A*02:01	A*02:05	B*51:01	B*52:01	C*04:01	C*12:02
LCL-042-B958	A*11:01	A*31:01	B*15:01	B*40:01	C*03:03	C*07:02
LCL-013-B958	A*11:01	A*24:02	B*13:01	B*35:05	C*03:04	C*04:01
LCL-008-B958	A*03:01	A*23:01	B*35:01	B*44:03	C*04:01	C*04:01
LCL-024-B958	A*01:01	A*23:01	B*08:01	B*44:03	C*04:01	C*07:01
TIG.A.1						
LCL-AT0019-B958	A*02:01	A*11:01	B*08:01	B*55:01	C*03:03	C*07:01
LCL-022-B958	A*02:01	A*32:01	B*15:01	B*44:02	C*05:01	C*05:01
LCL-024-B958	A*01:01	A*23:01	B*08:01	B*44:03	C*04:01	C*07:01
LCL-AT0067-B958	A*24:02	A*24:02	B*15:01	B*15:01	C*03:03	C*03:03
LCL-060-B958	A*24:02	A*29:01	B*07:05	B*39:09	C*07:02	C*15:05
LCL-047-B958	A*03:02	A*24:02	B*27:07	B*35:01	C*04:01	C*15:02
TIG.E.1, TIG.E.2, TIG.E.3						
LCL-027-B958	A*02:01	A*02:01	B*15:01	B*57:01	C*03:03	C*06:02
LCL-022-B958	A*02:01	A*32:01	B*15:01	B*44:02	C*05:01	C*05:01
LCL-032-B958	A*11:01	A*32:01	B*44:02	B*57:01	C*05:01	C*06:02
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
LCL-036-B958	A*23:01	A*24:02	B*27:07	B*41:01	C*15:02	C*17:01
TIG.G.1						
LCL-038-B958	A*11:01	A*24:02	B*35:01	B*40:01	C*03:04	C*04:01
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-047-B958	A*03:02	A*24:02	B*27:07	B*35:01	C*04:01	C*15:02
LCL-042-B958	A*11:01	A*31:01	B*15:01	B*40:01	C*03:03	C*07:02
LCL-044-B958	A*01:01	A*31:01	B*08:01	B*51:01	C*07:01	C*15:02
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
TIG.I.1						
LCL-028-B958	A*24:02	A*24:10	B*38:02	B*40:01	C*03:04	C*07:02
LCL-045-B958	A*02:01	A*29:02	B*40:01	B*44:03	C*03:04	C*16:01
LCL-064-B958	A*02:01	A*02:05	B*51:01	B*52:01	C*04:01	C*12:02
LCL-065-B958	A*11:01	A*24:17	B*15:02	B*37:01	C*06:02	C*08:01
TIG.H.1						
LCL-AT0021-B958	A*02:01	A*02:01	B*08:01	B*40:01	C*03:04	C*07:01
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-028-B958	A*24:02	A*24:10	B*38:02	B*40:01	C*03:04	C*07:02
LCL-044-B958	A*01:01	A*31:01	B*08:01	B*51:01	C*07:01	C*15:02
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
TIG.D.1, TIG.D.2, TIG.D.3						
GR060-LCL-MABA	A*03:01	A*32:01	B*47:01	B*08:01	C*06:02	C*07:01
GR053-LCL-MABA	A*11:01	A*11:01	B*40:01	B*40:10	C*04:03	C*07:02
TIG.J.1, TIG.J.2						
LCL-AT0065	A*02:01	A*23:01	B*41:02	B*44:02	C*5:01	C*17:01
LCL-051-B958	A*02:01	A*02:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-033-B958	A*23:01	A*25:01	B*18:01	B*49:01	C*07:01	C*12:03

LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
LCL-029 -B958	A*01:01	A*33:03	B*37:01	B*58:01	C*03:02	C*06:02
TIG.K.1, TIG.K.2						
LCL-AT0088-B958	A*03:01	A*03:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-059-B958	A*03:01	A*23:01	B*07:02	B*08:01	C*07:19	C*07:27
LCL- 013-B958	A*11:01	A*24:02	B*13:01	B*35:05	C*03:04	C*04:01
LCL-044-B958	A*01:01	A*31:01	B*08:01	B*51:01	C*07:01	C*15:02
TIG.B.1, TIG.B.2						
LCL-AT0021-B958	A*02:01	02:01	08:01	40:01	03:04	07:01
LCL-064-B958	A*02:01	A*02:05	B*51:01	B*52:01	C*04:01	C*12:02
LCL-042-B958	A*11:01	A*31:01	B*15:01	B*40:01	C*03:03	C*07:02
LCL-032-B958	A*11:01	A*32:01	B*44:02	B*57:01	C*05:01	C*06:02
LCL-065 -B958	A*11:01	A*24:17	B*15:02	B*37:01	C*06:02	C*08:01
TIG.F.1						
LCL-038-B958	A*11:01	A*24:02	B*35:01	B*40:01	C*03:04	C*04:01
LCL-032-B958	A*11:01	A*32:01	B*44:02	B*57:01	C*05:01	C*06:02
LCL-027-B958	A*02:01	A*02:01	B*15:01	B*57:01	C*03:03	C*06:02
LCL-041-B958	A*01:01	A*01:01	B*08:01	B*08:01	C*07:01	C*07:01
TIG.L.2						
LCL-007-B958	A*02:01	A*11:01	B*13:02	B*27:05	C*01:02	C*06:02
LCL-EE -B958	A*24:02	A*24:02	B*18:01	B*55:01	C*03:03	C*07:01
LCL-022-B958	A*02:01	A*32:01	B*15:01	B*44:02	C*05:01	C*05:01
LCL-AT0019-B958	A*02:01	A*11:01	B*08:01	B*55:01	C*03:03	C*07:01
TIG.K.3						
LCL-AT0088-B958	A*03:01	A*03:01	B*07:02	B*07:02	C*07:02	C*07:02
LCL-059-B958	A*03:01	A*23:01	B*07:02	B*08:01	C*07:19	C*07:27
LCL-013 -B958	A*11:01	A*24:02	B*13:01	B*35:05	C*03:04	C*04:01
LCL-044-B958	A*01:01	A*31:01	B*08:01	B*51:01	C*07:01	C*15:02

Supplementary Table 4: List of antibodies used for polychromatic T-cell phenotype analysis

Marker	Fluorochrome	Clone	Supplier
CD56	BUV395	NCAM16.2	Becton Dickinson
CD16	BUV496	3G8	Becton Dickinson
CD4	BUV563	SK3	Becton Dickinson
CD3	BUV661	UCHT1	Becton Dickinson
CCR5	BUV737	2D7/CCR5	Becton Dickinson
CD45	BUV805	HI30	Becton Dickinson
CD49f	BV421	GoH3	Biolegend
CD19	eF450	HIB19	Life Technologies
CD28	BV480	CD28.2	Becton Dickinson
CCR4	BV510	L291H4	Biolegend
CD57	BV605	QA17A04	Biolegend
CD45RA	BV650	HI100	Biolegend
KLRG1	SB702	13F12F2	Life Technologies
CD14	BV750	63D3	Biolegend
CD8	SB780	RPA-T8	Life Technologies
CX3CR1	BB515	2A9-1	Becton Dickinson
CD49d	BB700	9F10	Becton Dickinson
CCR1	PE	5F10B29	Biolegend
CXCR6	PE-Dazzle594	K041E5	Biolegend
CD62L	PE-Cy5	DREG-56	Life Technologies
CCR2	PE-Cy7	K036C2	Biolegend
Multimer	APC	N/A	Immudex/Various
S1PR1	eF660	SW4GYPP	Life Technologies
CD27	APC-R700	M-T271	Becton Dickinson
Live/Dead	NIR	N/A	Life Technologies

Supplementary Table 5: List of EBV-specific MHC-Multimers used in this study

Peptide Sequence	HLA-Restriction	Lots used to test
CLGGLLTMV	A*02:01	A.1, B.1, B.2, C.1, E.1, E.2, E.3, G.1, H.1, J.1, J.2
YLLEMLWRL	A*02:01	A.1, B.1, B.2, C.1, E.1, E.2, E.3, G.1, H.1, J.1, J.2
YLQQNWWTL	A*02:01	A.1, B.1, B.2, C.1, E.1, E.2, E.3, G.1, H.1, J.1, J.2
FLYALALLL	A*02:01	A.1, B.1, B.2, C.1, E.1, E.2, E.3, G.1, H.1, J.1, J.2
PYLFWLAAI	A*23:02	J.1, J.2
TYGPVFMCL	A*24:01	L.1, L.2
RPQKRPSICGC	B*07:02	K.1, K.2, K.3
YNLRRGIAL	B*08:01	D.1, D.2, D.3
HPVGEADYFEY	B*35:01	F.1, G.1
IEDPPFNSL	B*40:01	C.1, G.1

Supplementary Table 6: Summary of TRBV CDR3 sequencing data

sample name	Total templates	Productive templates	Fraction productive	Total rearrangements	Productive rearrangements
TIG.A PBMC CD8+	344528	300170	0.8712	49632	40735
TIG.B PBMC CD8+	331938	276141	0.8319	149523	122106
TIG.C PBMC CD8+	270732	210977	0.7793	100282	79940
TIG.D PBMC CD8+	289040	241303	0.8348	136542	110443
TIG.E PBMC CD8+	268966	209091	0.7774	120422	95804
TIG.G PBMC CD8+	233500	192810	0.8257	130825	106866
TIG.H PBMC CD8+	375182	299930	0.7994	230884	186353
TIG.I PBMC CD8+	224382	177771	0.7923	135931	110598
TIG.J PBMC CD8+	149353	123420	0.8264	63937	52436
TIG.K PBMC CD8+	149625	122751	0.8204	84332	70278
TIG.C.1 CD8+	182274	133497	0.7324	4824	3702
TIG.C.1 IFN- γ +TNF+	31706	26020	0.8207	641	448
TIG.A.1 CD8+	18447	15086	0.8178	623	461
TIG.A.1 IFN- γ +TNF+	1319	1047	0.7938	87	60
TIG.E.1 CD8+	13741	11377	0.828	1192	886
TIG.E.1 IFN- γ +TNF+	46804	34567	0.7385	1142	804
TIG.G.1 CD8+	4200	3174	0.7557	371	260
TIG.G.1 IFN- γ +TNF+	889	723	0.8133	136	89
TIG.I.1 CD8+	107191	81913	0.7642	2471	1844
TIG.I.1 IFN- γ +TNF+	21815	15012	0.6882	194	129
TIG.H.1 CD8+	60637	43569	0.7185	1368	977
TIG.H.1 IFN- γ +TNF+	97381	61811	0.6347	771	467
TIG.D.1 CD8+	238696	162330	0.6801	5065	3932
TIG.D.1 IFN- γ +TNF+	12006	11651	0.9704	125	79
TIG.J.1 CD8+	23320	16646	0.7138	1597	1225
TIG.J.1 IFN- γ +TNF+	4091	2909	0.7111	632	489
TIG.E.2 CD8+	99377	81190	0.817	4110	3152
TIG.E.2 IFN- γ +TNF+	56184	42242	0.7519	765	548
TIG.K.1 CD8+	22484	19879	0.8841	3719	2981
TIG.K.1 IFN- γ +TNF+	2609	2553	0.9785	91	52
TIG.B.1 CD8+	116213	91124	0.7841	3094	2276
TIG.B.1 IFN- γ +TNF+	41848	34122	0.8154	824	549
TIG.B.2 CD8+	55985	44003	0.786	2855	2128
TIG.B.2 IFN- γ +TNF+	31289	25365	0.8107	747	502
TIG.J.2 CD8+	2849	2142	0.7518	531	407
TIG.J.2 IFN- γ +TNF+	46297	30833	0.666	489	323
TIG.D.2 CD8+	172848	118821	0.6874	3485	2517
TIG.D.2 IFN- γ +TNF+	33997	32831	0.9657	593	471
TIG.D.3 CD8+	165983	113330	0.6828	3282	2402
TIG.D.3 IFN- γ +TNF+	29565	28386	0.9601	271	193
TIG.E.3 CD8+	67844	55429	0.817	3898	2893
TIG.E.3 IFN- γ +TNF+	8185	6026	0.7362	351	243
TIG.K.2 CD8+	40198	35067	0.8724	5169	4152
TIG.K.2 IFN- γ +TNF+	7320	7244	0.9896	137	95

