

Supplementary Figure 1. TCR_{MCC1} is neither self- nor alloreactive

a IFN γ production of CD8 T_{TCR-MCC1} cells upon coculture with T2 cells loaded with alanine mutants of LTA_{g15-23}. Positive cell frequency was normalized by the mean values of unmutated LTA_{g15-23}. **b** IFN γ production of CD8 T_{TCR-MCC1} cells upon coculture with T2 cells loaded with indicated self-peptides that has a similar sequence to that of LTA_{g15-23}. LTA_{g15-23} was used as a positive control. **c** Dermal fibroblasts expressing HLA-A2 and ABCG2. **d** IFN γ production of CD8

T_{TCR-MCC1} cells upon coculture with indicated human dermal fibroblasts. **e** IFN γ production of CD8 T_{TCR-MCC1} cells upon coculture with indicated LCLs. LTA₁₅₋₂₃-loaded T2 cells was used as a positive control.

Supplementary Figure 2. IFN γ upregulates HLA on MCC cell lines.

a HLA-A2 expression on WaGa cells measured after a 3-day culture with the indicated reagents. **b** NeonGreen expression frequency in Jurkat reporter cells after overnight coculture with WaGa cells pre-treated as in (a). **c** In vitro coculture assay using TCR_{MCC1}-transduced primary CD8+ T cells against WaGa cells with or without 3-day pre-treatment with 10 ng/mL IFN γ . **d** HLA-A2 expression on MCC cell lined with the indicated pre-treatment.

Supplementary Figure 3. Clinical trial scheme.

Supplementary Figure 4. LDC increased serum concentrations of IL-15 and IL-7.

Supplementary Figure 5. T_{TCR-MCC1} infiltration and T cell phenotypes in tumor.

a CD3/WPRE IHC in Pt 3 infusion 1 day 56 tumor. **b** TCR_{MCC1} transcript expression on the UMAP embedding. **c** Heatmap showing expression of top-10 marker genes for T cell sub-clusters. **d** Representative marker genes expression for T cell sub-clusters on the UMAP embedding.

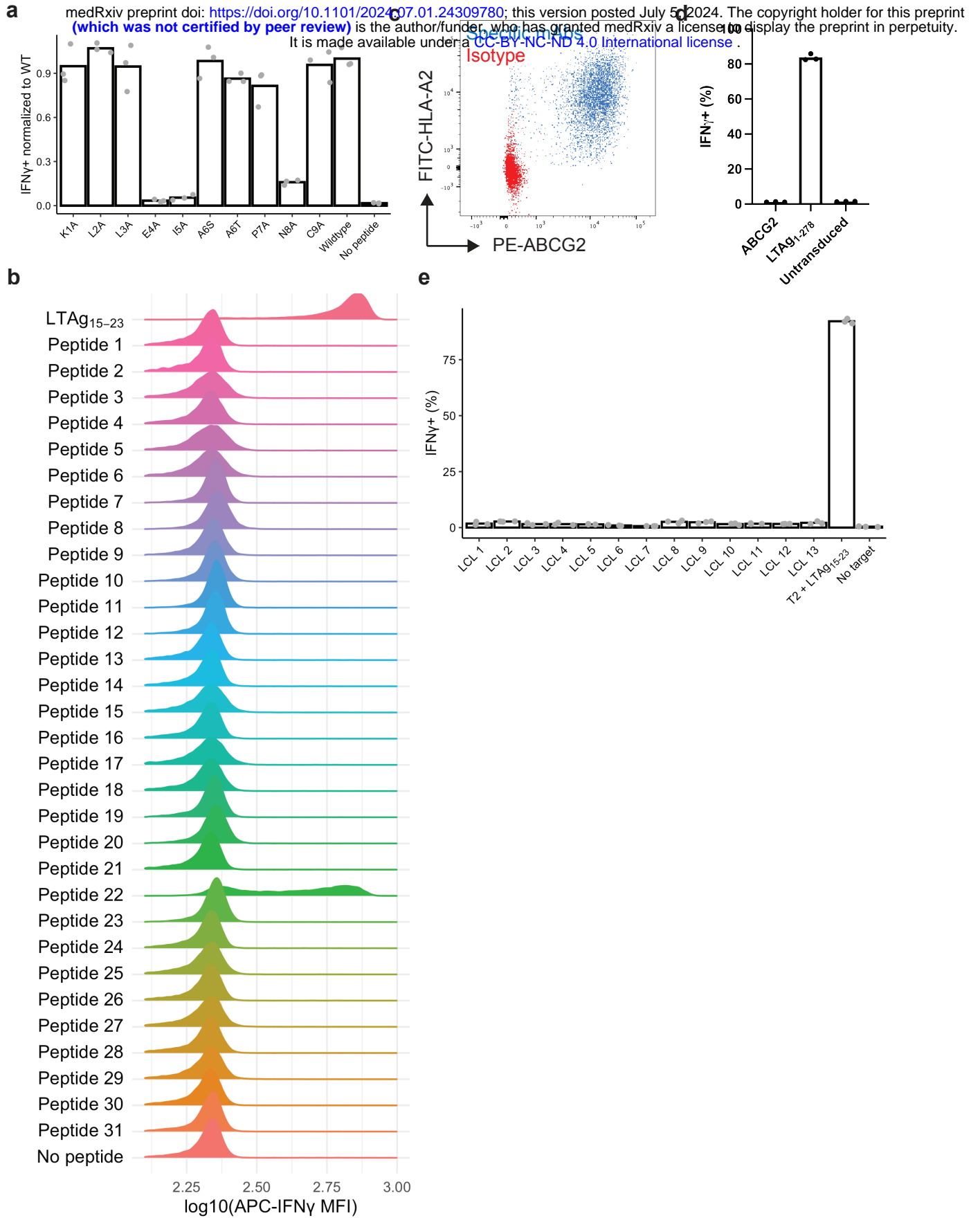
Supplementary Figure 6. Heatmaps of marker genes for cell clusters identified in Pt 6 tumor.

a, b Marker gene heatmaps for major cell types (a) and T/NK sub-clusters (b).

Supplementary Figure 7. Pt 6 old infusion clonotype and T_{TCRMCC1} cells show distinct phenotypes in tumor.

a Clonotypes in the Pt 6 old infusion product targeting sTA_{g83-91}. **b** Distribution of old infusion clonotypes specific to LTA_{g15-23} projected on the UMAP. **c** Expression of *PDCD1* and *LAG3*, two marker genes of the T cell sub-cluster “2: T, late activated.” **d** TCR_{MCC1} transcript expression on the UMAP embedding. **e** Frequency of T_{TCR-MCC1} cells in T cell sub-clusters in Pt 6 tumor.

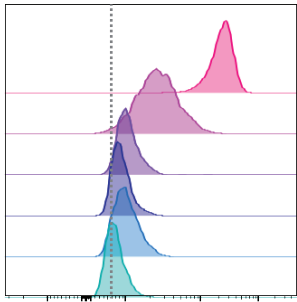
Supplementary Figure 1



Supplementary Figure 2

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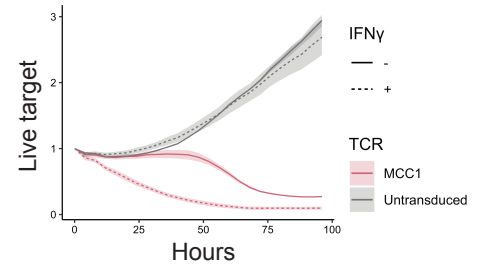
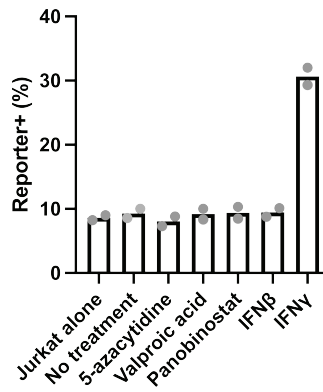
a



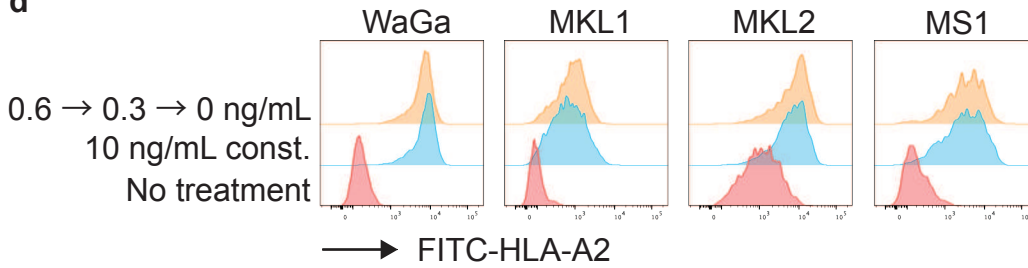
IFN γ 10 ng/mL
IFN β 100 ng/mL
Valproic acid 250 μ M
Panobinostat 1 nM
5-azacytidine 10 μ M
No treatment

→ FITC-HLA-A2

b

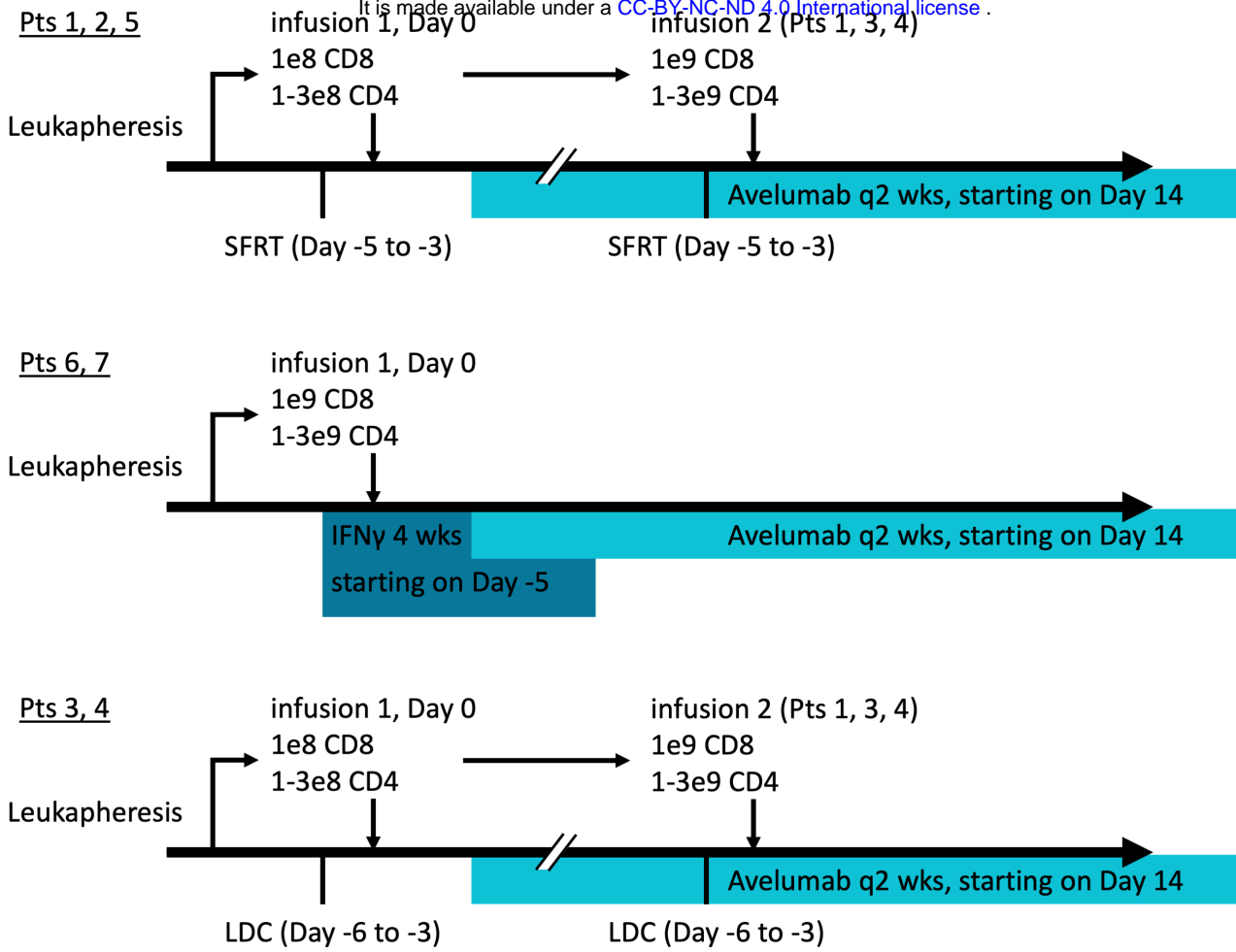


d



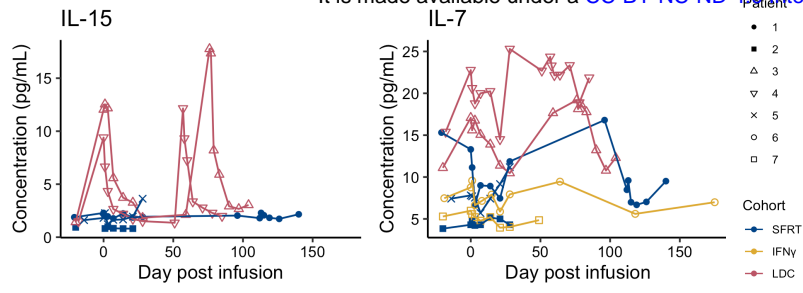
Supplementary Figure 3

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Supplementary Figure 4

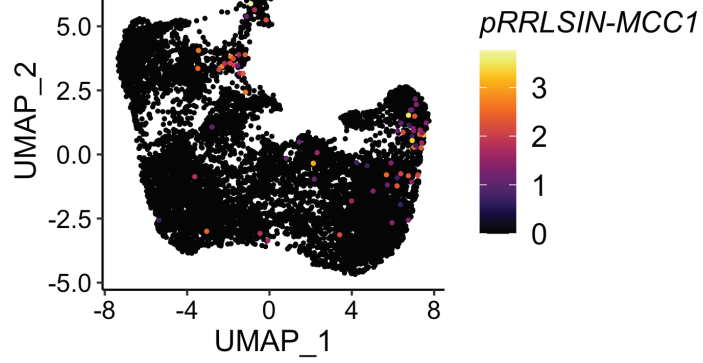
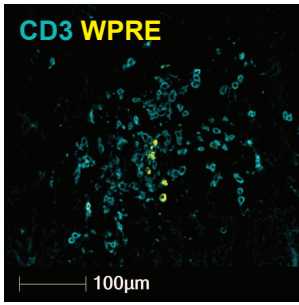
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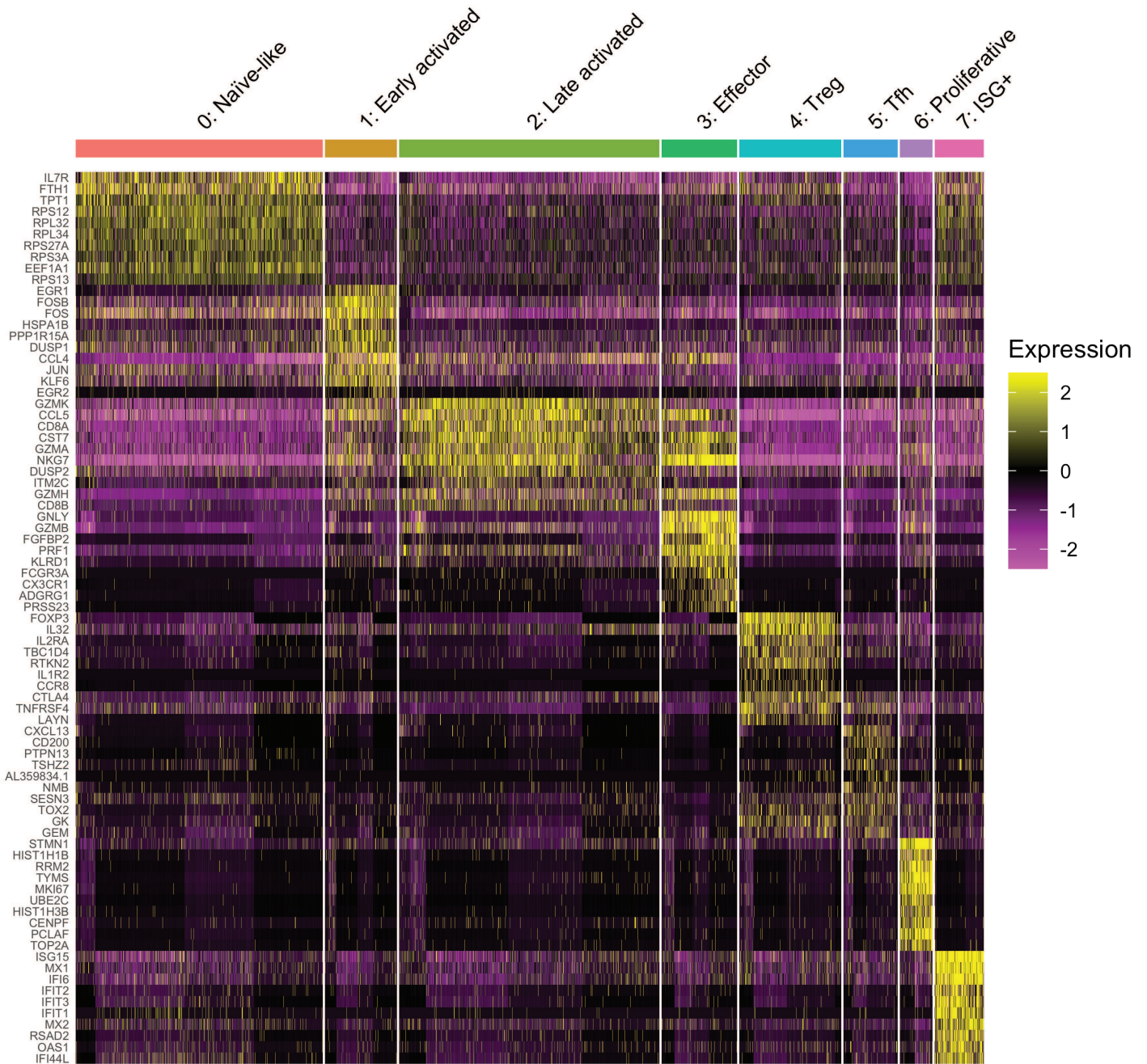
Supplementary Figure 5

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a



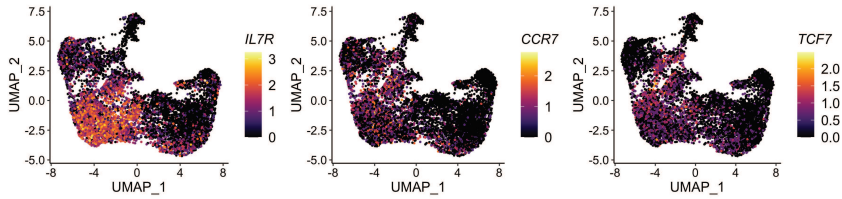
c



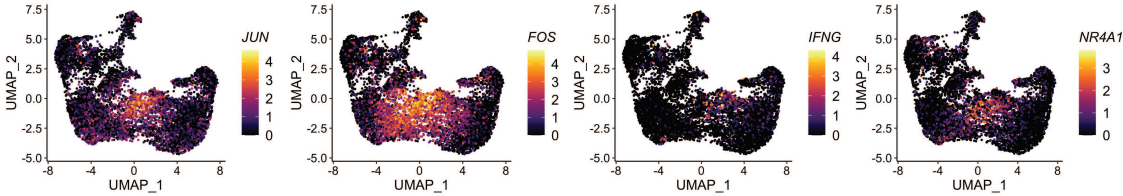
Supplementary Figure 5 (continued)

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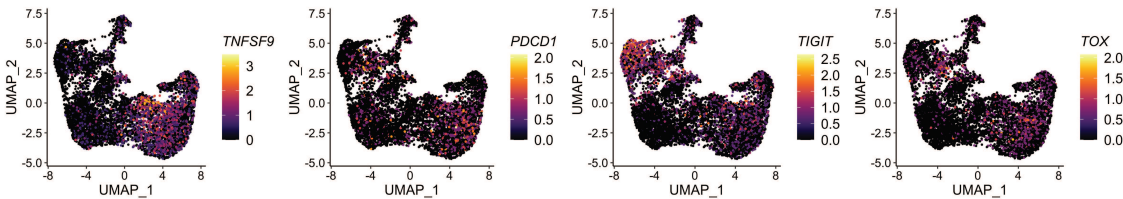
0: Naïve-like



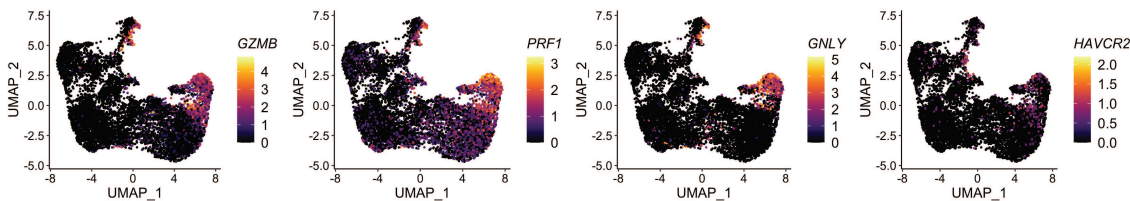
1: Early activated



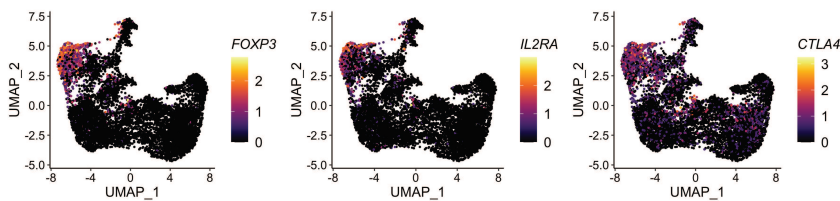
2: Late activated



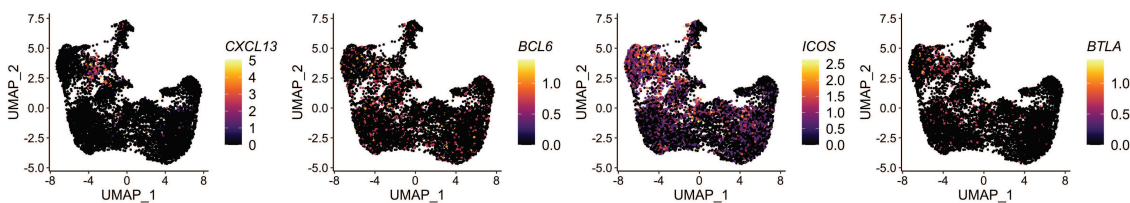
3: Effector



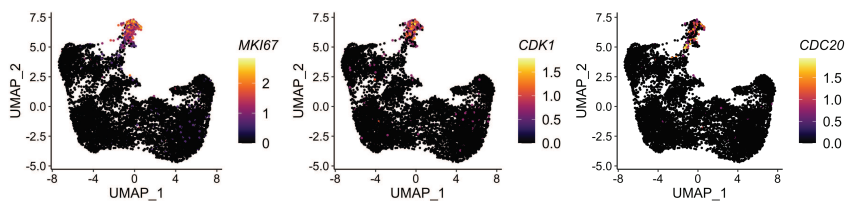
4: Treg



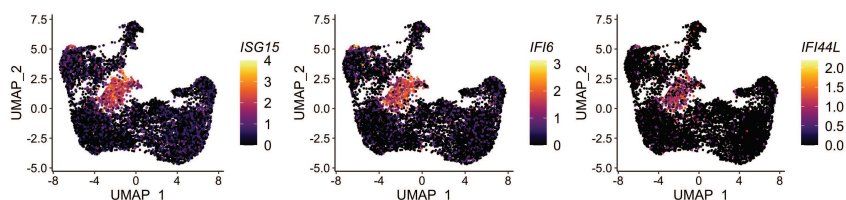
5: Tfh



6: Proliferative



7: ISG+



Supplementary Figure 7

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