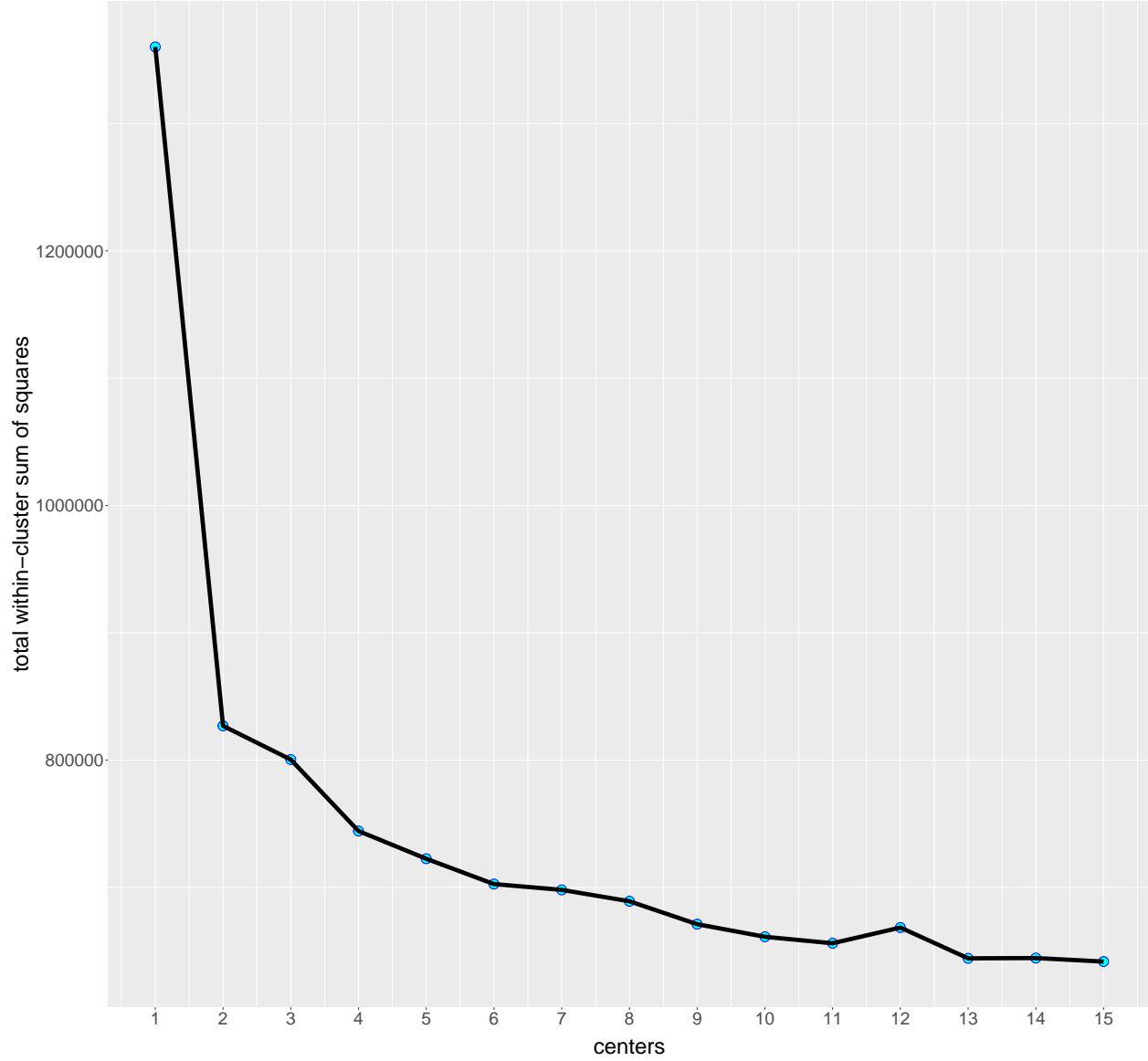


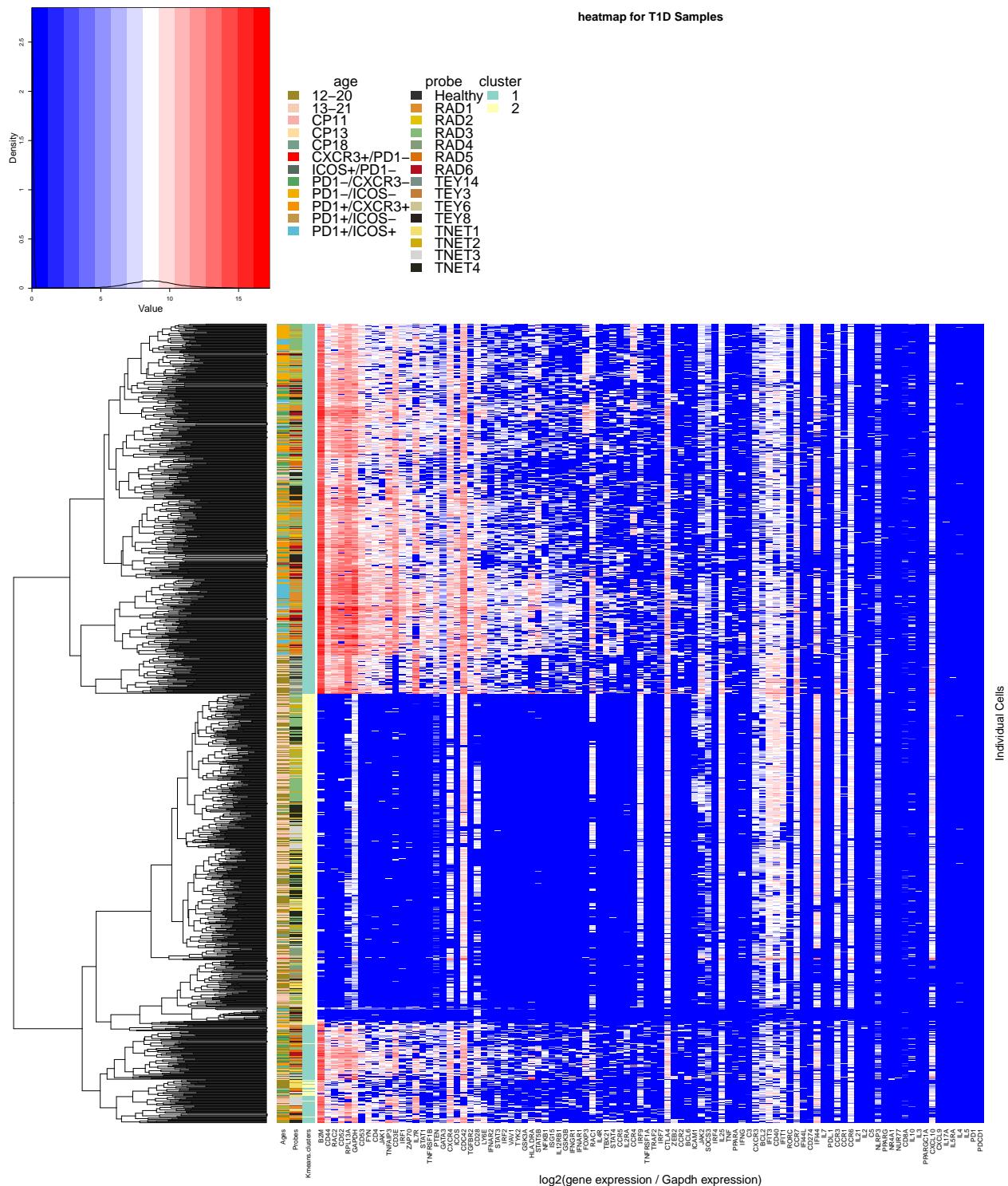
T1D_analysis

```
No expression detected in 5/1291 cells
```

```
ctNorm[is.na(ctNorm)] <- 0
```

kmeans scree plot





[1]

[1]

[1] Patient vs. Cluster

	probe_Healthy	probe_RAD1	probe_RAD2	probe_RAD3	probe_RAD4	probe_RAD5	probe_RAD6	probe_TEY3	probe_TEY6	probe_TEY8
cluster_1	14	152	43	140	9					
cluster_2	0	10	5	143	36					

```

cluster_1      91       75       12       21       32
cluster_2      3        1        8        4        6
    probe_TEY14 probe_TNET1 probe_TNET2 probe_TNET3 probe_TNET4
cluster_1      30       15       5        28       64
cluster_2      0        61       89       65       124

```

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)

```

data:  probeTable
X-squared = 521.83, df = NA, p-value = 0.0004998

```

```

[1]
[1]
[1] Cohort vs. Cluster
    cellSource_Child cellSource_Adult cellSource_Risk
cluster_1          510            95           112
cluster_2          198            18            339
    cellSource_Healthy
cluster_1          14
cluster_2          0

```

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)

```

data:  sourceTable
X-squared = 299.74, df = NA, p-value = 0.0004998

```

```

[1]
[1]
[1] Marker vs. Cluster
    age_PD1+/ICOS+ age_PD1-/CXCR3- age_PD1-/ICOS- age_CP18 age_CP11
cluster_1          140            125            150            1           15
cluster_2           9             13              7            23           40
    age_PD1+/CXCR3+ age_13-21 age_12-20 age_PD1+/ICOS-
cluster_1          115            64              75            22
cluster_2           6            196            222            13
    age_ICOS+/PD1- age_CP13 age_CXCR3+/PD1-
cluster_1          14              2              8
cluster_2           2            22              2

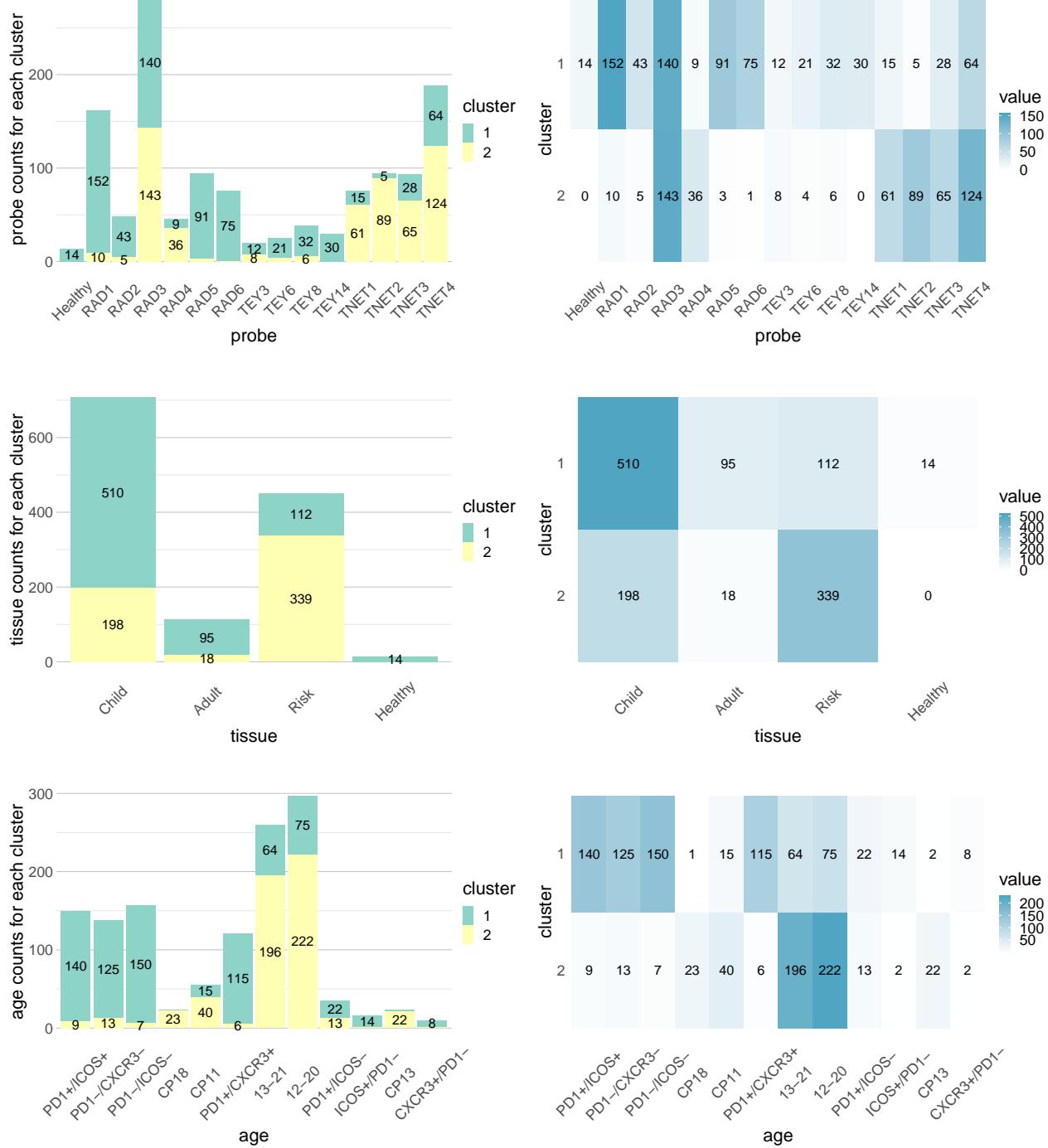
```

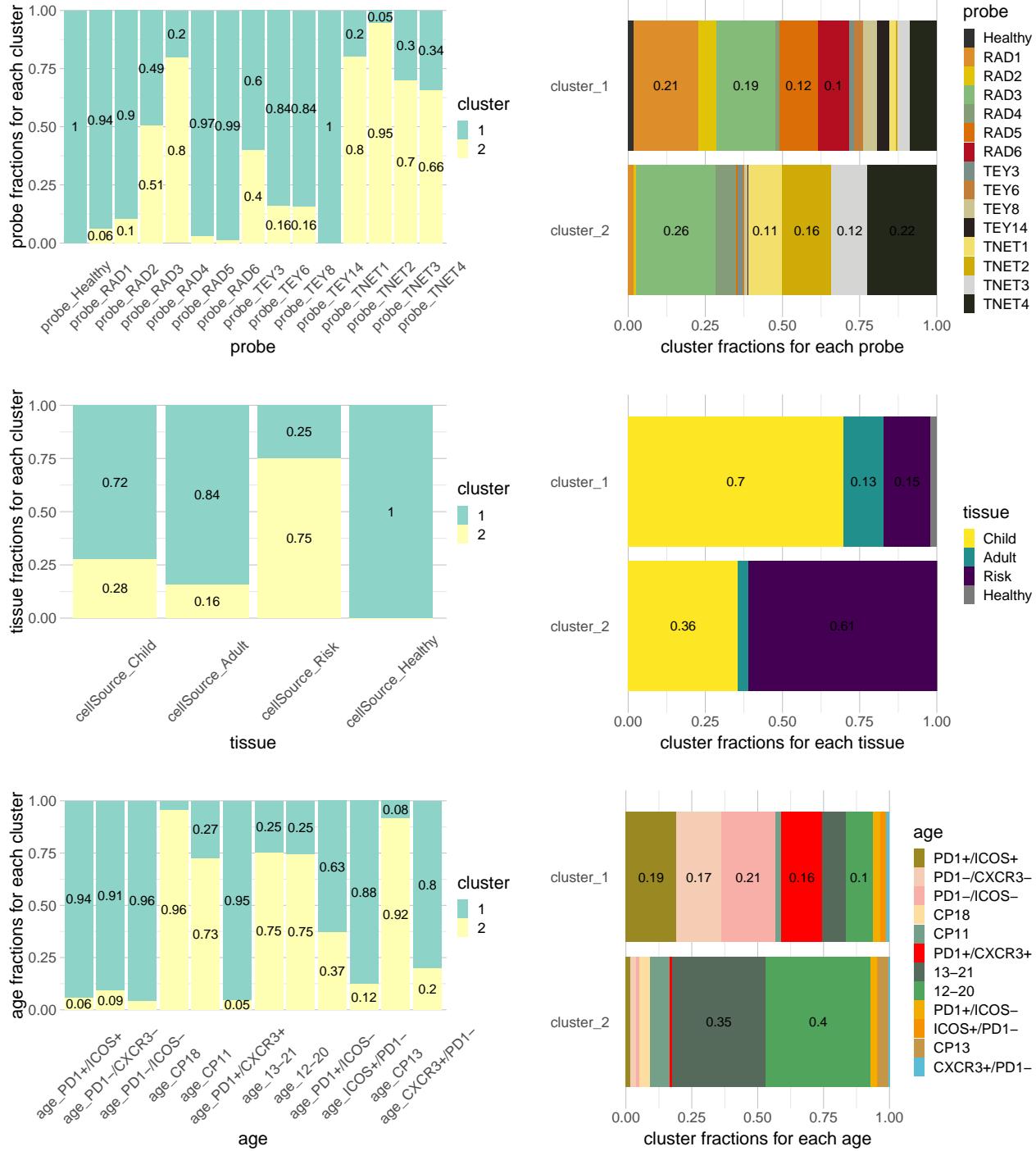
Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)

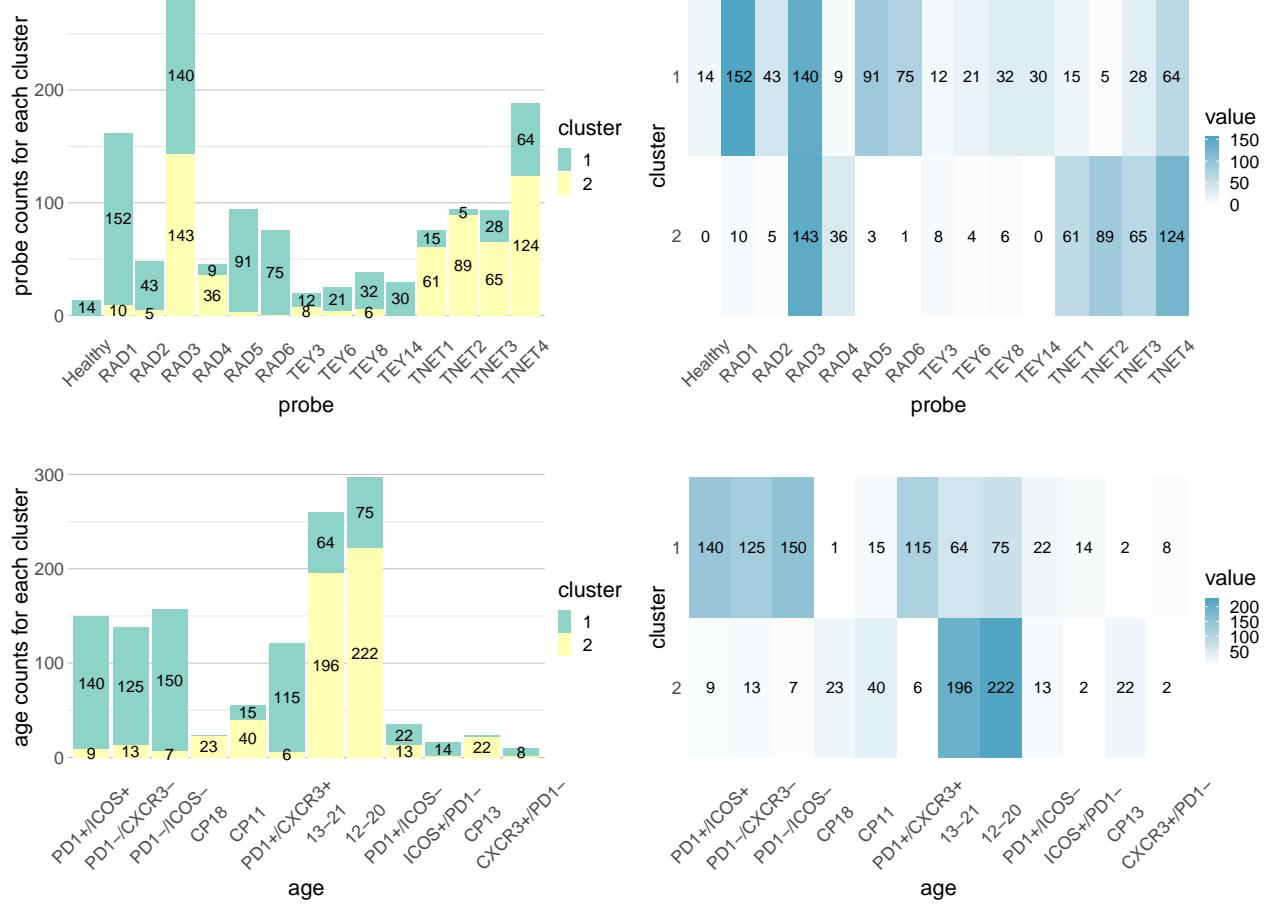
```

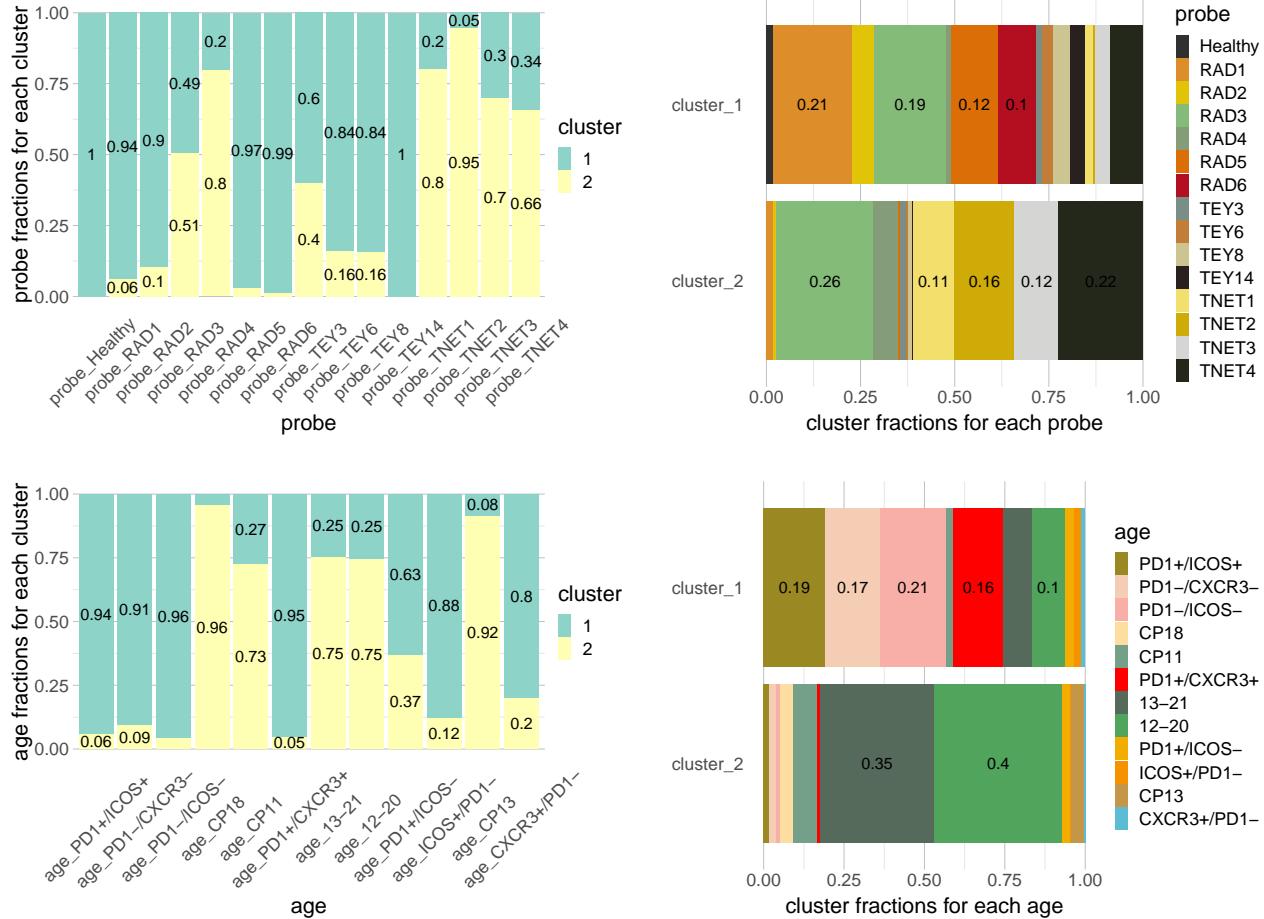
data:  ageTable
X-squared = 625.02, df = NA, p-value = 0.0004998

```

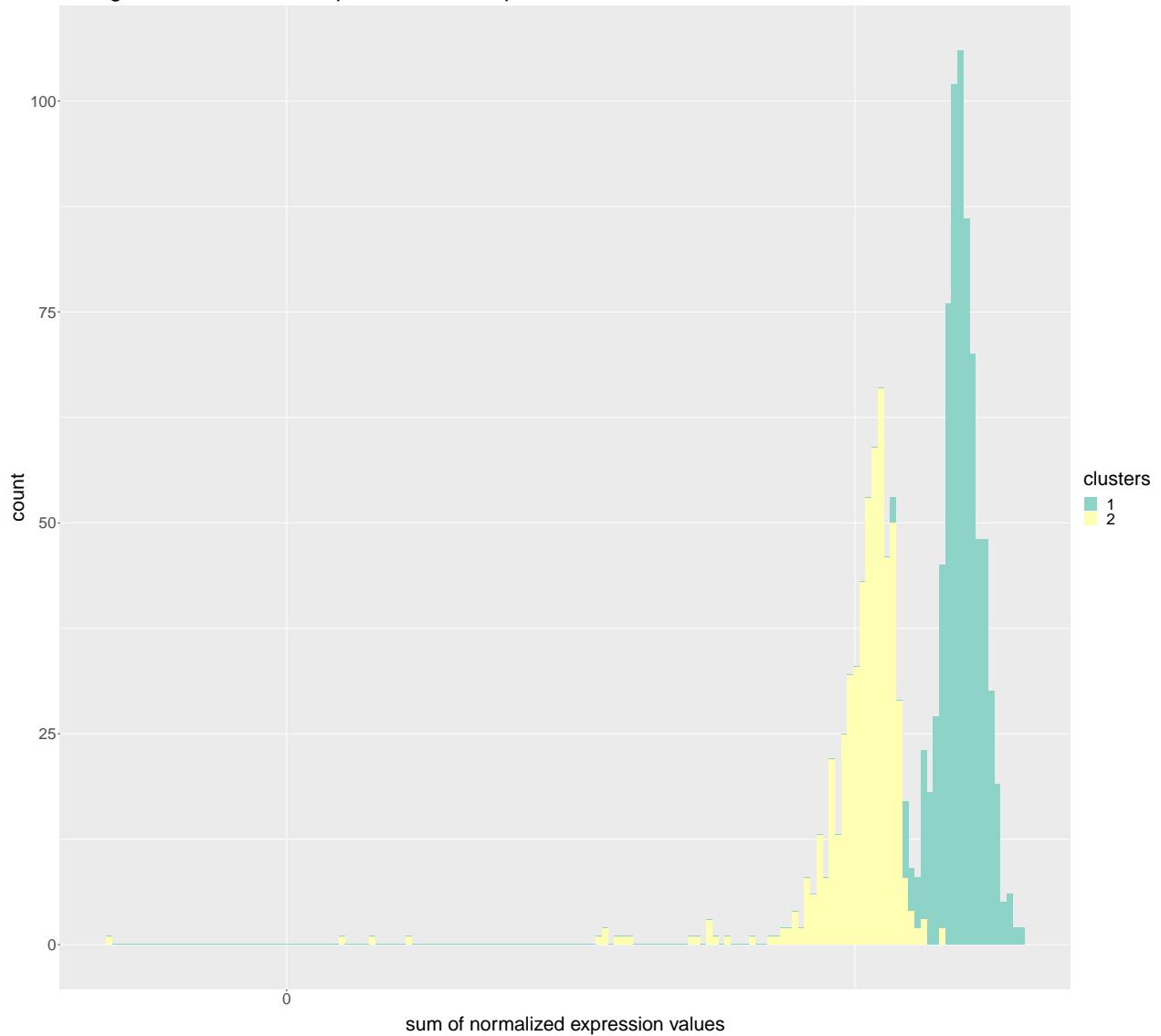






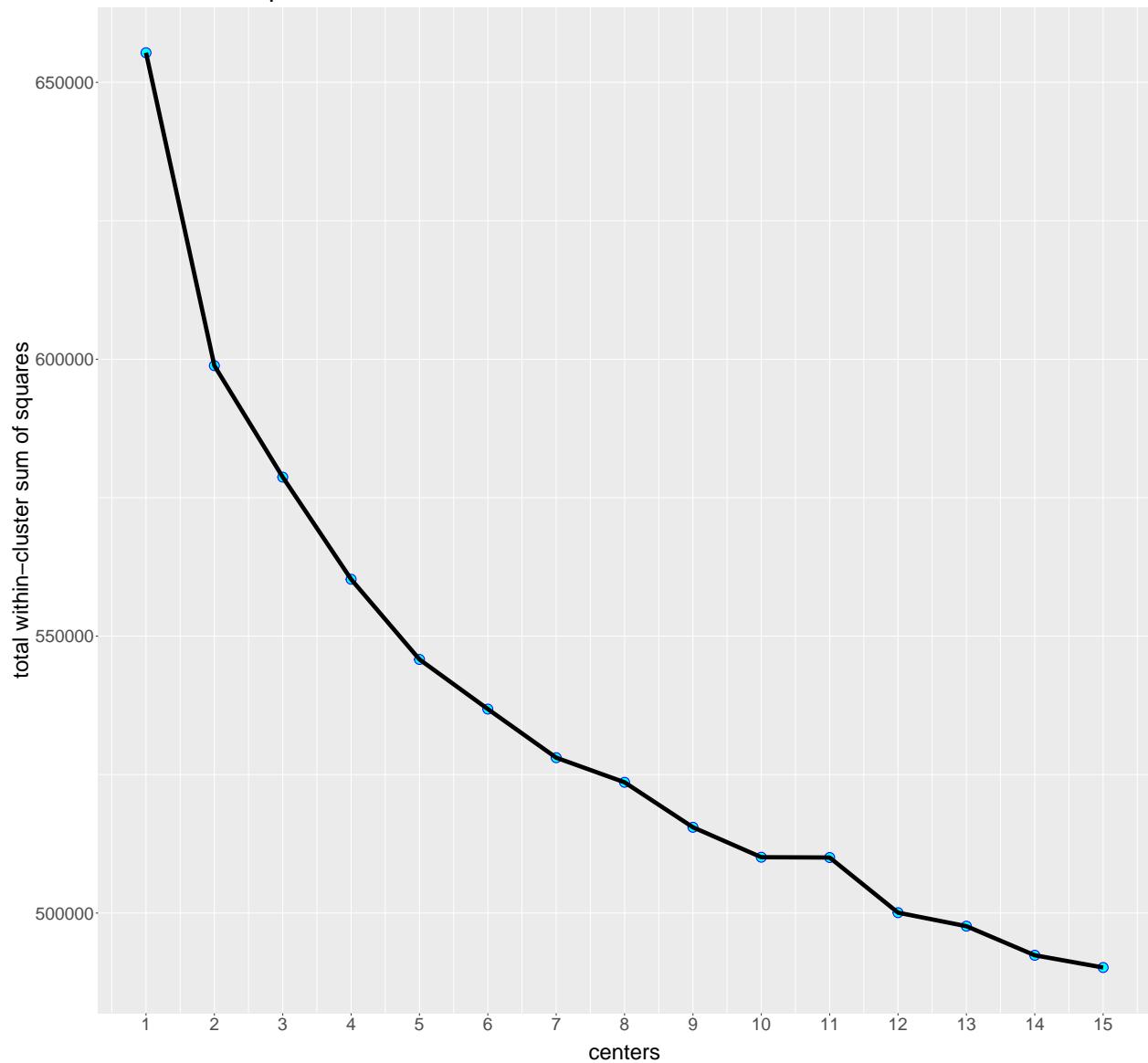


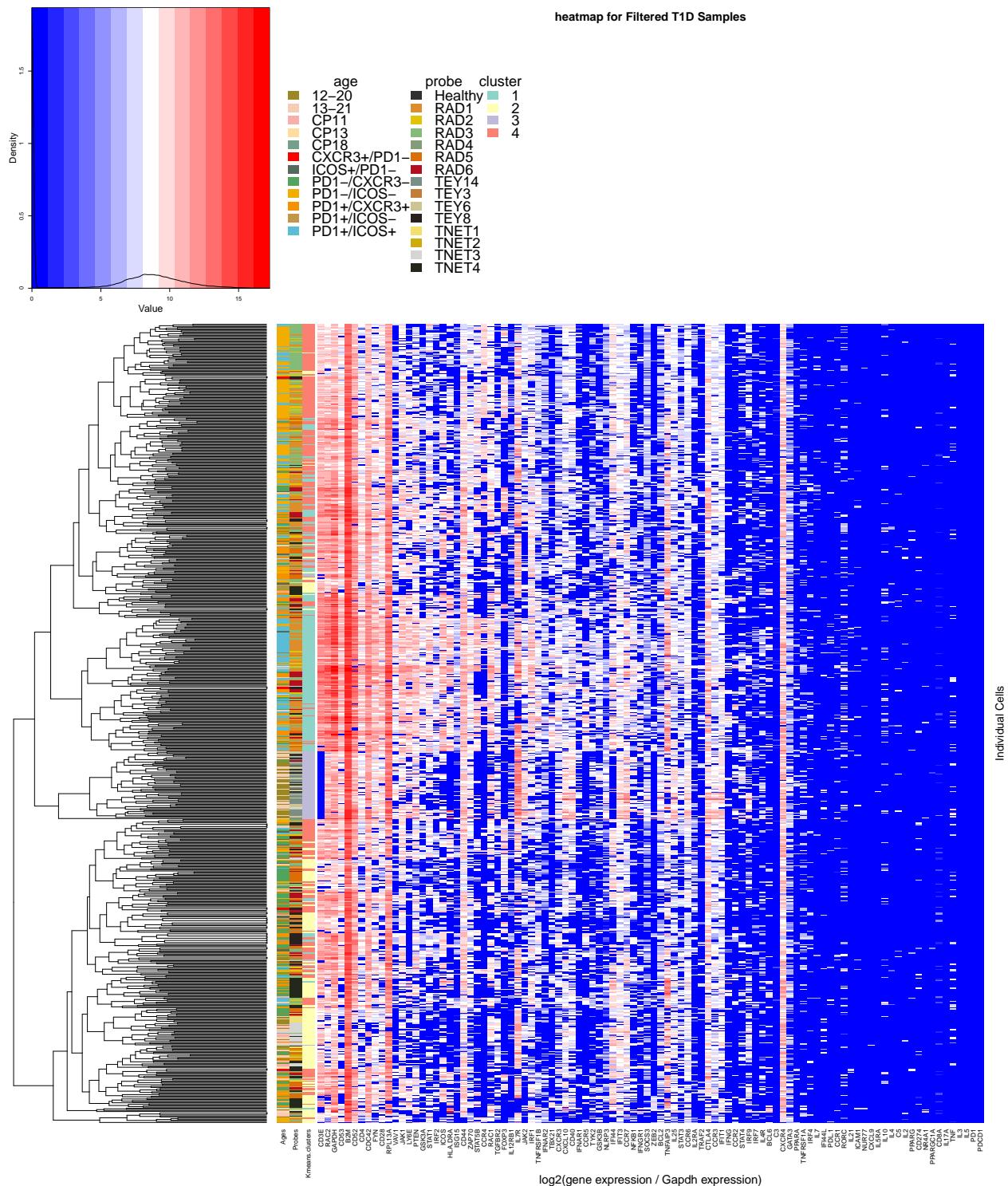
histogram of cumulative expression values per cell



555 / 1286 cells were removed due to low gene expression (cluster ID of removed clusters: 2)

kmeans scree plot





[1]

[1]

[1] Patient vs. Cluster

	probe_Healthy	probe_RAD1	probe_RAD2	probe_RAD3	probe_RAD4
cluster_1	0	81	11	28	1
cluster_2	1	11	2	12	2
cluster_3	12	1	0	1	0

	1	59	30	99	6
	probe_RAD5	probe_RAD6	probe_TEY3	probe_TEY6	probe_TEY8
cluster_1	24	35	0	0	8
cluster_2	41	8	4	0	10
cluster_3	1	3	0	21	0
cluster_4	25	29	8	0	14
	probe_TEY14	probe_TNET1	probe_TNET2	probe_TNET3	probe_TNET4
cluster_1	0	0	0	1	5
cluster_2	0	13	5	24	49
cluster_3	29	0	0	2	0
cluster_4	1	2	0	1	10

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)

```
data: probeTable
X-squared = 967.78, df = NA, p-value = 0.0004998
```

```
[1]
[1]
[1] Cohort vs. Cluster
      cellSource_Child cellSource_Adult cellSource_Risk
cluster_1           180                  8          6
cluster_2            76                 14         91
cluster_3             6                 50          2
cluster_4           248                 23         13
      cellSource_Healthy
cluster_1            0
cluster_2            1
cluster_3           12
cluster_4            1
```

Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)

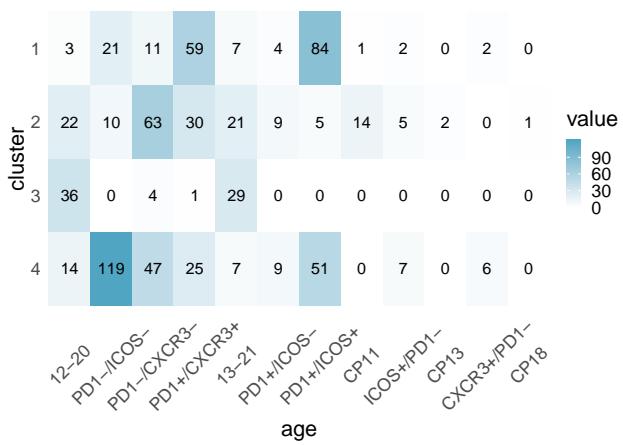
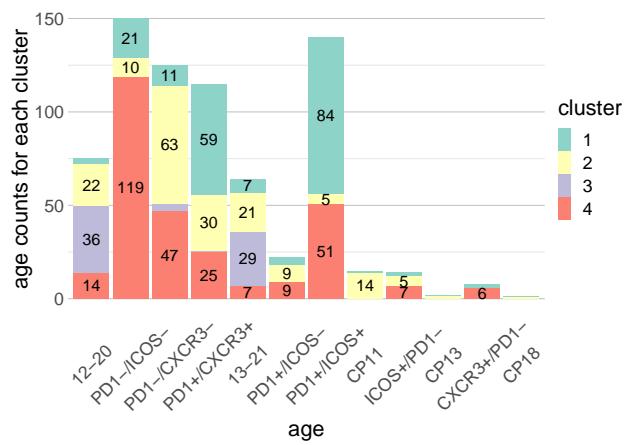
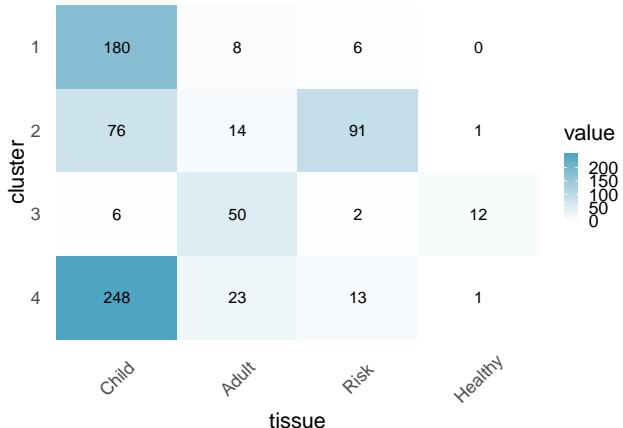
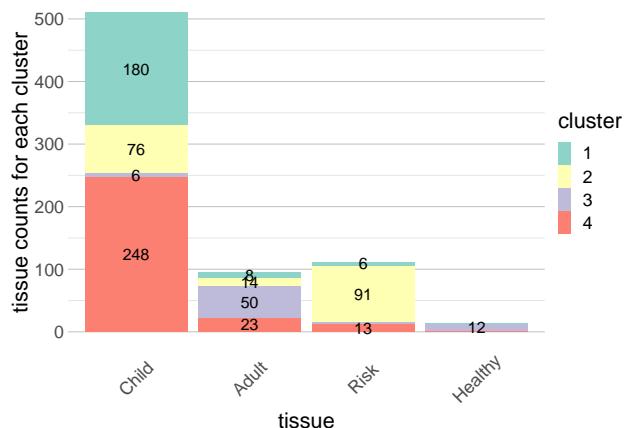
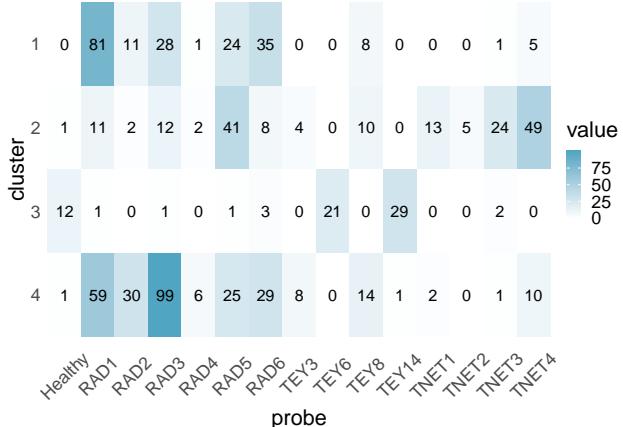
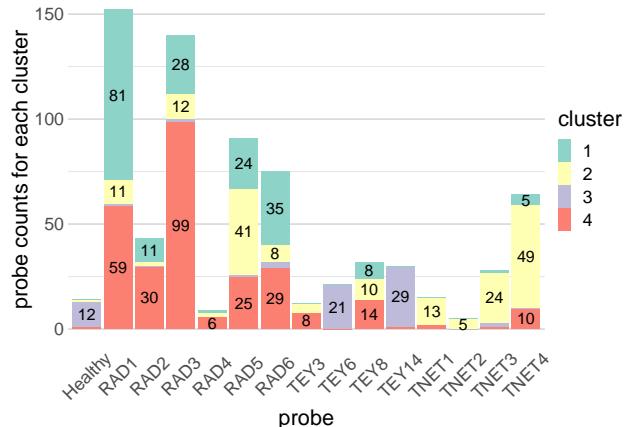
```
data: sourceTable
X-squared = 574.15, df = NA, p-value = 0.0004998
```

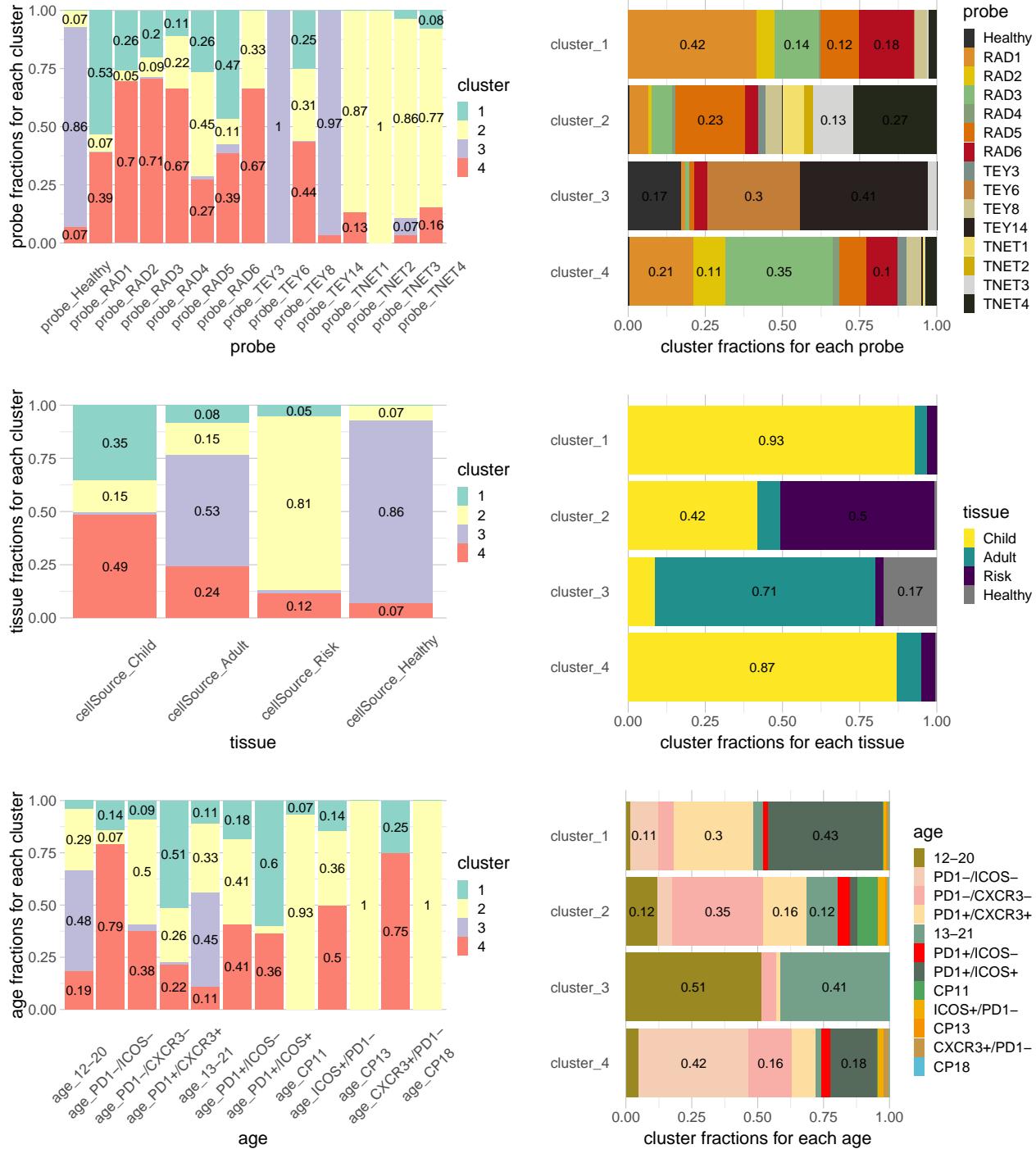
```
[1]
[1]
[1] Marker vs. Cluster
      age_12-20 age_PD1-/ICOS- age_PD1-/CXCR3- age_PD1+/CXCR3+
cluster_1            3            21            11          59
cluster_2           22            10            63          30
cluster_3           36              0              4            1
cluster_4           14           119            47          25
      age_13-21 age_PD1+/ICOS- age_PD1+/ICOS+ age_CP11 age_ICOS+/PD1-
cluster_1            7              4            84            1            2
cluster_2           21              9              5            14            5
cluster_3           29              0              0            0            0
cluster_4            7              9            51            0            7
      age_CP13 age_CXCR3+/PD1- age_CP18
cluster_1            0              2              0
cluster_2            2              0              1
```

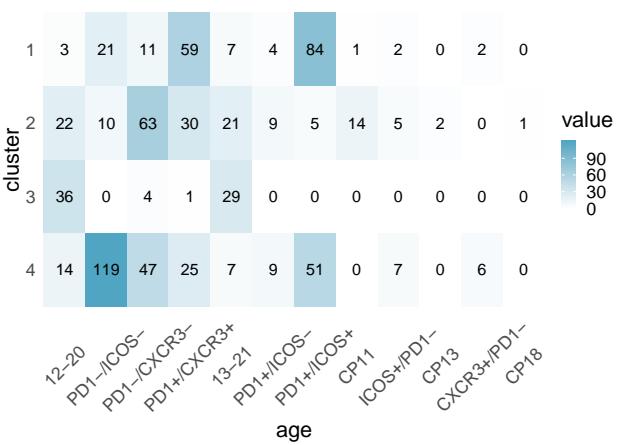
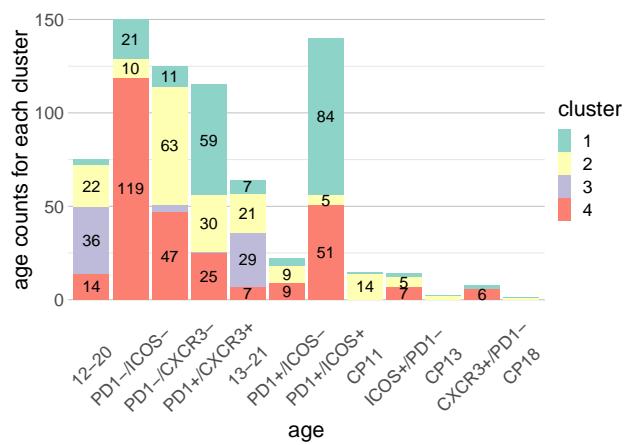
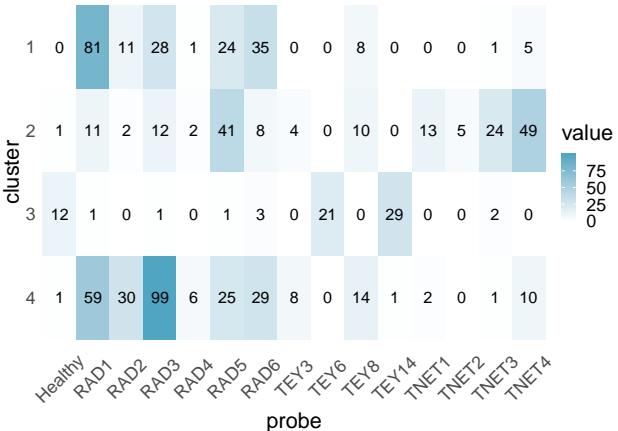
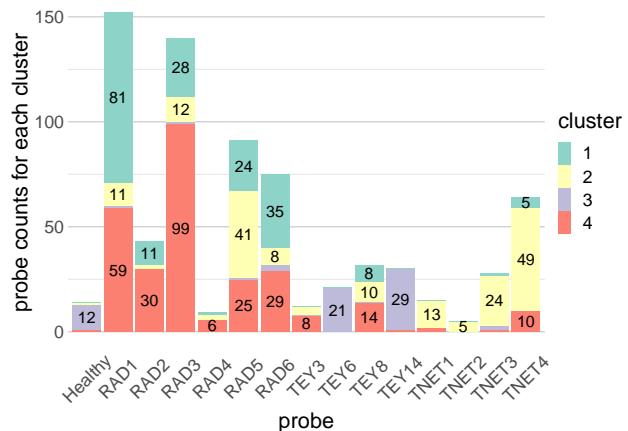
cluster_3	0	0	0
cluster_4	0	6	0

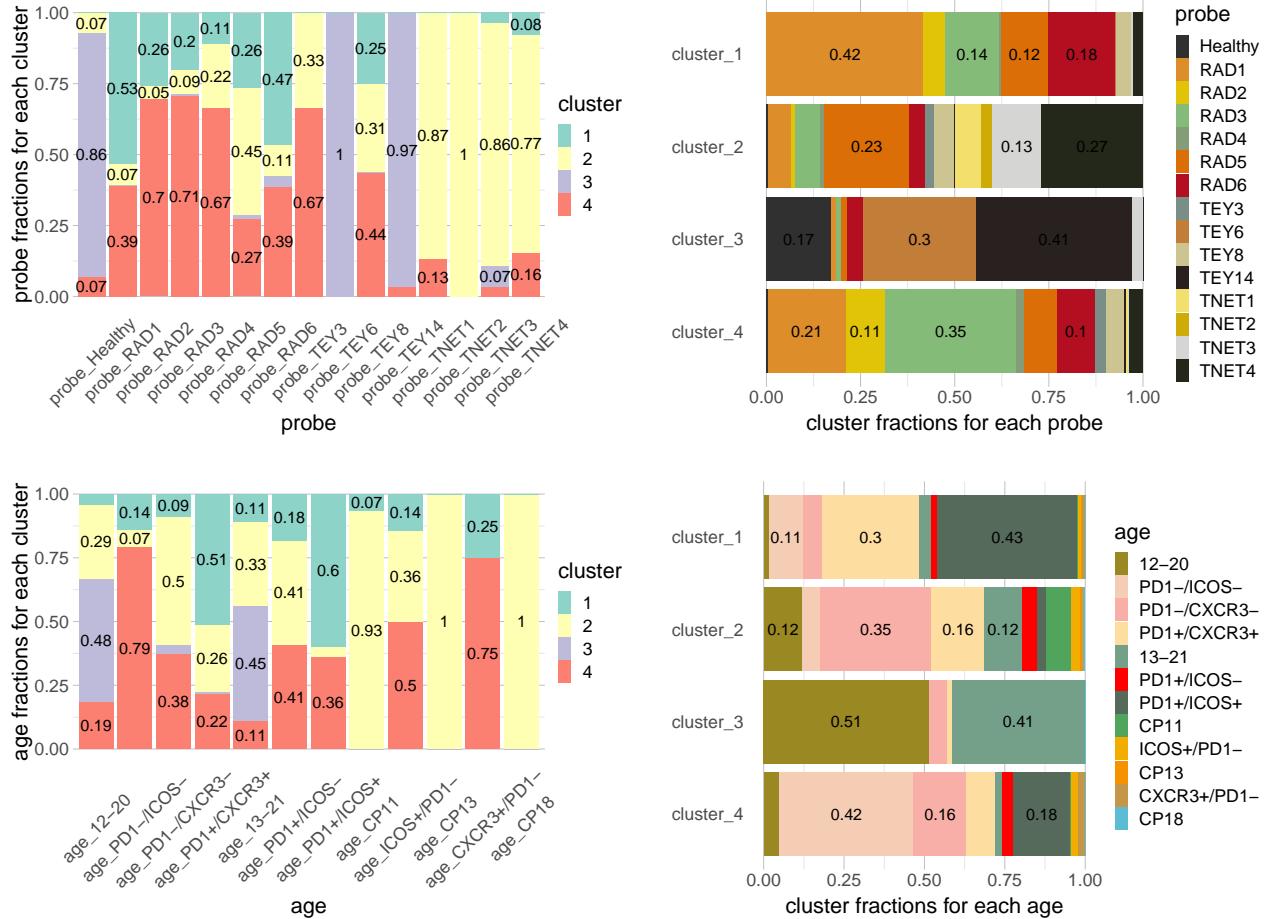
Pearson's Chi-squared test with simulated p-value (based on 2000 replicates)

```
data: ageTable
X-squared = 606.23, df = NA, p-value = 0.0004998
```

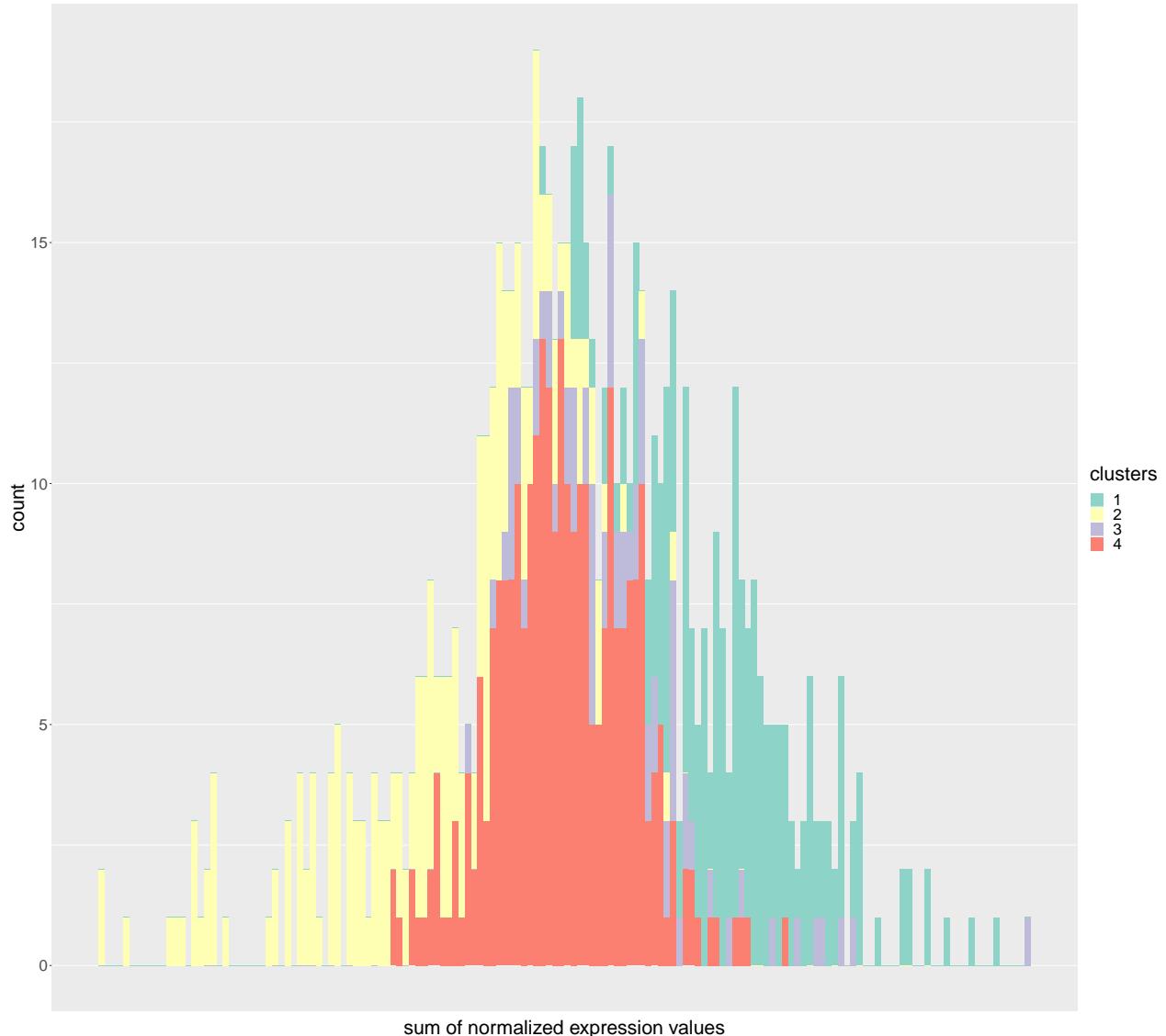




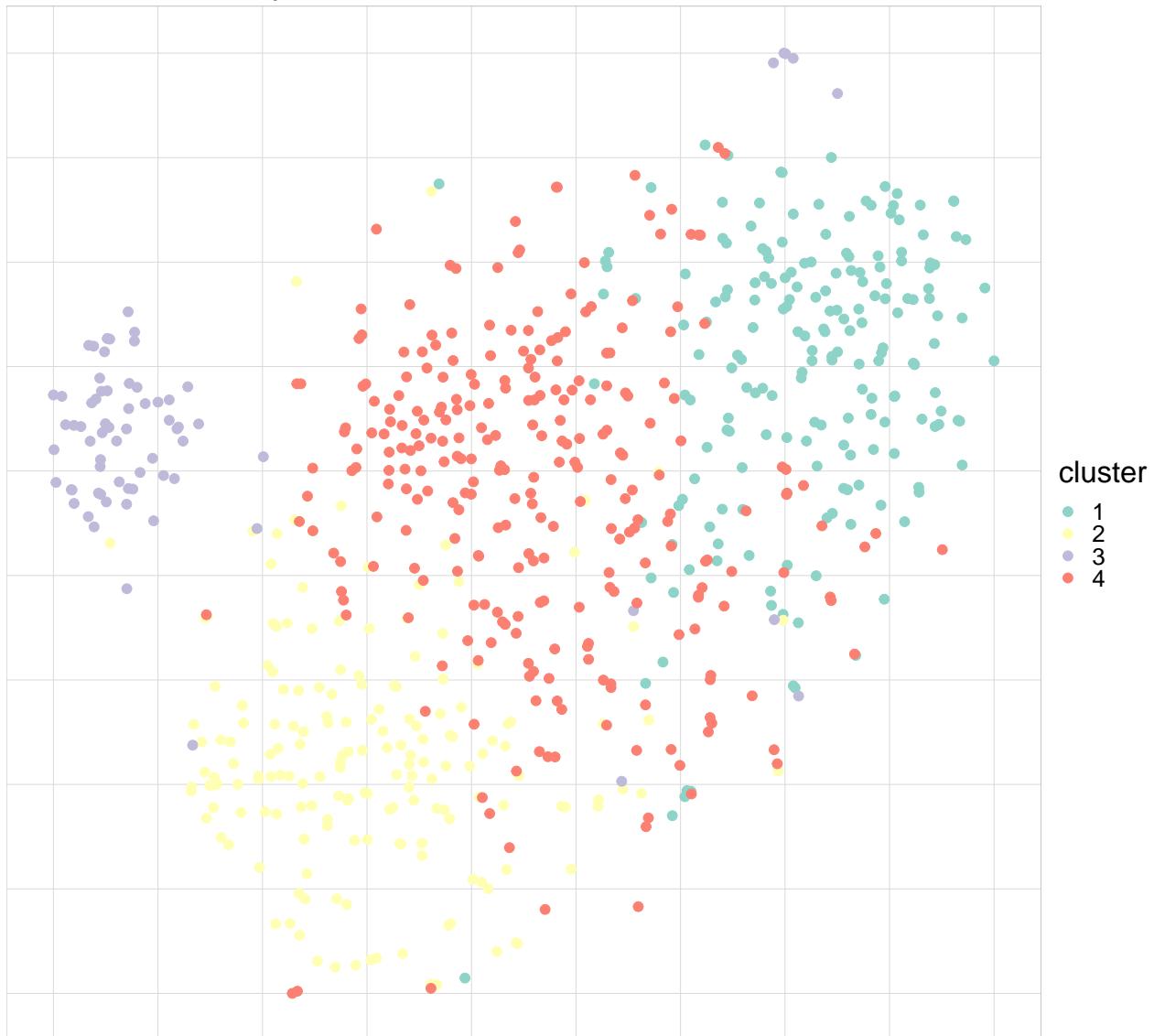




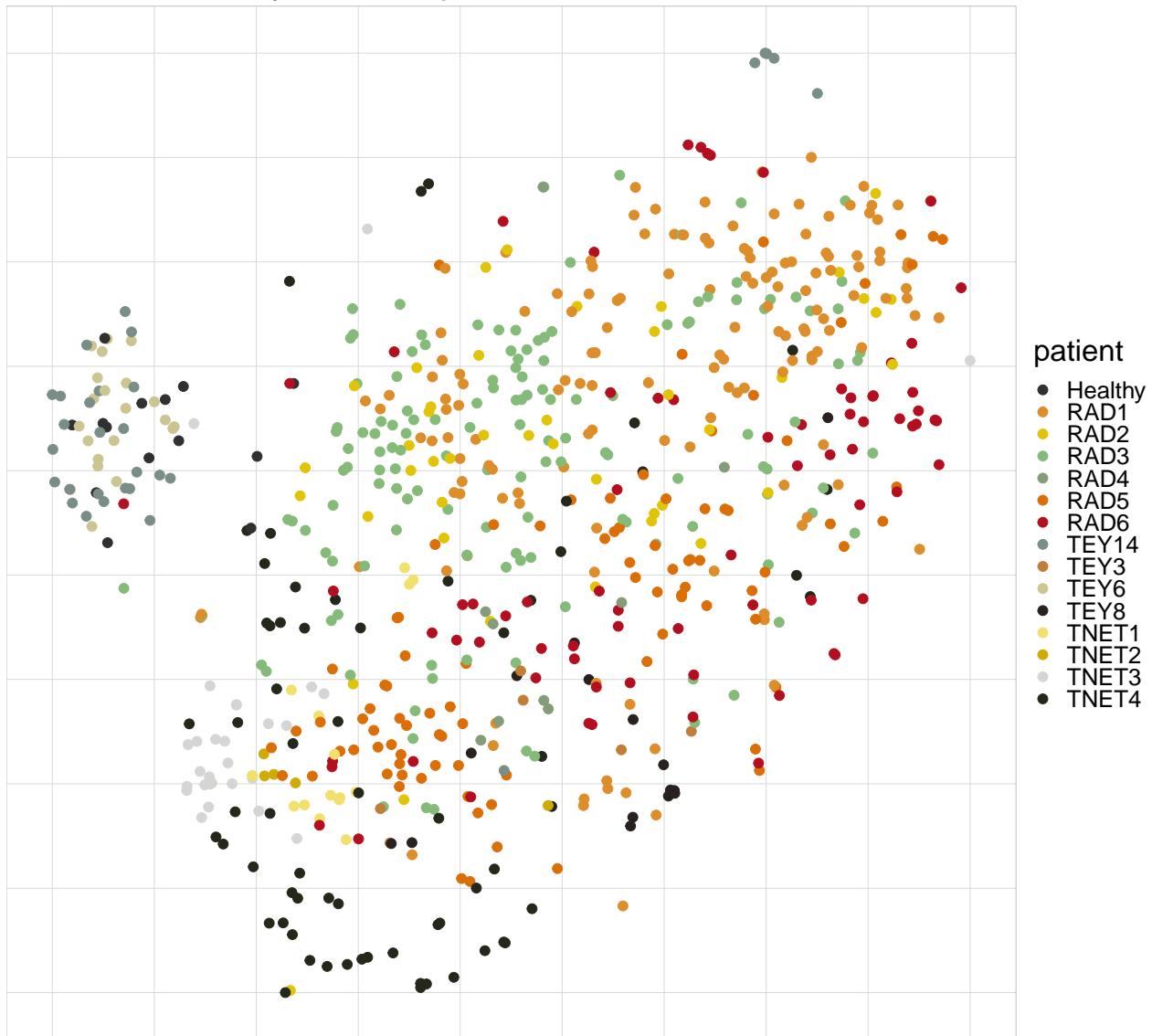
histogram of cumulative expression values per cell



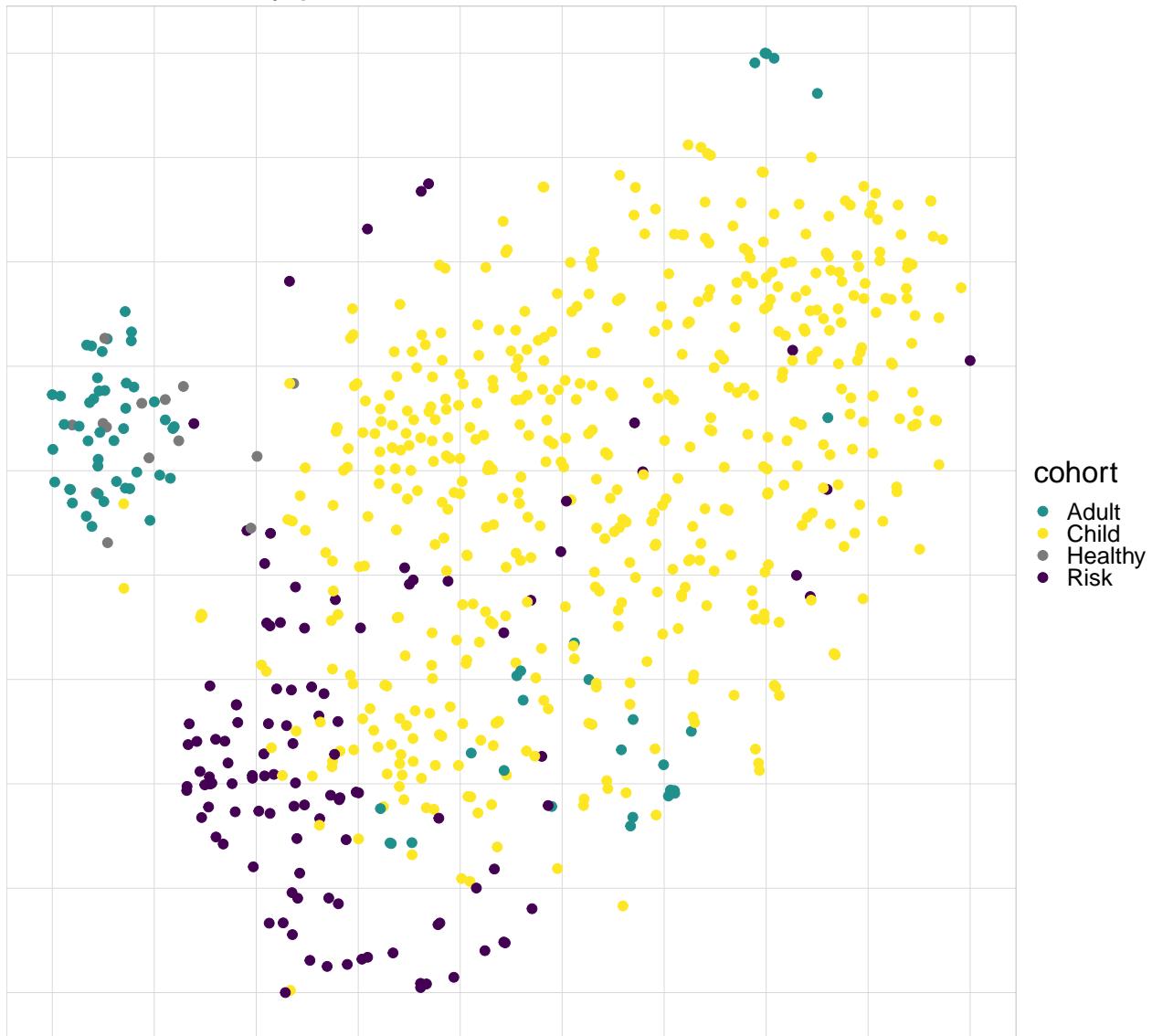
t-SNE colored by kmeans.cluster



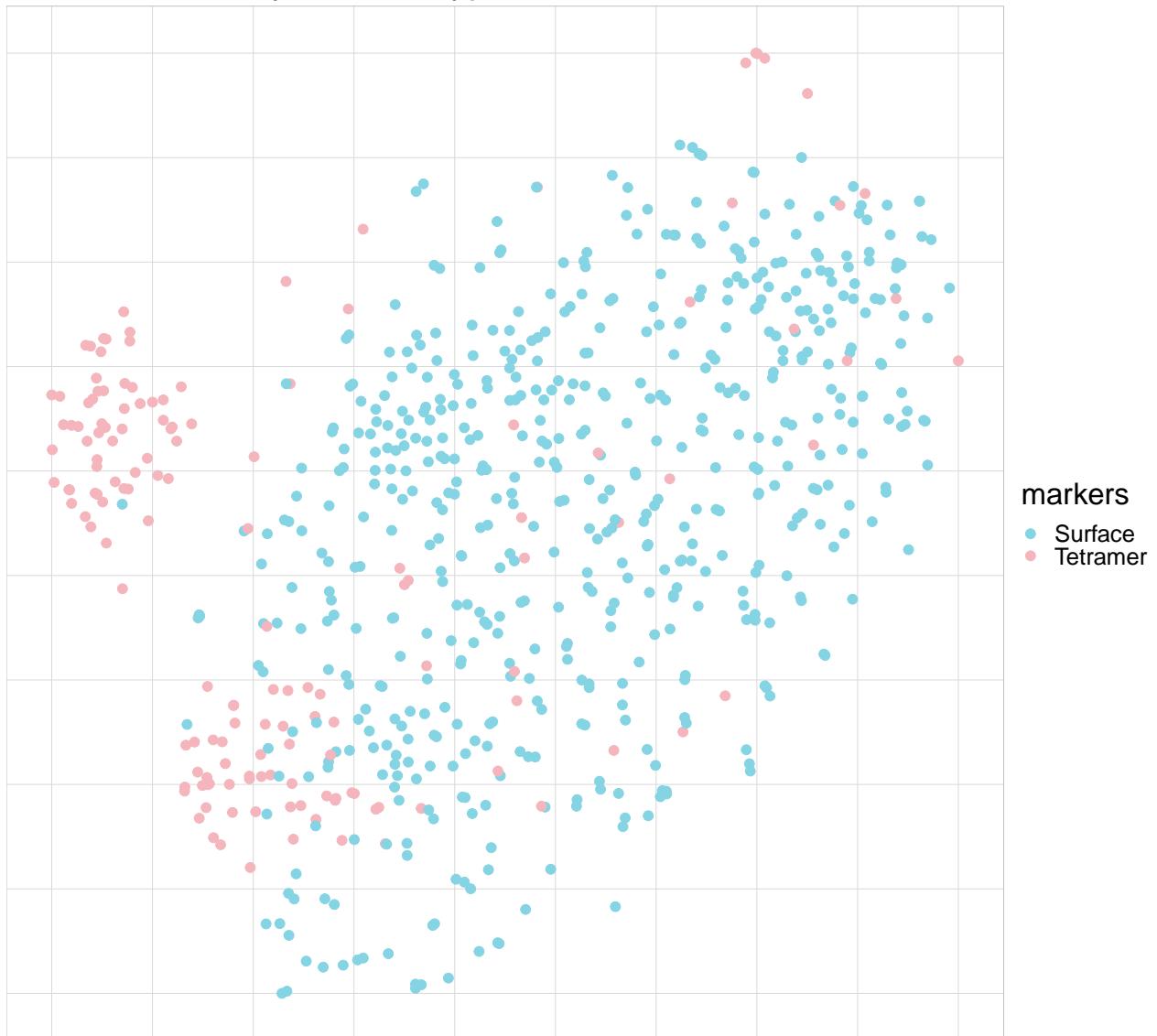
t-SNE colored by different patients



t-SNE colored by patient cohorts



t-SNE colored by different types of markers



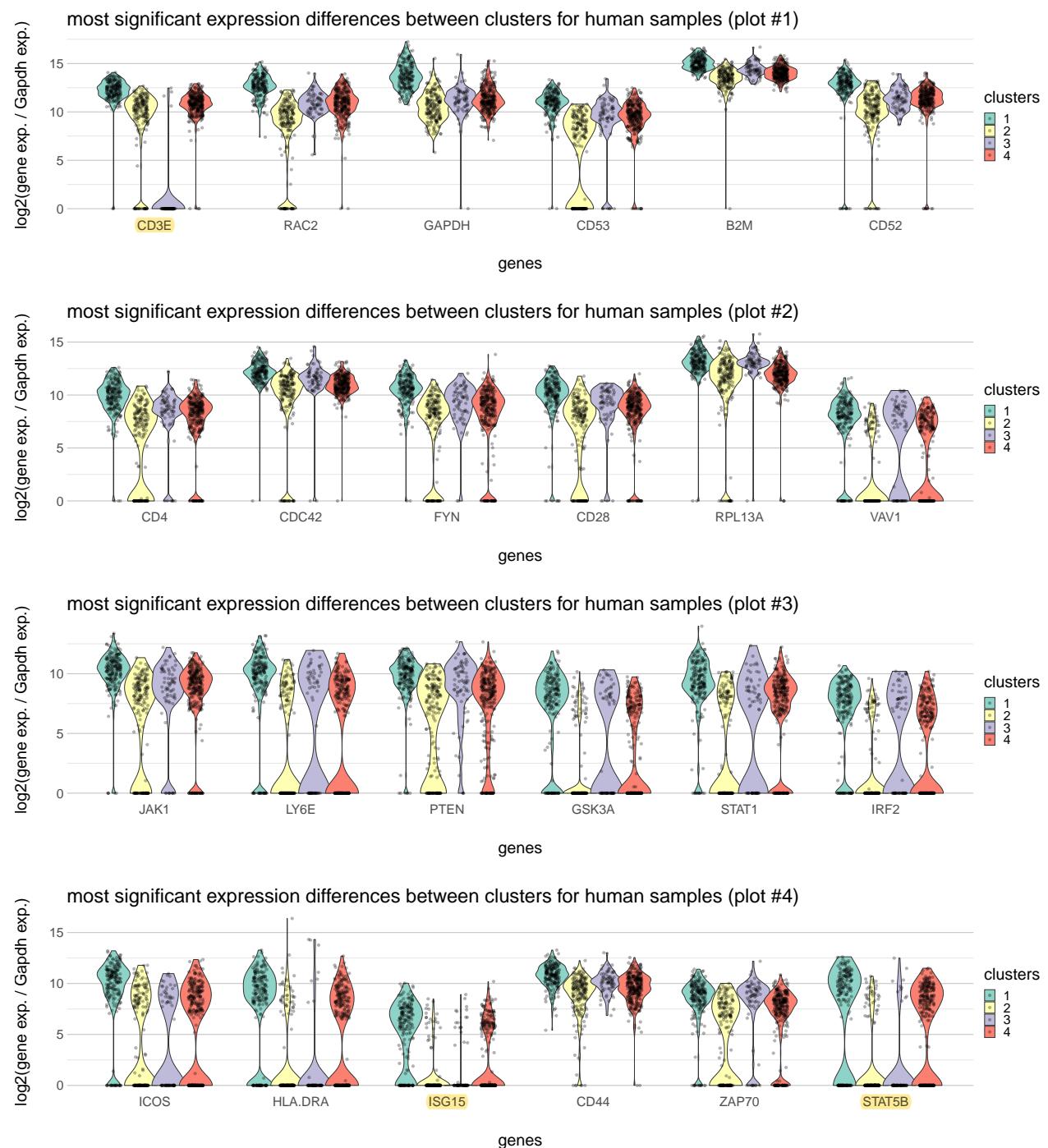
t-SNE colored by different markers

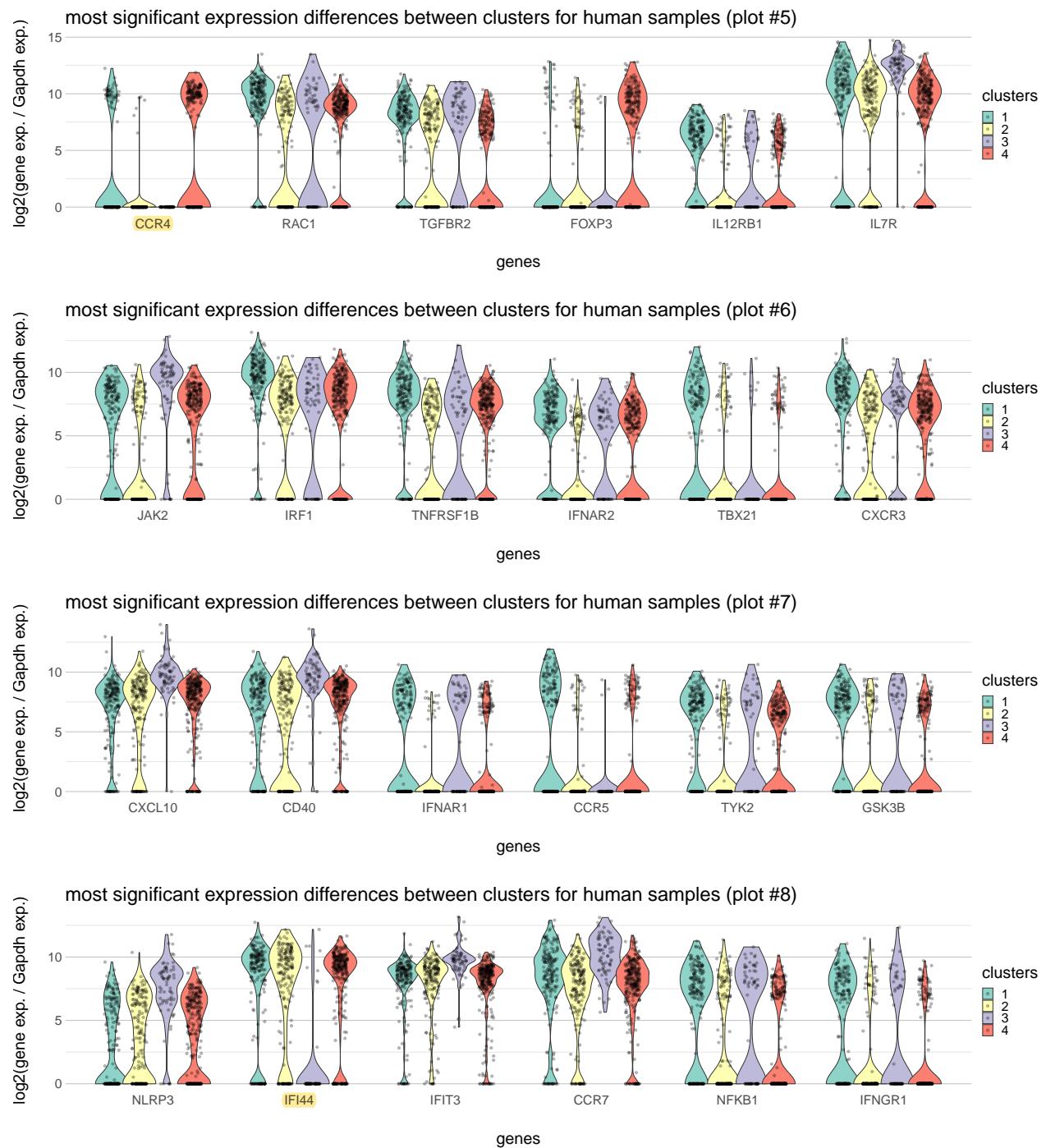


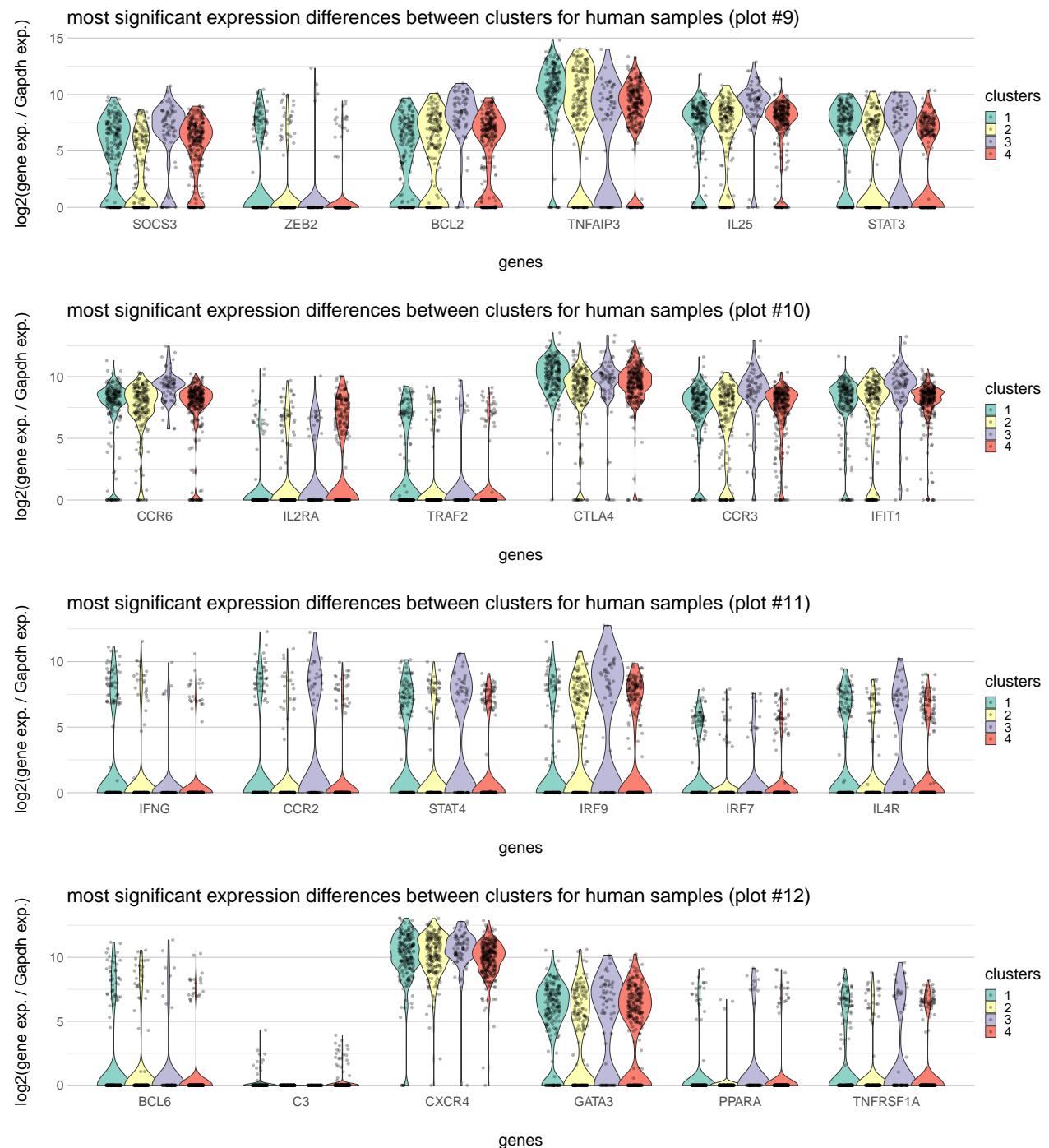
[1] Differentially expressed genes between clusters for human samples:

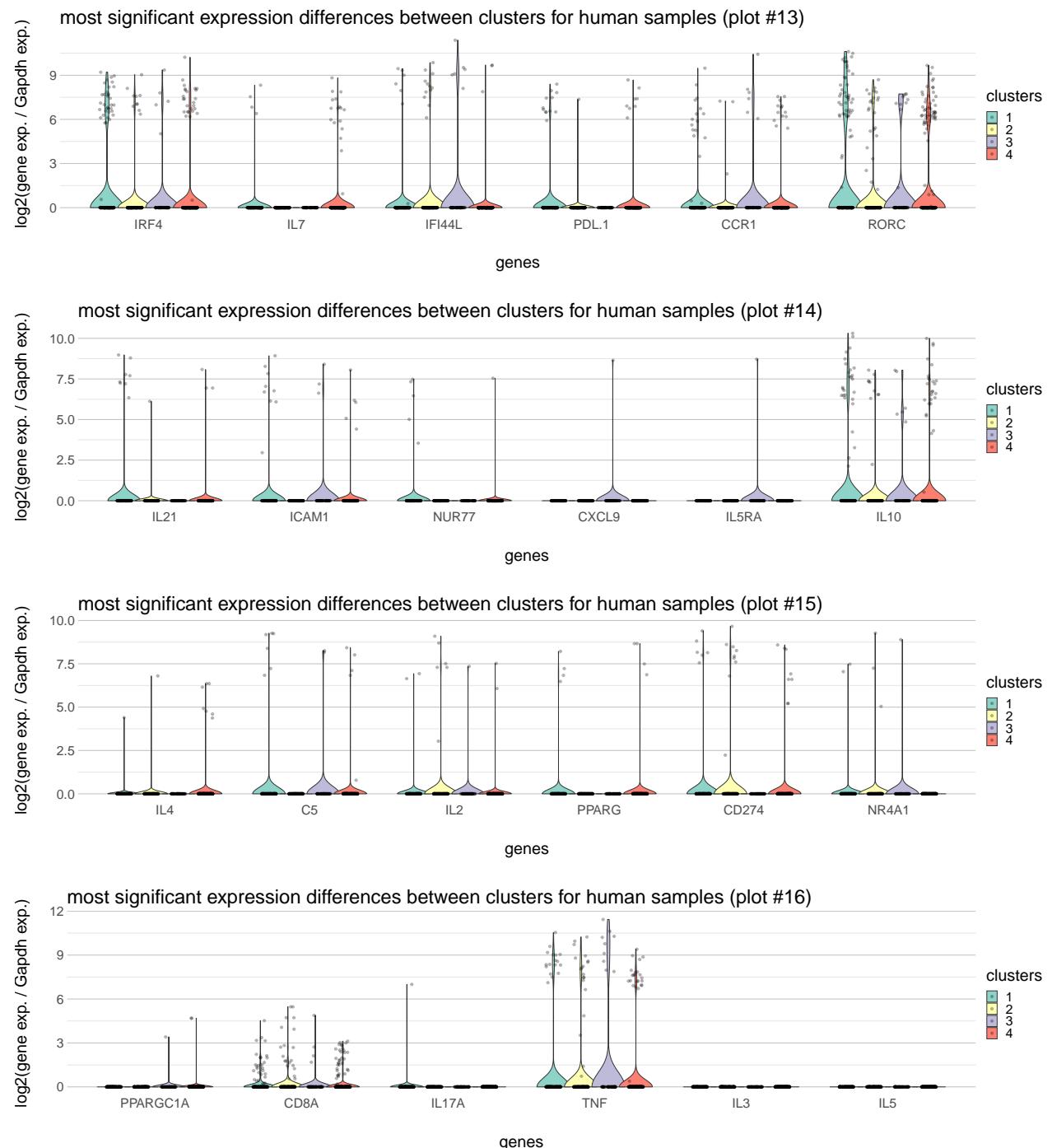
[1]	CD3E: 1.705e-78	RAC2: 2.047e-73	GAPDH: 3.469e-67
[4]	CD53: 4.727e-62	B2M: 1.146e-59	CD52: 9.399e-56
[7]	CD4: 1.985e-49	CDC42: 1.258e-48	FYN: 3.676e-44
[10]	CD28: 1.376e-43	RPL13A: 1.599e-42	VAV1: 1.319e-41
[13]	JAK1: 8.245e-40	LY6E: 1.65e-39	PTEN: 6.094e-37
[16]	GSK3A: 6.88e-37	STAT1: 5.829e-36	IRF2: 5.006e-35
[19]	ICOS: 8.374e-35	HLA.DRA: 1.072e-34	ISG15: 2.045e-34
[22]	CD44: 1.567e-33	ZAP70: 4.435e-33	STAT5B: 2.905e-32
[25]	CCR4: 5.321e-31	RAC1: 8.806e-31	TGFBR2: 9.311e-31
[28]	FOXP3: 1.608e-30	IL12RB1: 3.323e-28	IL7R: 8.738e-28
[31]	JAK2: 9.679e-28	IRF1: 3.508e-27	TNFRSF1B: 5.728e-27
[34]	IFNAR2: 5.873e-25	TBX21: 1.364e-23	CXCR3: 1.248e-22
[37]	CXCL10: 2.554e-21	CD40: 3.939e-21	IFNAR1: 5.235e-21
[40]	CCR5: 1.535e-20	TYK2: 2.531e-20	GSK3B: 2.77e-20
[43]	NLRP3: 1.281e-19	IFI44: 2.892e-19	IFIT3: 2.954e-18

[46]	CCR7:	3.111e-18	NFKB1:	2.327e-17	IFNGR1:	5.603e-17
[49]	S0CS3:	6.359e-17	ZEB2:	2.782e-16	BCL2:	3.571e-16
[52]	TNFAIP3:	2.572e-15	IL25:	8.536e-15	STAT3:	1.657e-14
[55]	CCR6:	3.986e-14	IL2RA:	1.206e-13	TRAF2:	2.275e-11
[58]	CTLA4:	2.87e-11	CCR3:	5.978e-11	IFIT1:	6.719e-11
[61]	IFNG:	3.836e-09	CCR2:	6.39e-08	STAT4:	2.465e-07
[64]	IRF9:	6.555e-07	IRF7:	1.005e-05	IL4R:	2.415e-05
[67]	BCL6:	2.836e-05	C3:	6.957e-05	CXCR4:	6.957e-05
[70]	GATA3:	0.0001186	PPARA:	0.0001369	TNFRSF1A:	0.0001578
[73]	IRF4:	0.0006577	IL7:	0.0006947	IFI44L:	0.003539
[76]	PDL.1:	0.005404	CCR1:	0.01362	RORC:	0.01552
[79]	IL21:	0.01672	ICAM1:	0.01672	NUR77:	0.02002
[82]	CXCL9:	0.02712	IL5RA:	0.02712	IL10:	0.04623



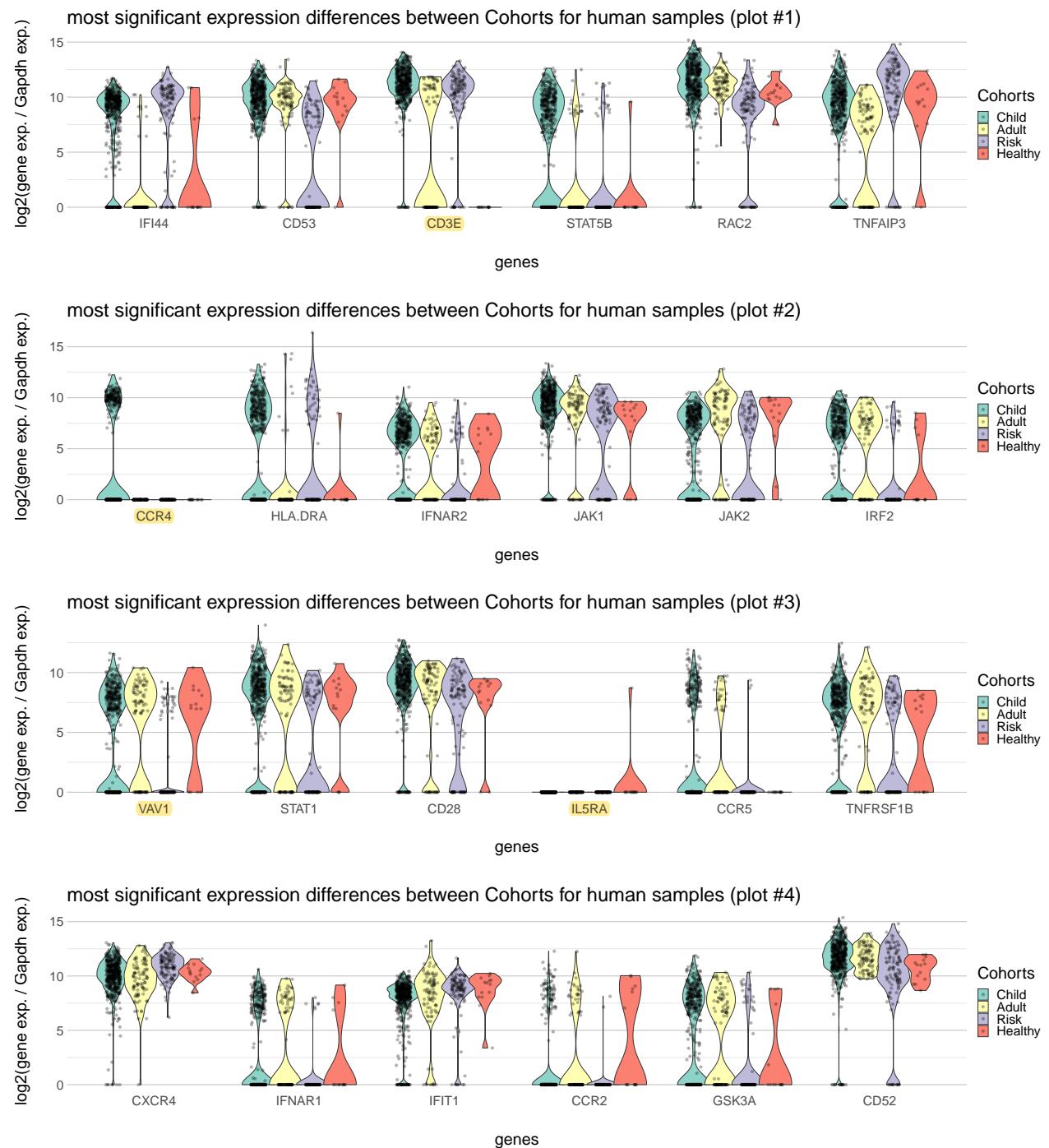


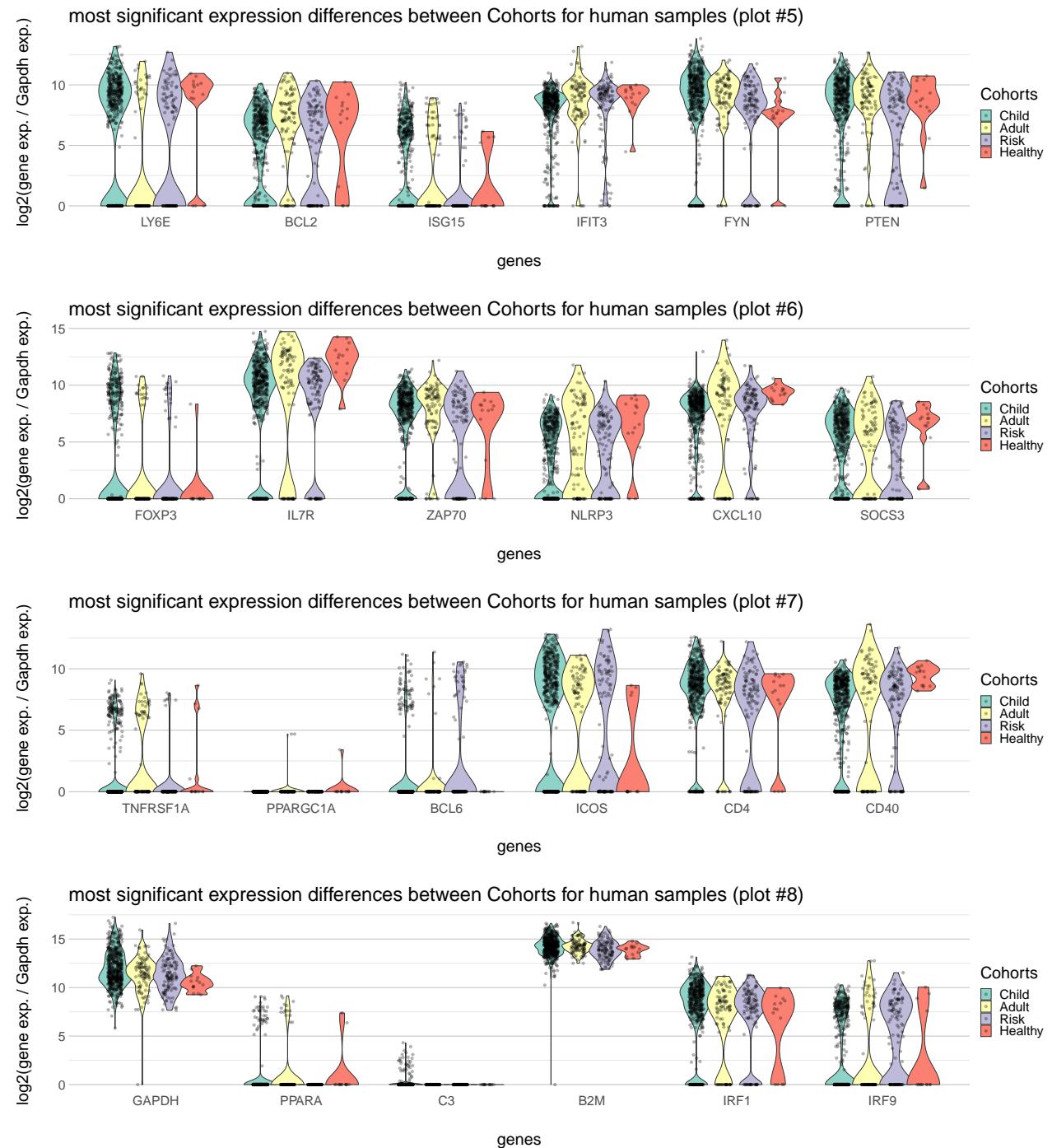


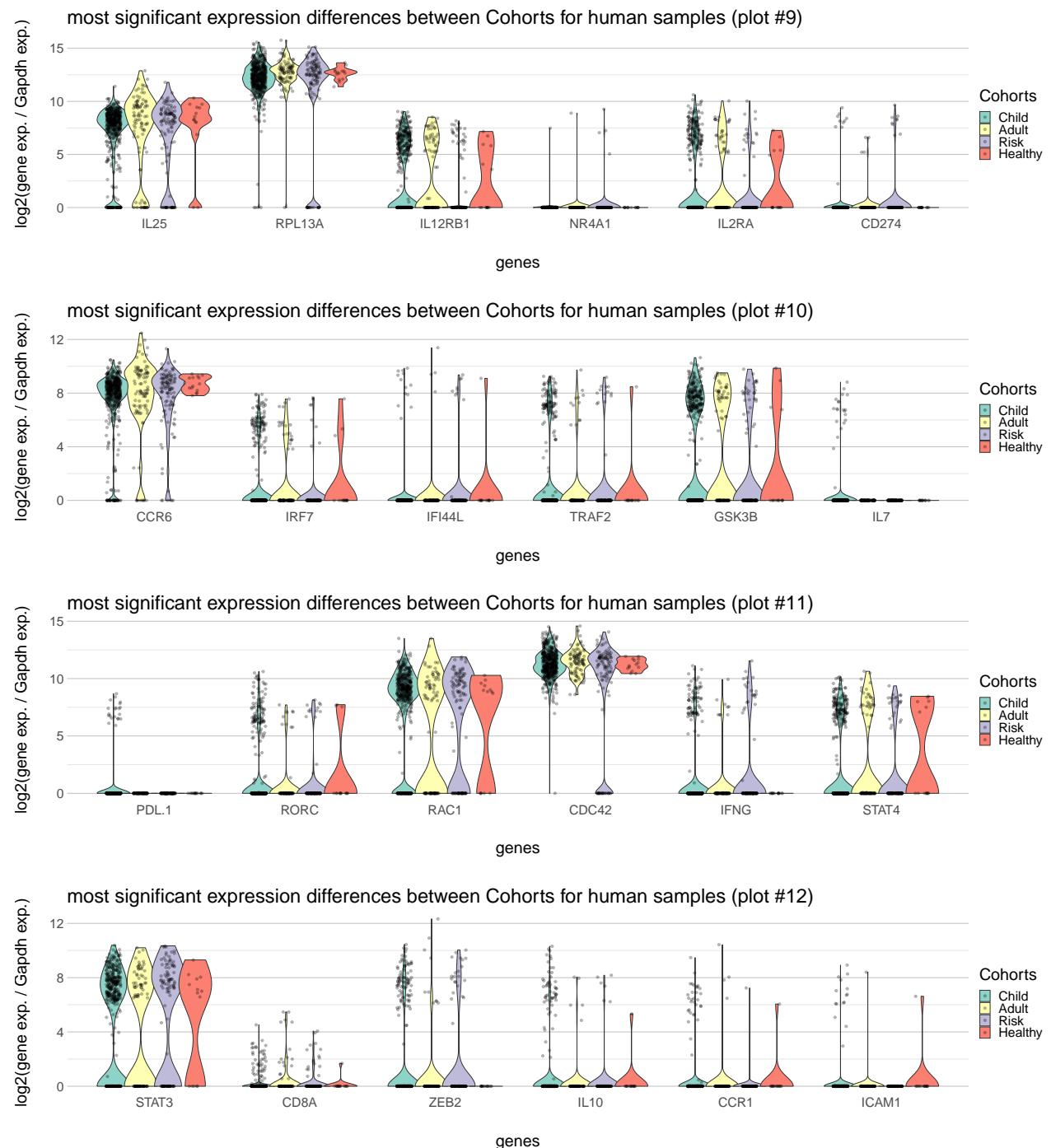


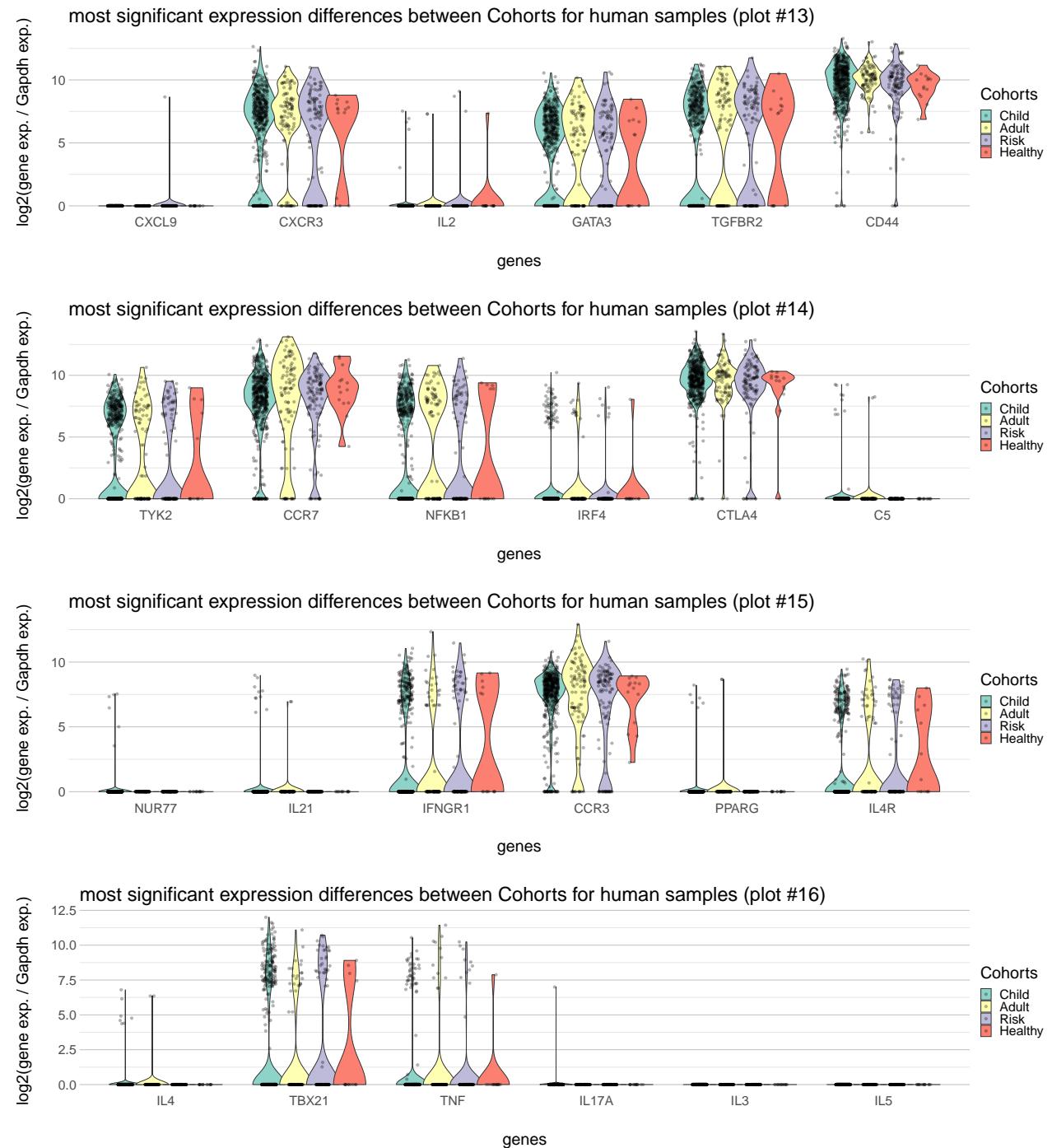
```
[1] Differentially expressed genes between Cohorts for human samples:
[1] IFI44: 1.788e-35    CD53: 1.046e-31    CD3E: 6.064e-28
[4] STAT5B: 9.982e-25    RAC2: 1.534e-24    TNFAIP3: 5.748e-23
[7] CCR4: 7.084e-23     HLA.DRA: 5.297e-17   IFNAR2: 3.594e-13
[10] JAK1: 6.573e-13    JAK2: 8.796e-13    IRF2: 2.035e-12
[13] VAV1: 2.159e-11    STAT1: 3.59e-11     CD28: 4.329e-11
[16] IL5RA: 2.587e-10    CCR5: 2.199e-09    TNFRSF1B: 3.617e-09
[19] CXCR4: 7.742e-09    IFNAR1: 1.211e-08   IFIT1: 1.329e-08
[22] CCR2: 3.237e-08    GSK3A: 3.4e-08      CD52: 3.857e-08
[25] LY6E: 1.013e-07    BCL2: 1.647e-07    ISG15: 2.759e-07
```

[28]	IFIT3:	2.823e-07	FYN:	1.028e-06	PTEN:	1.632e-06
[31]	FOXP3:	1.632e-06	IL7R:	6.206e-06	ZAP70:	1.667e-05
[34]	NLRP3:	2.351e-05	CXCL10:	2.453e-05	SOCS3:	3.471e-05
[37]	TNFRSF1A:	3.7e-05	PPARGC1A:	4.488e-05	BCL6:	7.433e-05
[40]	ICOS:	8.929e-05	CD4:	9.405e-05	CD40:	0.0002526
[43]	GAPDH:	0.0002728	PPARA:	0.0005246	C3:	0.0007997
[46]	B2M:	0.0009622	IRF1:	0.001067	IRF9:	0.001067
[49]	IL25:	0.004051	RPL13A:	0.005001	IL12RB1:	0.008475
[52]	NR4A1:	0.008475	IL2RA:	0.01098	CD274:	0.01292
[55]	CCR6:	0.01958	IRF7:	0.02546	IFI44L:	0.02546
[58]	TRAF2:	0.03125	GSK3B:	0.03843	IL7:	0.03843
[61]	PDL.1:	0.03843	RORC:	0.04007	RAC1:	0.04905





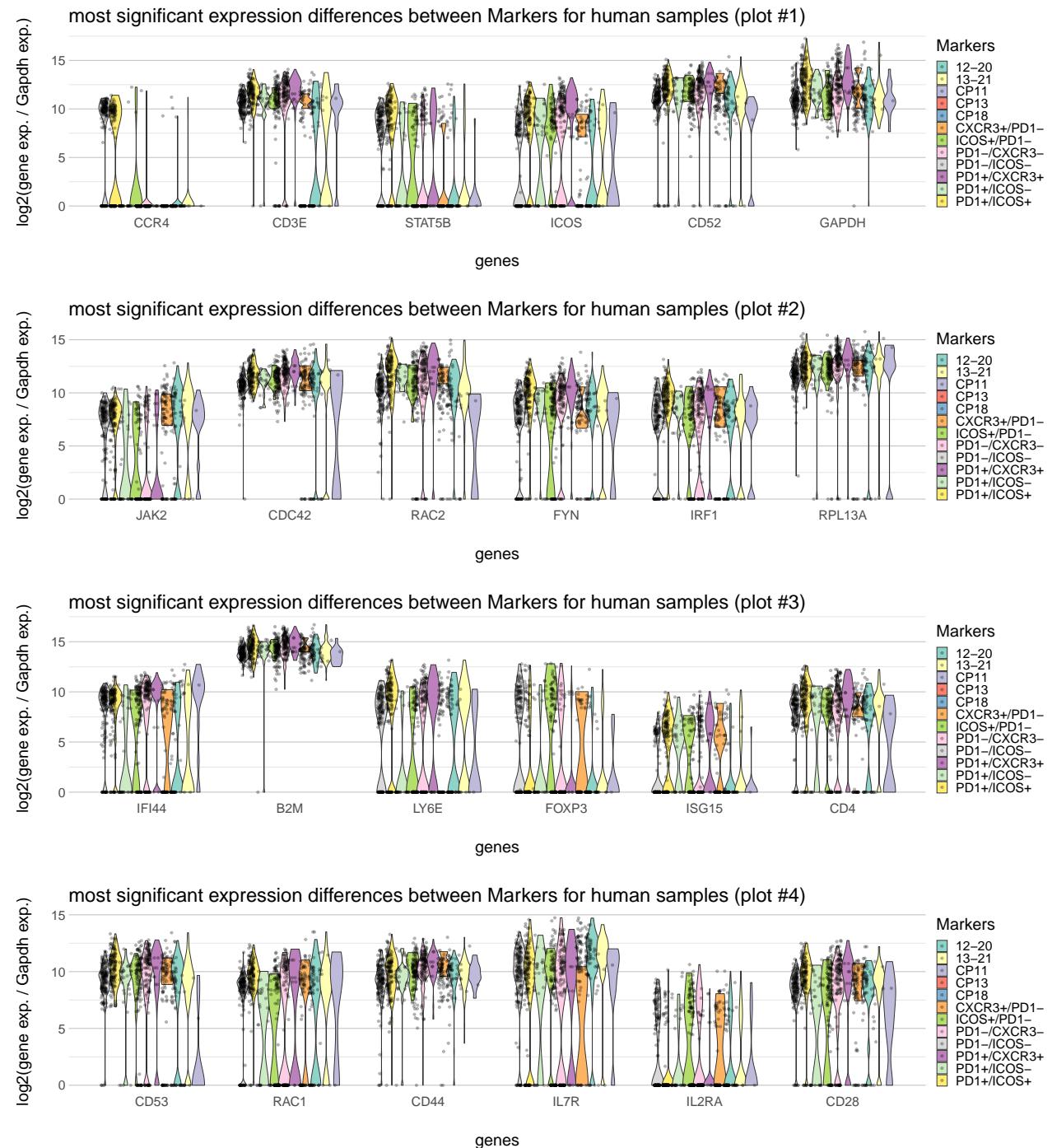


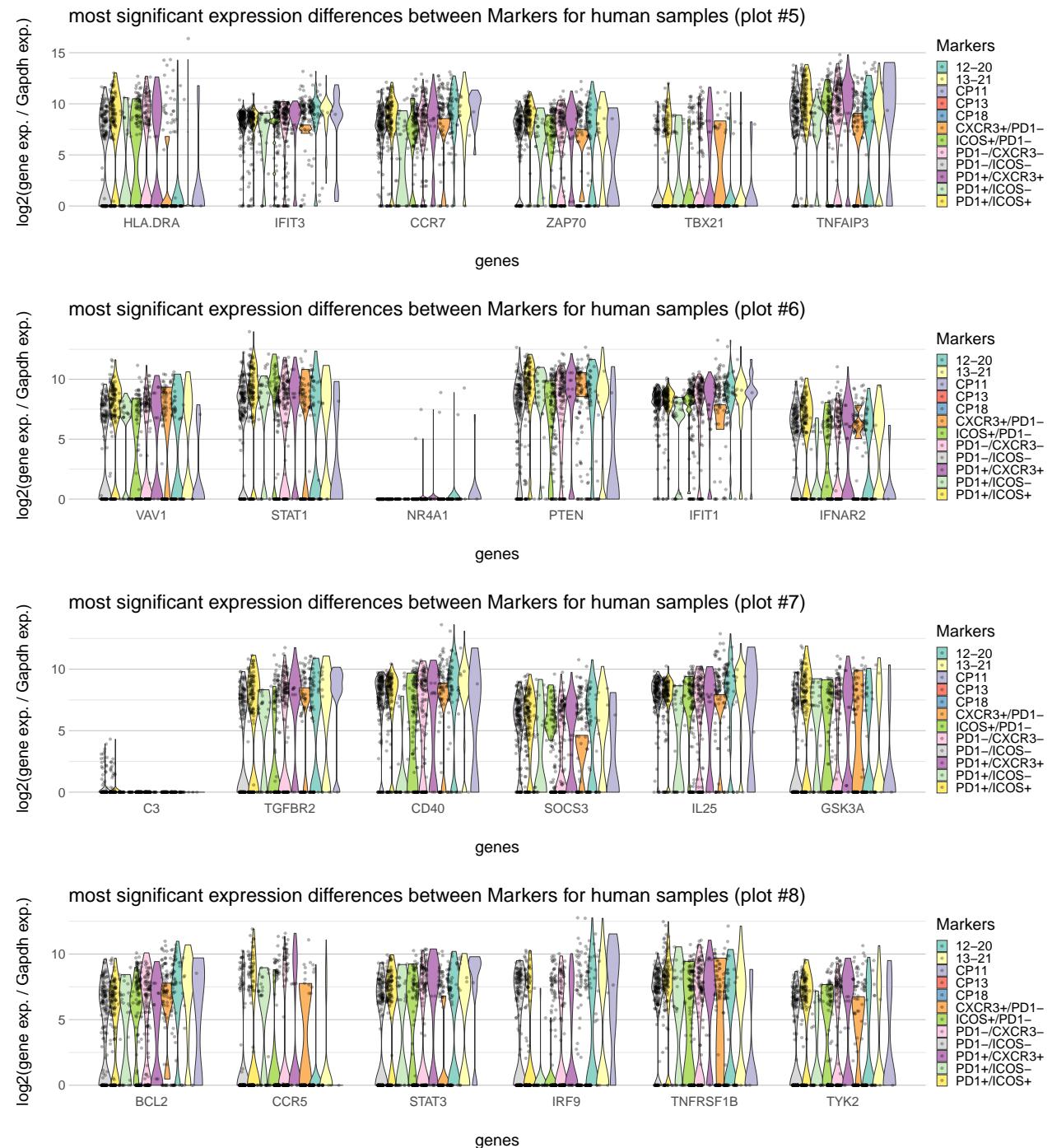


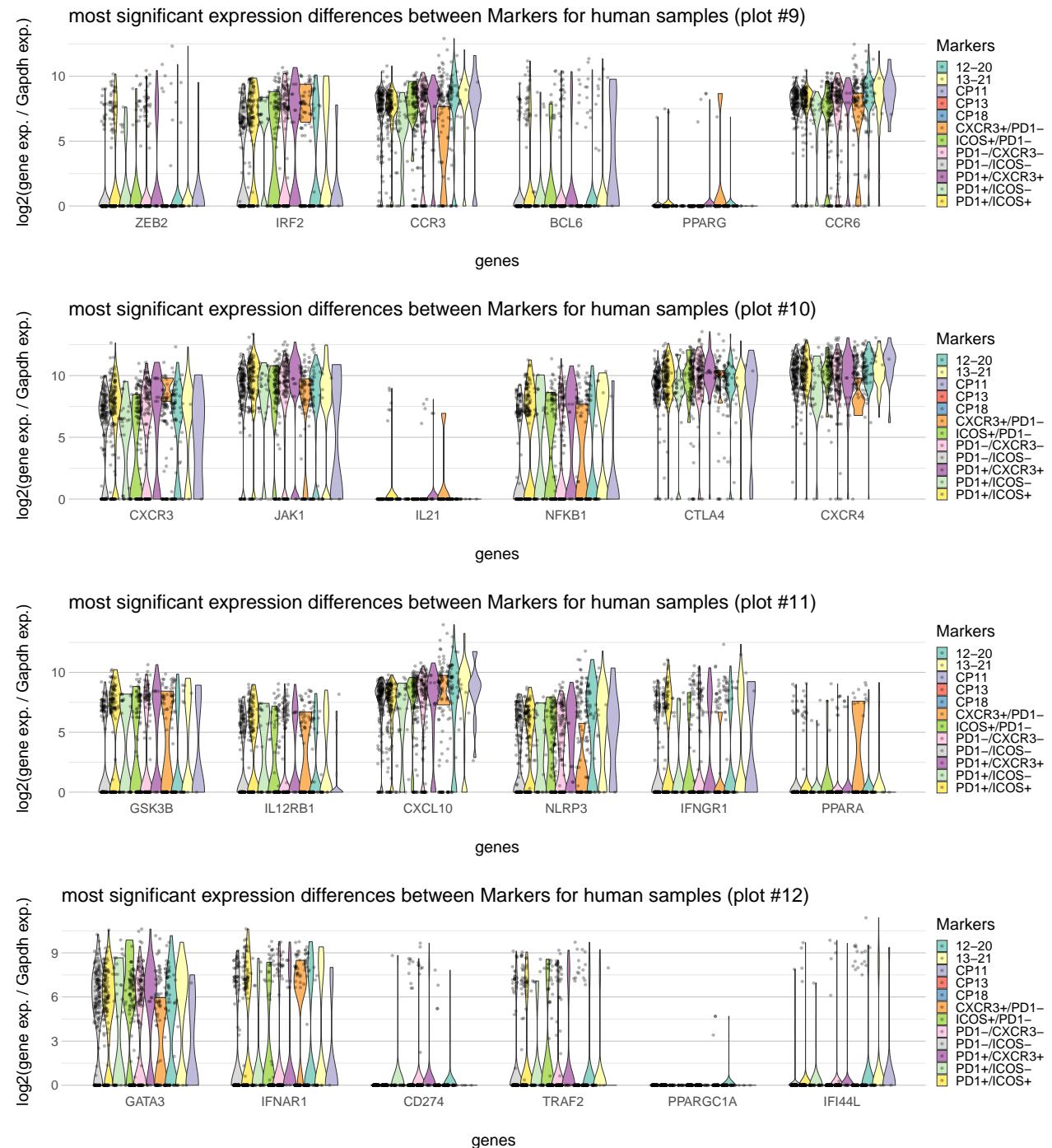
[1] Differentially expressed genes between Markers for human samples:

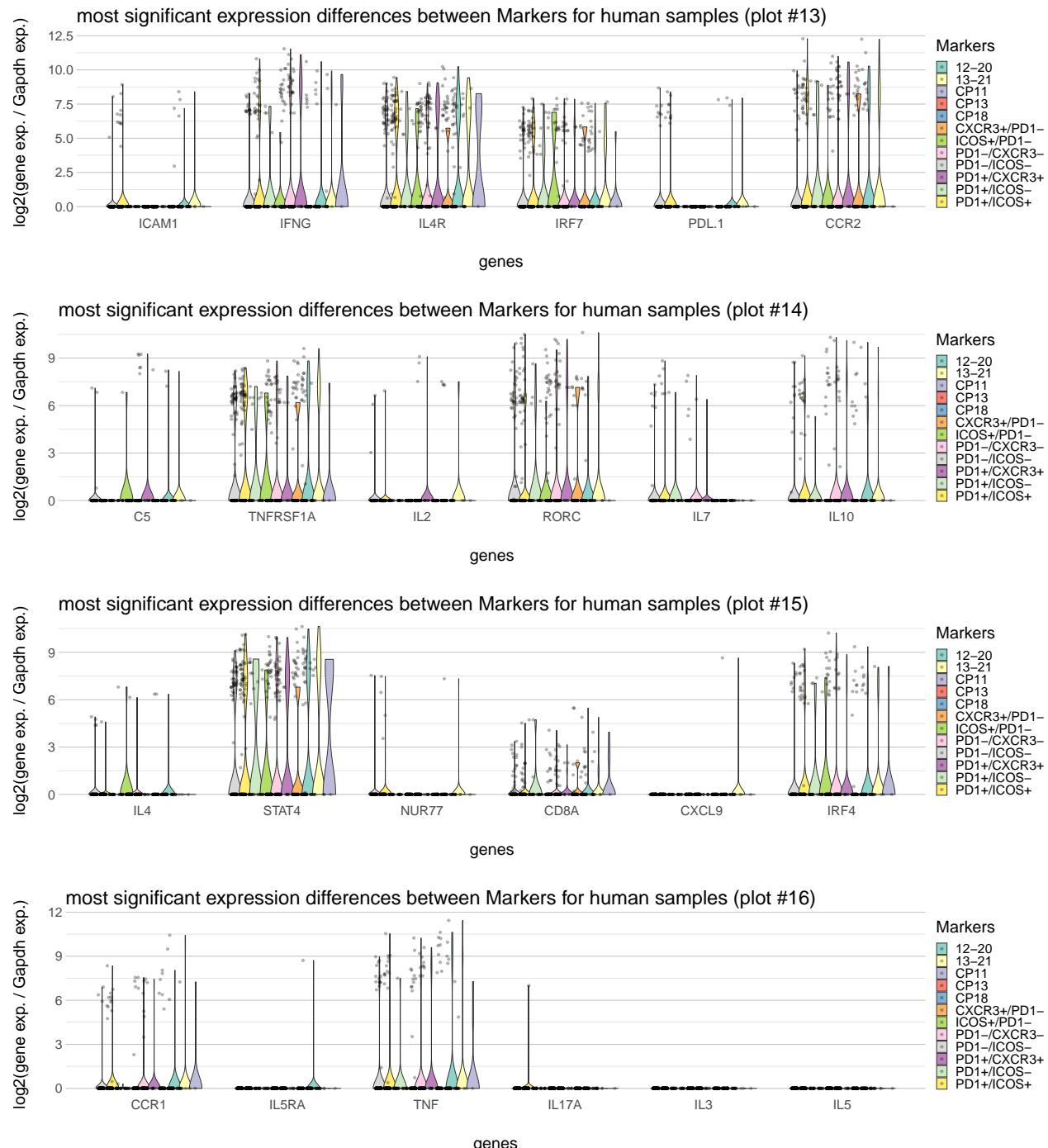
- | | | |
|-------------------------|------------------|-------------------|
| [1] CCR4: 2.004e-69 | CD3E: 9.791e-37 | STAT5B: 1.996e-30 |
| [4] ICOS: 3.614e-30 | CD52: 5.4e-27 | GAPDH: 1.22e-26 |
| [7] JAK2: 9.202e-26 | CDC42: 1.943e-22 | RAC2: 2.59e-22 |
| [10] FYN: 4.427e-21 | IRF1: 5.023e-19 | RPL13A: 1.169e-18 |
| [13] IFI44: 2.916e-17 | B2M: 5.249e-17 | LY6E: 2.115e-15 |
| [16] FOXP3: 8.913e-14 | ISG15: 1.31e-13 | CD4: 1.74e-13 |
| [19] CD53: 4.433e-13 | RAC1: 5.932e-13 | CD44: 8.131e-13 |
| [22] IL7R: 1.536e-12 | IL2RA: 1.536e-12 | CD28: 2.793e-12 |
| [25] HLA.DRA: 4.703e-12 | IFIT3: 7.541e-12 | CCR7: 1.162e-11 |

[28]	ZAP70:	2.297e-11	TBX21:	2.297e-11	TNFAIP3:	2.297e-11
[31]	VAV1:	6.081e-11	STAT1:	7.538e-11	NR4A1:	9.983e-11
[34]	PTEN:	1.69e-10	IFIT1:	6.649e-10	IFNAR2:	2.003e-09
[37]	C3:	2.003e-09	TGFBR2:	2.365e-09	CD40:	2.365e-09
[40]	S0CS3:	1.901e-08	IL25:	2.002e-08	GSK3A:	8.909e-08
[43]	BCL2:	1.015e-07	CCR5:	1.043e-07	STAT3:	1.458e-07
[46]	IRF9:	1.458e-07	TNFRSF1B:	1.462e-07	TYK2:	1.462e-07
[49]	ZEB2:	3.623e-07	IRF2:	3.886e-07	CCR3:	4.715e-06
[52]	BCL6:	4.731e-06	PPARG:	4.745e-06	CCR6:	6.126e-06
[55]	CXCR3:	1.04e-05	JAK1:	1.54e-05	IL21:	1.919e-05
[58]	NFKB1:	3.129e-05	CTLA4:	4.066e-05	CXCR4:	7.938e-05
[61]	GSK3B:	9.776e-05	IL12RB1:	0.0001289	CXCL10:	0.0001289
[64]	NLRP3:	0.0002977	IFNGR1:	0.0002977	PPARA:	0.002193
[67]	GATA3:	0.002479	IFNAR1:	0.002538	CD274:	0.002944
[70]	TRAF2:	0.004186	PPARGC1A:	0.007719	IFI44L:	0.01045
[73]	ICAM1:	0.01795	IFNG:	0.02452	IL4R:	0.02543
[76]	IRF7:	0.02616	PDL.1:	0.03137		









[1] Differentially expressed genes between Types of Markers for human samples:

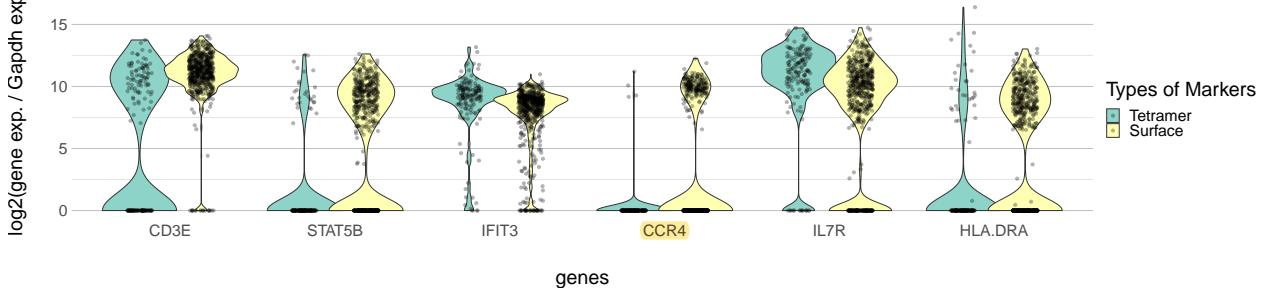
```

[1] CD3E: 7.834e-28      STAT5B: 1.355e-14      IFIT3: 1.485e-13
[4] CCR4: 6.513e-13      IL7R: 8.901e-13       HLA.DRA: 1.92e-11
[7] JAK2: 6.124e-11      CD52: 1.373e-10      IFI44: 4.402e-10
[10] CCR7: 3.345e-09     BCL2: 7.1e-09        RAC2: 7.744e-09
[13] ICOS: 2.453e-08     IFIT1: 3.655e-08     CCR5: 5.697e-08
[16] GAPDH: 1.791e-07    NLRP3: 6.187e-07     CD53: 8.713e-07
[19] CCR6: 1.16e-06      STAT1: 1.349e-06     IL25: 1.43e-06
[22] TNFRSF1B: 2.812e-06 IFI44L: 1.025e-05   CD40: 1.028e-05
[25] FOXP3: 1.14e-05    CCR3: 2.241e-05     CXCL10: 2.531e-05

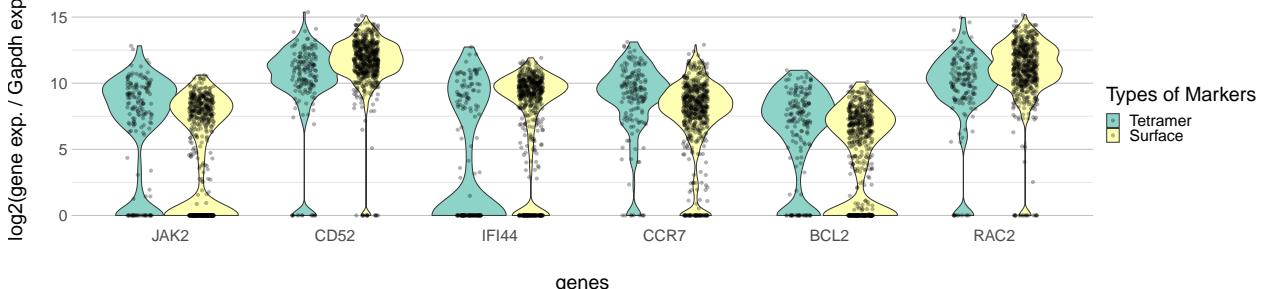
```

[28]	TBX21:	2.606e-05	ISG15:	9.883e-05	JAK1:	0.0001365
[31]	B2M:	0.0002118	CXCR4:	0.0009804	ZEB2:	0.0009929
[34]	IRF9:	0.001112	IRF1:	0.001773	C3:	0.001773
[37]	CD4:	0.002256	PPARGC1A:	0.002256	IRF2:	0.002438
[40]	TNFAIP3:	0.003139	FYN:	0.003956	RORC:	0.008583
[43]	TRAF2:	0.009596	CDC42:	0.01225	TGFBR2:	0.01326
[46]	NR4A1:	0.01374	IL4R:	0.01755	TYK2:	0.01902
[49]	IFNAR2:	0.01989	IL7:	0.0284	GSK3A:	0.04139
[52]	LY6E:	0.04783				

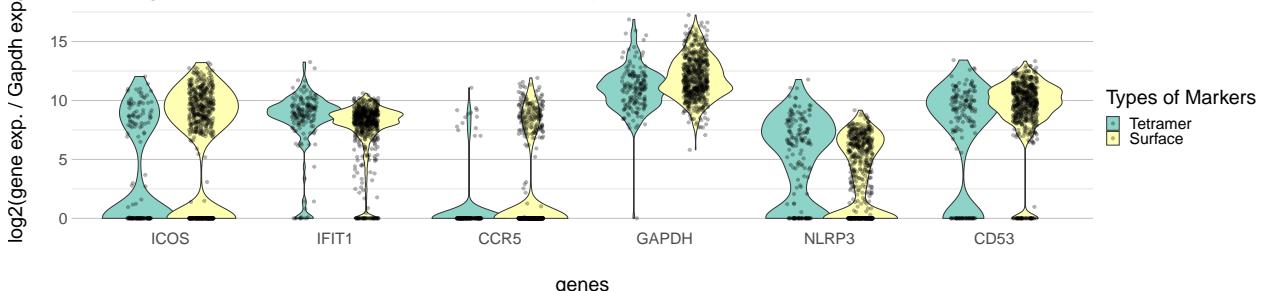
most significant expression differences between Types of Markers for human samples (plot #1)



most significant expression differences between Types of Markers for human samples (plot #2)



most significant expression differences between Types of Markers for human samples (plot #3)



most significant expression differences between Types of Markers for human samples (plot #4)

