alona
automatic cell type annotation
using machine learning

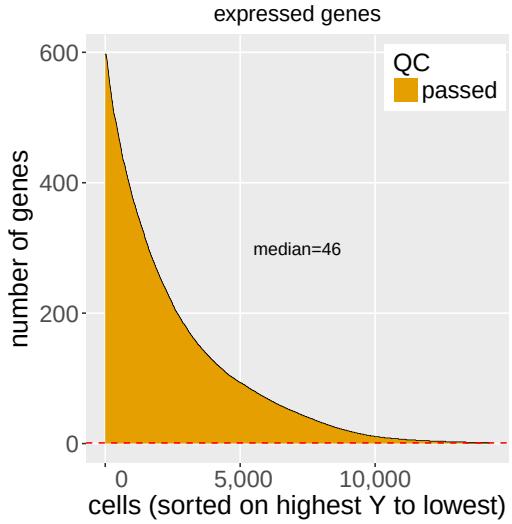
https://alona.PanglaoDB.se

1 Input details

filename	sequencing-B cell.zip
size	7.18 MiB
job id	5cc6bdbd5d76c
time finished	2019-04-29T09:17:47 UTC
description	NA
md5	`0dc716f5d06ceff79f0efd418a6414a7`
time uploaded	Mon Apr 29 2019 17:01:24 GMT+0800 (äÿŋåŻ¡æäĞåĞĘæŮűéŮť)
species	*Homo sapiens*
data type	Normalized counts
QC strategy	min. 1 expressed genes per cell
delimiter	TAB
header	Yes
full length mRNA-seq	Yes
cell cluster statistic	median
remove mitochondrial genes	No
cluster resolution	small

2 Quality filtering

The red line indicates the pre-defined filtering threshold.



The plot normally shown in this box
is not applicable if data are not raw read counts.

2.1 Metrics

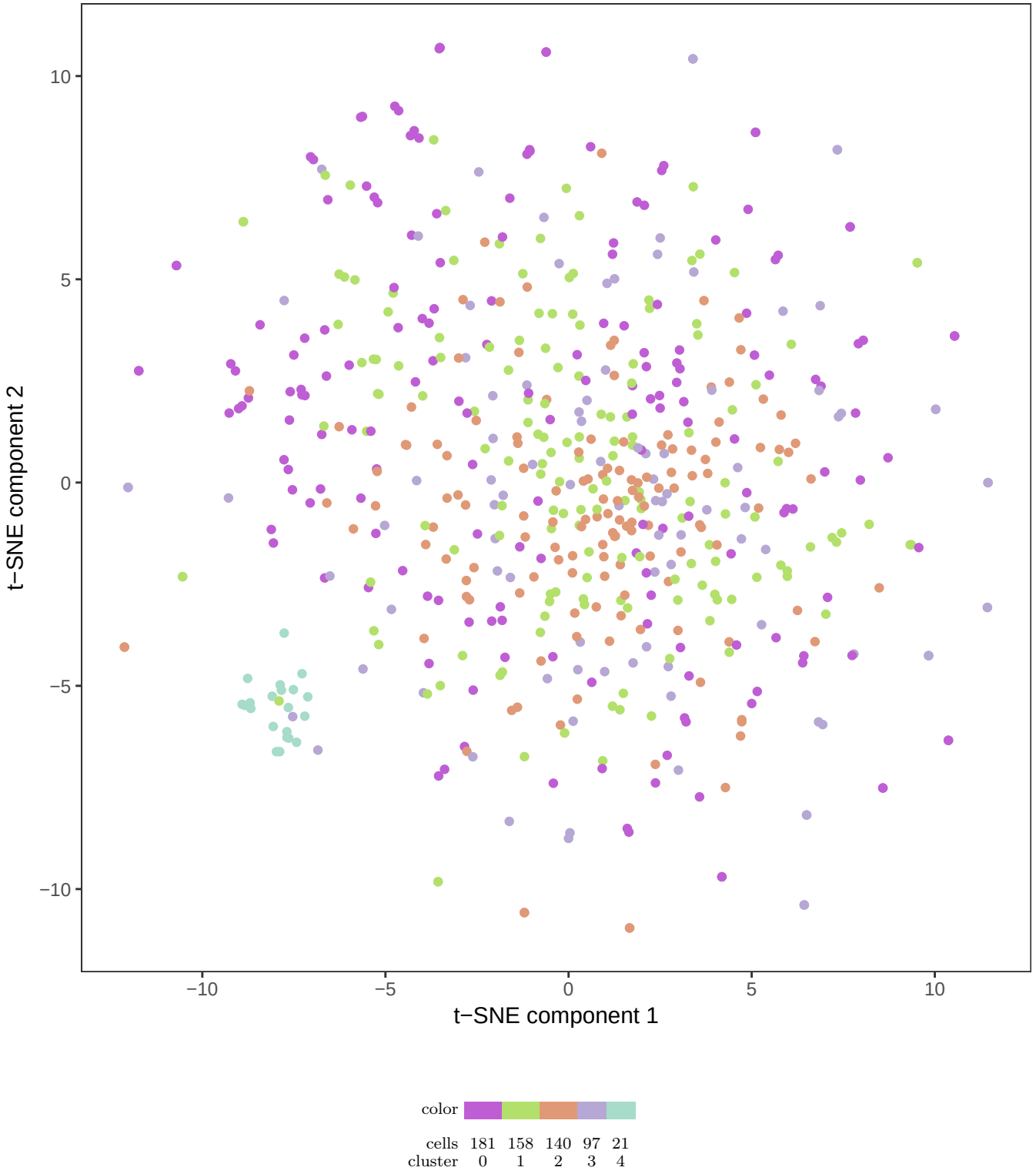
- 597 out of 597 cells were used in the analysis.
- 1 genes could not be mapped to internal gene symbols (unused genes are listed in section 10). This is usually because of a non-standard or non-official gene symbol/alias.
- 11,136 genes were used in the analysis.
- 5 cell cluster(s) were formed.
- 1 cell type(s) were predicted.

3 Top 20 expressed genes

This is a list of the top 20 most expressed genes in the data. Genes were ranked across all clusters.

symbol	description	biotype	median	mad
Cd74	CD74 molecule	protein-coding gene	3.567	0.075
B2m	beta-2-microglobulin	protein-coding gene	3.439	0.100
Rpl41	ribosomal protein L41	protein-coding gene	3.399	0.100
Rps18	ribosomal protein S18	protein-coding gene	3.387	0.114
Rps27	ribosomal protein S27	protein-coding gene	3.382	0.109
Rpl3	ribosomal protein L3	protein-coding gene	3.355	0.100
Rpl19	ribosomal protein L19	protein-coding gene	3.331	0.085
Rps3a1	ribosomal protein S3A1	protein coding gene	3.329	0.093
Actb	actin beta	protein-coding gene	3.325	0.144
Rps4x	ribosomal protein S4 X-linked	protein-coding gene	3.297	0.113
Rps14	ribosomal protein S14	protein-coding gene	3.295	0.115
Rpl7	ribosomal protein L7	protein-coding gene	3.282	0.116
Rps5	ribosomal protein S5	protein-coding gene	3.281	0.123
Rps11	ribosomal protein S11	protein-coding gene	3.270	0.107
Rps25	ribosomal protein S25	protein-coding gene	3.250	0.113
Gm10036	uncharacterized transcript		3.241	0.114
Rps13	ribosomal protein S13	protein-coding gene	3.234	0.129
Cxcr4	C-X-C motif chemokine receptor 4	protein-coding gene	3.223	0.209
Rpl8	ribosomal protein L8	protein-coding gene	3.212	0.131
Rpl4	ribosomal protein L4	protein-coding gene	3.211	0.123

4 t-distributed stochastic neighbor embedding (t-SNE)



5 Cell type predictions

5.1 Machine learning

These results are based on the machine learning classifier. Details of cell to cluster mappings is found in section 9.

cluster[a]	no. cells[b]	% cells	genes[c]	cell type	probability[d]
0	181	30.310	2,660	B cells	0.164
1	158	26.470	2,246	B cells	0.201
2	140	23.450	2,232	B cells	0.201
3	97	16.250	2,311	B cells	0.250
4	21	3.520	2,749	B cells	0.595

[a] Cluster identifier.
[b] Number of cells in the cluster.
[c] For each cell in the cluster, counting the number of genes with > 0 expression and reporting the median.
[d] Model probability reported by the SVM.

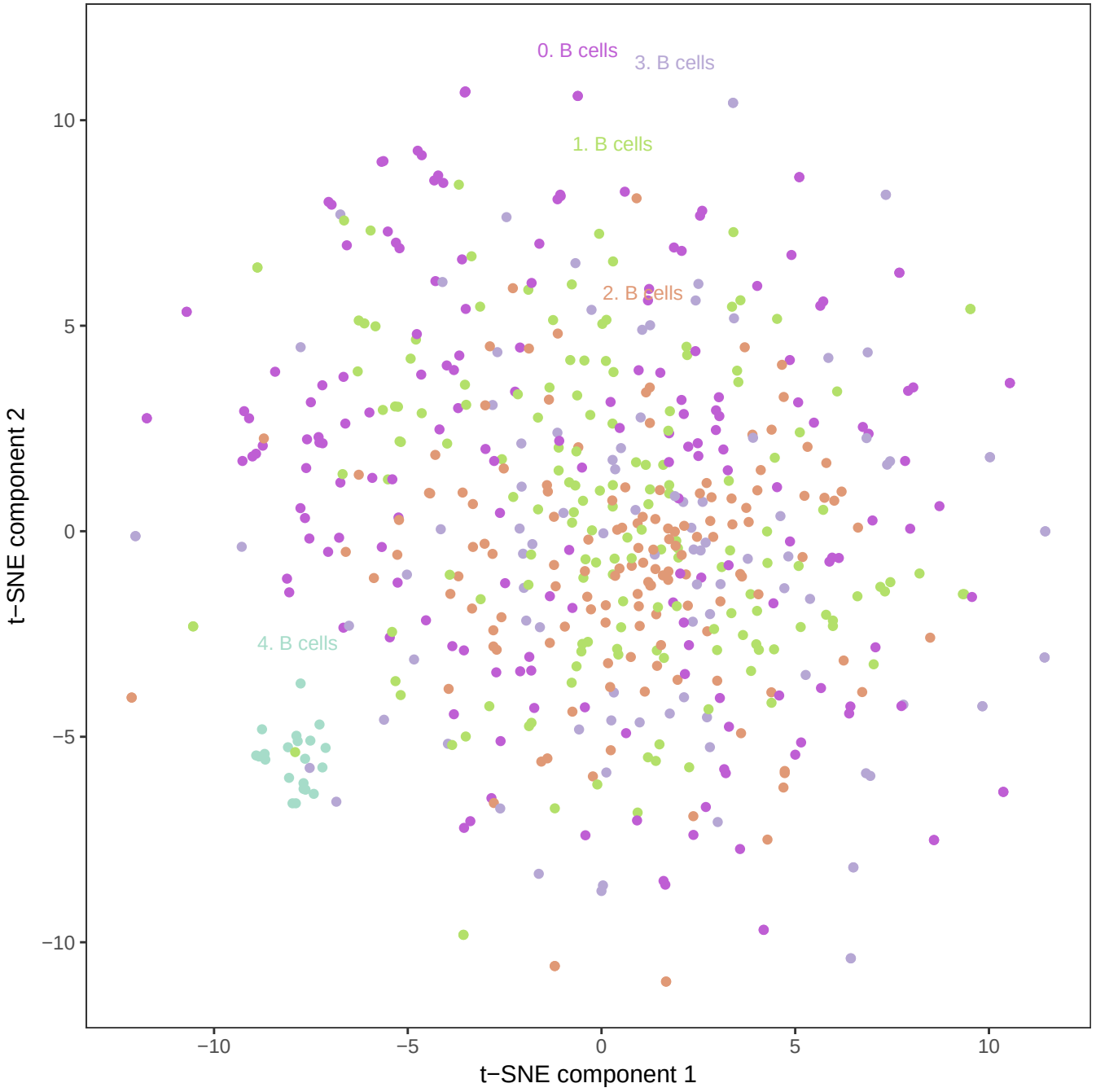
5.2 Hypergeometric test

These results are purely based on marker genes. Green rows indicate significant associations. The following markers were used: `https://panglaodb.se/markers/PanglaoDB_markers_28_Apr_2019.tsv.gz`

cluster[a]	cell type	activity score[b]	p-value[c]	adjusted p-value[d]	significance[e]
0	B cells	37	4.6e-07	8.5e-05	*
1	B cells naive	30	8.6e-04	5.3e-02	*
2	B cells	38	5.6e-08	4.9e-05	*
3	B cells memory	35	1.0e-06	1.5e-04	*
4	B cells	33	2.3e-06	2.9e-04	*

[a] Cluster identifier.
[b] Activity score of expressed marker genes.
[c] P-value from a hypergeometric test.
[d] Adjusted p-value based on the Benjamini-Hochberg procedure.
[e] * significant at FDR<10%.

6 Annotated t-SNE



7 Top 20 expressed genes per cluster

7.1 cluster 0 - B cells (n=181; prob=0.164)

symbol	description	biotype	median
Cd74	CD74 molecule	protein-coding gene	3.546
B2m	beta-2-microglobulin	protein-coding gene	3.424
Rpl41	ribosomal protein L41	protein-coding gene	3.387
Rps27	ribosomal protein S27	protein-coding gene	3.382
Rps18	ribosomal protein S18	protein-coding gene	3.378
Actb	actin beta	protein-coding gene	3.341
Rpl3	ribosomal protein L3	protein-coding gene	3.339
Rpl19	ribosomal protein L19	protein-coding gene	3.321
Rps3a1	ribosomal protein S3A1	protein coding gene	3.319
Rps4x	ribosomal protein S4 X-linked	protein-coding gene	3.290
Rpl7	ribosomal protein L7	protein-coding gene	3.279
Rps5	ribosomal protein S5	protein-coding gene	3.278
Rps14	ribosomal protein S14	protein-coding gene	3.274
Rps11	ribosomal protein S11	protein-coding gene	3.254
Cxcr4	C-X-C motif chemokine receptor 4	protein-coding gene	3.250
Rps25	ribosomal protein S25	protein-coding gene	3.239
Gm10036	uncharacterized transcript		3.238
Rps13	ribosomal protein S13	protein-coding gene	3.225
Rps28	ribosomal protein S28	protein-coding gene	3.220
Rpl4	ribosomal protein L4	protein-coding gene	3.217

Markers: *Cd74*, *Cxcr4*, *Ms4a1*, *Cd79b*, *Cd79a*, *Cd69*, *Cd19*, *Ltb*, *Bank1*, *Ptprc*, *Hvcn1*, *H2-Ob*, *Vpreb3*, *Cd22*, *Bcl11a*, *Cd40*, *Birc3*, *Ccr7*, *Lrmp*, *Pou2af1*, *Blnk*, *Pax5*, *H2-Oa*, *Spn*, *Fam129c*, *Ralgps2*, *Smap2*, *Tnfrsf9*, *Fchsd2*, *Cd72*, *Klhl6*, *Slamf6*, *Fcer2a*

7.2 cluster 1 - B cells (n=158; prob=0.201)

symbol	description	biotype	median
Cd74	CD74 molecule	protein-coding gene	3.579
B2m	beta-2-microglobulin	protein-coding gene	3.448
Rpl41	ribosomal protein L41	protein-coding gene	3.408
Rps18	ribosomal protein S18	protein-coding gene	3.400
Rps27	ribosomal protein S27	protein-coding gene	3.389
Rpl3	ribosomal protein L3	protein-coding gene	3.360
Rpl19	ribosomal protein L19	protein-coding gene	3.337
Actb	actin beta	protein-coding gene	3.331
Rps3a1	ribosomal protein S3A1	protein coding gene	3.330
Rps4x	ribosomal protein S4 X-linked	protein-coding gene	3.316
Rps14	ribosomal protein S14	protein-coding gene	3.312
Rpl7	ribosomal protein L7	protein-coding gene	3.289
Rps5	ribosomal protein S5	protein-coding gene	3.288
Rps11	ribosomal protein S11	protein-coding gene	3.269
Rps25	ribosomal protein S25	protein-coding gene	3.253
Gm10036	uncharacterized transcript		3.249
Rpl10a	ribosomal protein L10a	protein-coding gene	3.230
Rps13	ribosomal protein S13	protein-coding gene	3.228
Rpl23a	ribosomal protein L23a	protein-coding gene	3.224
Rps15a	ribosomal protein S15a	protein-coding gene	3.223

Markers: *Cd74*, *Cxcr4*, *Ms4a1*, *Cd79b*, *Cd79a*, *Ltb*, *Bank1*, *Cd19*, *Cd69*, *Ptprc*, *Hvcn1*, *Cd22*, *Bcl11a*, *Birc3*, *Pou2af1*, *Blnk*, *Spn*, *H2-Oa*, *Pax5*, *Fam129c*, *Tnfrsf9*, *H2-Ob*, *Ralgps2*, *Klhl6*, *Fchsd2*, *Smap2*

7.3 cluster 2 - B cells (n=140; prob=0.201)

symbol	description	biotype	median
Cd74	CD74 molecule	protein-coding gene	3.584
B2m	beta-2-microglobulin	protein-coding gene	3.424
Rpl41	ribosomal protein L41	protein-coding gene	3.421
Rps18	ribosomal protein S18	protein-coding gene	3.389
Rps27	ribosomal protein S27	protein-coding gene	3.384
Rpl3	ribosomal protein L3	protein-coding gene	3.383
Rpl19	ribosomal protein L19	protein-coding gene	3.352
Rps3a1	ribosomal protein S3A1	protein coding gene	3.343
Actb	actin beta	protein-coding gene	3.328
Rps5	ribosomal protein S5	protein-coding gene	3.317
Rps4x	ribosomal protein S4 X-linked	protein-coding gene	3.314
Rps14	ribosomal protein S14	protein-coding gene	3.311
Rpl7	ribosomal protein L7	protein-coding gene	3.292
Rps11	ribosomal protein S11	protein-coding gene	3.290
Rps25	ribosomal protein S25	protein-coding gene	3.268
Rps13	ribosomal protein S13	protein-coding gene	3.266
Cxcr4	C-X-C motif chemokine receptor 4	protein-coding gene	3.262
Gm10036	uncharacterized transcript		3.256
Rpl26	ribosomal protein L26	protein-coding gene	3.250
Rpl10a	ribosomal protein L10a	protein-coding gene	3.238

Markers: *Cd74*, *Cxcr4*, *Ms4a1*, *Cd79b*, *Cd79a*, *Cd69*, *Bank1*, *Cd19*, *Ltb*, *Ptprc*, *Hvcn1*, *H2-Ob*, *Bcl11a*, *Cd22*, *Blnk*, *Birc3*, *Cd40*, *Pax5*, *Pou2af1*, *Spn*, *Fam129c*, *Cd72*, *H2-Oa*, *Ccr7*, *Smap2*, *Tnfrsf9*, *Fchsd2*, *Ralgps2*, *Fcer2a*, *Cr2*, *Klhl6*, *Slamf6*

7.4 cluster 3 - B cells (n=97; prob=0.25)

symbol	description	biotype	median
Cd74	CD74 molecule	protein-coding gene	3.574
B2m	beta-2-microglobulin	protein-coding gene	3.467
Rps27	ribosomal protein S27	protein-coding gene	3.396
Rps18	ribosomal protein S18	protein-coding gene	3.396
Rpl41	ribosomal protein L41	protein-coding gene	3.390
Rps3a1	ribosomal protein S3A1	protein coding gene	3.346
Rpl3	ribosomal protein L3	protein-coding gene	3.342
Rpl19	ribosomal protein L19	protein-coding gene	3.334
Actb	actin beta	protein-coding gene	3.317
Rps14	ribosomal protein S14	protein-coding gene	3.308
Rps4x	ribosomal protein S4 X-linked	protein-coding gene	3.296
Rpl7	ribosomal protein L7	protein-coding gene	3.286
Rps11	ribosomal protein S11	protein-coding gene	3.283
Rps25	ribosomal protein S25	protein-coding gene	3.258
Rps5	ribosomal protein S5	protein-coding gene	3.246
Rps13	ribosomal protein S13	protein-coding gene	3.239
Gm10036	uncharacterized transcript		3.234
Rpl4	ribosomal protein L4	protein-coding gene	3.229
Rpl26	ribosomal protein L26	protein-coding gene	3.226
Rps15a	ribosomal protein S15a	protein-coding gene	3.221

Markers: *Cd74*, *Cxcr4*, *Ms4a1*, *Cd79b*, *Cd79a*, *Bank1*, *Cd69*, *Ptprc*, *Ltb*, *Cd19*, *Vpreb3*, *Hvcn1*, *Cd22*, *Bcl11a*, *Birc3*, *Pou2af1*, *Smap2*, *Pax5*, *Spn*, *Fam129c*, *Ralgps2*, *Blnk*, *Tnfrsf9*, *H2-Oa*, *Trp53inp1*, *Fchsd2*, *Slamf6*, *Klhl6*

7.5 cluster 4 - B cells (n=21; prob=0.595)

symbol	description	biotype	median
B2m	beta-2-microglobulin	protein-coding gene	3.528
Ssr4	signal sequence receptor subunit 4	protein-coding gene	3.431
Mzb1	marginal zone B and B1 cell specific protein	protein-coding gene	3.373
Rpl41	ribosomal protein L41	protein-coding gene	3.293
Cd74	CD74 molecule	protein-coding gene	3.290
Rps18	ribosomal protein S18	protein-coding gene	3.214
Herpud1	homocysteine inducible ER protein with ubiquitin like domain 1	protein-coding gene	3.206
Ubc	ubiquitin C	protein-coding gene	3.197
Xbp1	X-box binding protein 1	protein-coding gene	3.190
Rps4x	ribosomal protein S4 X-linked	protein-coding gene	3.185
Rpl3	ribosomal protein L3	protein-coding gene	3.171
Ppib	peptidylprolyl isomerase B	protein-coding gene	3.164
Rps5	ribosomal protein S5	protein-coding gene	3.151
Sec11c	SEC11 homolog C, signal peptidase complex subunit	protein-coding gene	3.137
Fkbp11	FK506 binding protein 11	protein-coding gene	3.134
Rpl8	ribosomal protein L8	protein-coding gene	3.133
Rplp0	ribosomal protein lateral stalk subunit P0	protein-coding gene	3.128
Hsp90b1	heat shock protein 90 beta family member 1	protein-coding gene	3.124
Rps14	ribosomal protein S14	protein-coding gene	3.123
Rps3a1	ribosomal protein S3A1	protein coding gene	3.103

Markers: *Mzb1, Cd74, Fkbp11, Derl3, Cd79a, Cxcr4, Creld2, Cd38, Sec61a1, Eaf2, Pou2af1, Tnfrsf17, Sdc1, Cd79b, Txndc11, Blnk, Edem2, Trp53inp1, Dok3, Edem1, Cd27, Birc3, Ptprc, Spn, Ralgps2, Fchsd2, Klhl6, Il21r, Tnfrsf9, Slamf6, H2-Oa*

8 Appendix - Top 10 cell type predictions

8.1 cluster 0

cell type	probability
B cells	0.164
T memory cells	0.089
T cells	0.083
Unknown	0.056
Dendritic cells	0.036
Neutrophils	0.027
Macrophages	0.026
Acinar cells	0.023
NK cells	0.018
Germ cells	0.016

8.2 cluster 1

cell type	probability
B cells	0.201
Unknown	0.069
T cells	0.065
T memory cells	0.061
Acinar cells	0.028
Macrophages	0.026
Neutrophils	0.026
Dendritic cells	0.022
NK cells	0.021
Clara cells	0.019

8.3 cluster 2

cell type	probability
B cells	0.201
T cells	0.087
T memory cells	0.064
Unknown	0.059
Macrophages	0.027
Acinar cells	0.026
Neutrophils	0.025
NK cells	0.021
Dendritic cells	0.021
Clara cells	0.017

8.4 cluster 3

cell type	probability
B cells	0.250
T cells	0.076
Unknown	0.058
T memory cells	0.054
Acinar cells	0.026
Neutrophils	0.025
Macrophages	0.025
Dendritic cells	0.024
Clara cells	0.018
NK cells	0.018

8.5 cluster 4

cell type	probability
B cells	0.595
T memory cells	0.021
Unknown	0.020
Neutrophils	0.015
Macrophages	0.014
T cells	0.013
Platelets	0.011
Germ cells	0.010
Enteroendocrine cells	0.010
Neurons	0.010

9 Appendix - cell to cluster assignments

```
cluster cell
0 cy60_1_cd_45_pos_3_A...
0 cy60_1_cd_45_pos_3_A...
0 cy60_1_cd_45_pos_3_E...
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0 cy60_1_cd_45_pos_3_F...
0 cy60_1_cd_45_pos_3_F...
0 cy60_1_cd_45_pos_3_H...
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0 cy60_1_cd_45_pos_4_C...
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0 CY65_POS_G_CAAGGCGA_...
0 Cy67-CD45pos-S2-A10_...
0 Cy67-CD45pos-S2-C11_...
0 Cy67-CD45pos-S2-C2_S...
0 Cy67-CD45pos-S2-D2_S...
0 Cy67-CD45pos-S2-D7_S...
0 Cy67-CD45pos-S2-E6_S...
0 Cy67-CD45pos-S2-F3_S...
0 Cy67-CD45pos-S2-G10_...
0 Cy67-CD45pos-S2-G12_...
0 Cy67-CD45pos-S2-H11_...
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0 cy72-CD45-pos-B06-S8...
0 cy72-CD45-pos-C10-S8...
0 cy72-CD45-pos-D02-S9...
0 cy72-CD45-pos-E02-S9...
0 cy72-CD45-pos-F08-S9...
0 cy72-CD45-pos-G01-S9...
0 cy72-CD45-pos-G04-S9...
0 cy72-CD45-pos-G09-S9...
0 cy74-CD45-pos-A08-S6...
0 cy74-CD45-pos-C12-S7...
0 cy74-CD45-pos-G12-S7...
0 cy79-p1-CD45-pos-PD1...
0 cy79-p1-CD45-pos-PD1...
0 cy79-p1-CD45-pos-PD1
```

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222. 1 cy60_1_cd_45_pos_HC_...
223. 1 cy60_1_cd_45_pos_HC_...
224. 1 cy60_1_cd_45_pos_HC_...
225. 1 CY65_NEG_E_AGAACATT_...
226. 1 Cy67-CD45pos-S2-B6_S...
227. 1 Cy67-CD45pos-S2-C12_...
228. 1 Cy67-CD45pos-S2-G2_S...
229. 1 Cy67-CD45pos-S2-G7_S...
230. 1 Cy67-CD45pos-S2-H10_...
231. 1 Cy72_CD45_A04_S676_c...
232. 1 Cy72_CD45_B09_S693_c...
233. 1 Cy72_CD45_C03_S699_c...
234. 1 Cy72_CD45_C06_S702_c...
235. 1 Cy72_CD45_D02_S710_c...
236. 1 Cy72_CD45_D03_S711_c...
237. 1 Cy72_CD45_G03_S747_c...
238. 1 Cy72_CD45_G08_S752_c...
239. 1 Cy72_CD45_H02_S758_c...
240. 1 cy72-CD45-pos-A02-S8...
241. 1 cy72-CD45-pos-B01-S8...
242. 1 cy72-CD45-pos-C05-S8...
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244. 1 cy72-CD45-pos-E10-S9...
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261. 1 cy79-p4-CD45-pos-PD1...
262. 1 cy80-CD45-neg-B04-S4...
263. 1 cy80-CD45-neg-D02-S4...
264. 1 cy80-Cd45-pos-Pd1-ne...
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266. 1 cy80-Cd45-pos-Pd1-ne...
267. 1 cy80-Cd45-pos-Pd1-ne...
268. 1 cy80-Cd45-pos-Pd1-ne...
269. 1 cy80-Cd45-pos-Pd1-ne...
270. 1 cy80-Cd45-pos-Pd1-ne...
271. 1 cy80-Cd45-pos-Pd1-ne...
272. 1 cy80-Cd45-pos-Pd1-ne...
273. 1 cy80-Cd45-pos-Pd1-ne...
274. 1 cy80-Cd45-pos-Pd1-ne...
275. 1 cy80-Cd45-pos-PD1-po...
276. 1 cy80-Cd45-pos-PD1-po...
277. 1 Cy81_FNA_CD45_F12_S2...
278. 1 Cy81_FNA_CD45_H05_S2...
279. 1 cy82-CD45-pos-1-F01-...
280. 1 cy84_Primary_CD45_po...
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282. 1 cy84_Primary_CD45_po...
283. 1 cy84_Primary_CD45_po...
284. 1 cy88_cd_45_pos_B11_S...
285. 1 cy88_cd_45_pos_F06_S...
286. 1 cy88_cd45pos_5_D02_S...
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289. 1 CY88CD45POS_7_C03_S2...
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291. 1 CY89A_CD45_POS_10_E1...
292. 1 CY89A_CD45_POS_4_A03...
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294. 1 CY89A_CD45_POS_4_E08...
295. 1 CY89A_CD45_POS_4_G05...
296. 1 CY89A_CD45_POS_4_H06...
297. 1 CY89A_CD45_POS_6_A02...
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299. 1 CY89A_CD45_POS_6_C12...
300. 1 CY89A_CD45_POS_6_D08...
301. 1 CY89A_CD45_POS_6_G01...
302. 1 CY89A_CD45_POS_6_G07...
303. 1 CY89A_Core_15_A05_S5...
304. 1 CY89A_Core_15_A09_S9...
305. 1 CY89A_Core_15_B01_S1...
306. 1 CY89A_Core_15_C04_S2...
307. 1 CY89A_Core_15_C12_S3...
308. 1 CY89A_Core_15_D04_S4...
309. 1 CY89A_Core_15_D06_S4...
310. 1 CY89A_Core_15_D11_S4...
311. 1 CY89A_Core_15_E04_S5...
312. 1 CY89A_Core_15_F05_S6...
313. 1 CY89COREQ1_B10_S310_...
314. 1 CY89COREQ1_C08_S320_...
315. 1 CY89COREQ1_E03_S339_...
316. 1 CY89COREQ1_E07_S343_...
317. 1 CY89COREQ1_G06_S366_...
318. 1 CY89COREQ1_G10_S370_...
319. 1 CY89COREQ1_G11_S371_...
320. 1 CY89COREQ1_H02_S374_...
321. 1 CY89FNA_C06_S222_com...
322. 1 CY89FNA_E07_S247_com...
323. 1 CY94_CD45NEG_CD90POS...
324. 1 cy94_cd45neg_cd90pos...
325. 1 cy94_cd45neg_cd90pos...
326. 1 cy94_cd45neg_cd90pos...
327. 1 cy94_cd45pos_4_B04_S...
328. 1 cy94_cd45pos_4_B10_S...
329. 1 cy94_cd45pos_4_D12_S...
330. 1 cy94_cd45pos_4_E09_S...
331. 1 cy94_cd45pos_B01_S10...
332. 1 cy94_cd45pos_B02_S11...
333. 1 CY94CD45POS_1_C06_S1...
334. 1 CY94CD45POS_1_D03_S1...
335. 1 CY94CD45POS_1_E08_S1...
336. 1 CY94CD45POS_1_F08_S1...
337. 1 CY94CD45POS_1_F11_S1...
338. 1 CY94CD45POS_1_G08_S1...
339. 1 CY94CD45POS_1_G10_S1...
340. 1 CY94CD45POS_1_H03_S1...
341. 2 cy60_1_cd_45_pos_3_A...
342. 2 cy60_1_cd_45_pos_3_A...
343. 2 cy60_1_cd_45_pos_3_B...
344. 2 cy60_1_cd_45_pos_3_D...
345. 2 cy60_1_cd_45_pos_3_E...
346. 2 cy60_1_cd_45_pos_3_F...
347. 2 cy60_1_cd_45_pos_4_A...
348. 2 cy60_1_cd_45_pos_4_E...
349. 2 cy60_1_cd_45_pos_4_G...
350. 2 cy60_1_cd_45_pos_HC_...
351. 2 cy60_1_cd_45_pos_HC_...
352. 2 cy60_1_cd_45_pos_HC_...
353. 2 cy60_1_cd_45_pos_HC_...
354. 2 cy60_1_cd_45_pos_HC_...
355. 2 cy60_1_cd_45_pos_HC_...
356. 2 Cy67-CD45pos-S2-F2_S...
357. 2 Cy67-CD45pos-S2-F6_S...
358. 2 Cy72_CD45_A05_S677_c...
359. 2 Cy72_CD45_F10_S742_c...
360. 2 Cy72_CD45_H05_S761_c...
361. 2 cy72-CD45-pos-G07-S9...
362. 2 Cy74_CD45_B02_S398_c...
363. 2 Cy74_CD45_B08_S404_c...
364. 2 Cy74_CD45_D08_S428_c...
365. 2 Cy74_CD45_H07_S475_c...
366. 2 cy74-CD45-pos-D03-S7...
367. 2 cy74-CD45-pos-E07-S7...
368. 2 cy74-CD45-pos-F02-S7...
369. 2 cy79-p1-CD45-pos-PD1...
370. 2 cy79-p1-CD45-pos-PD1...
371. 2 cy79-p1-CD45-pos-PD1...
372. 2 cy79-p1-CD45-pos-PD1...
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379. 2 cy79-p1-CD45-pos-PD1...
380. 2 cy79-p1-CD45-pos-PD1...
381. 2 cy79-p3-CD45-pos-PD1...
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392. 2 cy79-p3-CD45-pos-PD1...
393. 2 cy79-p3-CD45-pos-PD1...
394. 2 cy79-p3-CD45-pos-PD1...
395. 2 cy79-p3-CD45-pos-PD1...
396. 2 cy79-p5-CD45-pos-PD1...
397. 2 cy80-CD45-neg-C10-S8...
398. 2 cy80-CD45-neg-H01-S4...
399. 2 cy80-Cd45-pos-Pd1-ne...
400. 2 cy80-Cd45-pos-Pd1-ne...
401. 2 cy80-Cd45-pos-Pd1-ne...
402. 2 cy80-Cd45-pos-Pd1-ne...
403. 2 cy80-Cd45-pos-Pd1-ne...
404. 2 cy80-Cd45-pos-Pd1-ne...
405. 2 cy80-Cd45-pos-Pd1-ne...
406. 2 cy84_Primary_CD45_po...
407. 2 cy84_Primary_CD45_po...
408. 2 cy84_Primary_CD45_po...
409. 2 cy84-Met-CD45-pos-H0...
410. 2 CY88CD45POS_2_G07_S4...
411. 2 CY88CD45POS_7_G03_S2...
412. 2 CY89A_CD45_POS_10_A1...
413. 2 CY89A_CD45_POS_4_A11...
414. 2 CY89A_CD45_POS_4_B02...
415. 2 CY89A_CD45_POS_4_B05...
416. 2 CY89A_CD45_POS_4_B11...
417. 2 CY89A_CD45_POS_4_C12...
418. 2 CY89A_CD45_POS_4_F01...
419. 2 CY89A_CD45_POS_4_F06...
420. 2 CY89A_CD45_POS_4_F10...
421. 2 CY89A_CD45_POS_4_G09...
422. 2 CY89A_CD45_POS_6_A06...
423. 2 CY89A_CD45_POS_6_A11...
424. 2 CY89A_CD45_POS_6_B05...
425. 2 CY89A_CD45_POS_6_B07...
426. 2 CY89A_CD45_POS_6_B09...
427. 2 CY89A_CD45_POS_6_C04...
428. 2 CY89A_CD45_POS_6_D07...
429. 2 CY89A_CD45_POS_6_F05...
430. 2 CY89A_CD45_POS_6_G08...
431. 2 CY89A_CD45_POS_6_H09...
432. 2 CY89A_Core_15_A10_S1...
433. 2 CY89A_Core_15_B09_S2...
434. 2 CY89A_Core_15_C03_S2...
435. 2 CY89A_Core_15_F04_S6...
436. 2 CY89A_Core_15_G02_S7...
437. 2 CY89A_Core_15_G04_S7...
438. 2 CY89COREQ1_B08_S308_...
439. 2 CY89COREQ1_C02_S314_...
440. 2 CY89COREQ1_C07_S319_...
441. 2 CY89COREQ1_C12_S324_...
442. 2 CY89COREQ1_E05_S341_...
443. 2 CY89COREQ1_E11_S347_...
444. 2 CY89COREQ1_F05_S353_...
445. 2 CY89COREQ1_G07_S367_...
446. 2 CY89COREQ1_G09_S369_...
447. 2 CY89COREQ1_H03_S375_...
448. 2 CY89COREQ1_H10_S382_...
449. 2 CY89FNA_A10_S202_com...
450. 2 CY89FNA_C09_S225_com...
451. 2 CY89FNA_E08_S248_com...
452. 2 CY89FNA_F03_S255_com...
453. 2 CY94_CD45NEG_CD90POS...
454. 2 CY94_CD45NEG_CD90POS...

455. 2 cy94_cd45neg_cd90pos...
456. 2 cy94_cd45neg_cd90pos...
457. 2 cy94_cd45pos_4_B09_S...
458. 2 cy94_cd45pos_4_B12_S...
459. 2 cy94_cd45pos_4_C03_S...
460. 2 cy94_cd45pos_4_C04_S...
461. 2 cy94_cd45pos_4_D06_S...
462. 2 cy94_cd45pos_4_D07_S...
463. 2 cy94_cd45pos_4_G06_S...
464. 2 cy94_cd45pos_4_H11_S...
465. 2 cy94_cd45pos_B12_S12...
466. 2 cy94_cd45pos_C03_S12...
467. 2 cy94_cd45pos_F12_S16...
468. 2 cy94_cd45pos_G01_S16...
469. 2 cy94_cd45pos_H09_S18...
470. 2 CY94CD45POS_1_A05_S1...
471. 2 CY94CD45POS_1_A10_S1...
472. 2 CY94CD45POS_1_A12_S1...
473. 2 CY94CD45POS_1_B01_S1...
474. 2 CY94CD45POS_1_D07_S1...
475. 2 CY94CD45POS_1_E05_S1...
476. 2 CY94CD45POS_1_E07_S1...
477. 2 CY94CD45POS_1_E09_S1...
478. 2 CY94CD45POS_1_E10_S1...
479. 2 CY94CD45POS_1_F05_S1...
480. 2 CY94CD45POS_1_F09_S1...
481. 3 cy60_1_cd_45_pos_3_D...
482. 3 cy60_1_cd_45_pos_3_D...
483. 3 cy60_1_cd_45_pos_3_G...
484. 3 cy60_1_cd_45_pos_4_B...
485. 3 cy60_1_cd_45_pos_4_B...
486. 3 cy60_1_cd_45_pos_4_D...
487. 3 cy60_1_cd_45_pos_4_D...
488. 3 cy60_1_cd_45_pos_4_E...
489. 3 cy60_1_cd_45_pos_4_E...
490. 3 cy60_1_cd_45_pos_4_G...
491. 3 cy60_1_cd_45_pos_4_H...
492. 3 cy60_1_cd_45_pos_4_H...
493. 3 cy60_1_cd_45_pos_HC_...
494. 3 cy60_1_cd_45_pos_HC_...
495. 3 cy60_1_cd_45_pos_HC_...
496. 3 cy60_1_cd_45_pos_HC_...
497. 3 cy60_1_cd_45_pos_HC_...
498. 3 cy60_1_cd_45_pos_HC_...
499. 3 cy60_1_cd_45_pos_HC_...
500. 3 cy60_1_cd_45_pos_HC_...
501. 3 Cy67-CD45pos-S2-A5_S...
502. 3 Cy67-CD45pos-S2-C10_...
503. 3 Cy67-CD45pos-S2-C7_S...
504. 3 Cy67-CD45pos-S2-E11_...
505. 3 Cy67-CD45pos-S2-F5_S...
506. 3 Cy67-CD45pos-S2-G9_S...
507. 3 Cy71_CD45_H05_S569_c...
508. 3 Cy72_CD45_A03_S675_c...
509. 3 Cy72_CD45_A07_S679_c...
510. 3 Cy72_CD45_D05_S713_c...
511. 3 Cy72_CD45_E09_S729_c...
512. 3 Cy72_CD45_F04_S736_c...
513. 3 Cy72_CD45_G09_S753_c...
514. 3 cy72-CD45-pos-D12-S9...
515. 3 cy74-CD45-pos-G04-S7...
516. 3 cy79-p1-CD45-pos-PD1...
517. 3 cy79-p1-CD45-pos-PD1...
518. 3 cy79-p1-CD45-pos-PD1...
519. 3 cy79-p1-CD45-pos-PD1...
520. 3 cy79-p1-CD45-pos-PD1...
521. 3 cy79-p3-CD45-pos-PD1...
522. 3 cy79-p3-CD45-pos-PD1...
523. 3 cy80-CD45-neg-C08-S4...
524. 3 cy80-CD45-neg-F10-S4...
525. 3 cy80-Cd45-pos-Pd1-ne...
526. 3 cy80-Cd45-pos-Pd1-ne...
527. 3 cy80-Cd45-pos-Pd1-ne...
528. 3 cy80-Cd45-pos-Pd1-ne...
529. 3 cy80-Cd45-pos-Pd1-ne...
530. 3 cy80-Cd45-pos-Pd1-ne...
531. 3 cy80-Cd45-pos-Pd1-ne...
532. 3 cy80-Cd45-pos-Pd1-ne...
533. 3 cy80-Cd45-pos-Pd1-ne...
534. 3 cy80-Cd45-pos-Pd1-ne...
535. 3 cy82-CD45-pos-1-A04-...
536. 3 cy82-CD45-pos-1-B12-...
537. 3 cy84_Primary_CD45_po...
538. 3 cy84_Primary_CD45_po...
539. 3 cy84_Primary_CD45_po...
540. 3 cy84_Primary_CD45_po...
541. 3 cy84_Primary_CD45_po...
542. 3 cy84_Primary_CD45_po...
543. 3 cy84_Primary_CD45_po...
544. 3 cy84_Primary_CD45_po...
545. 3 cy84_Primary_CD45_po...
546. 3 cy84_Primary_CD45_po...
547. 3 cy84-Met-CD45-pos-B0...
548. 3 cy84-Met-CD45-pos-H0...
549. 3 cy84-Met-CD45-pos-H1...
550. 3 cy88_cd45pos_5_G04_S...
551. 3 CY89A_CD45_POS_4_E06...
552. 3 CY89A_CD45_POS_4_F11...
553. 3 CY89A_CD45_POS_6_D01...
554. 3 CY89A_CD45_POS_6_F07...
555. 3 CY89A_Core_15_B08_S2...
556. 3 CY89A_Core_15_B10_S2...
557. 3 CY89A_Core_15_D02_S3...
558. 3 CY89A_Core_15_E06_S5...
559. 3 CY89A_Core_15_E11_S5...
560. 3 CY89A_Core_15_H11_S9...
561. 3 CY89COREQ1_B06_S306_...
562. 3 CY89COREQ1_F08_S356_...
563. 3 CY89COREQ1_H01_S373_...
564. 3 CY89FNA_E05_S245_com...
565. 3 CY89FNA_G05_S269_com...
566. 3 CY94_CD45NEG_CD90POS...
567. 3 CY94_CD45NEG_CD90POS...
568. 3 cy94_cd45neg_cd90pos...
569. 3 cy94_cd45pos_4_D04_S...
570. 3 cy94_cd45pos_4_E10_S...
571. 3 cy94_cd45pos_4_G04_S...
572. 3 cy94_cd45pos_B06_S11...
573. 3 cy94_cd45pos_C08_S12...
574. 3 cy94_cd45pos_F09_S16...
575. 3 cy94_cd45pos_G04_S17...
576. 3 CY94CD45POS_1_A04_S1...
577. 3 CY94CD45POS_1_A06_S1...
578. 4 cy58-1-CD45-pos-C01-...
579. 4 cy60_1_cd_45_pos_3_B...
580. 4 cy60_1_cd_45_pos_3_G...
581. 4 cy60_1_cd_45_pos_HC_...
582. 4 cy60_1_cd_45_pos_HC_...
583. 4 cy60_1_cd_45_pos_HC_...
584. 4 cy80-Cd45-pos-Pd1-ne...
585. 4 cy82-CD45-pos-2-G12-...
586. 4 cy82-CD45-pos-3-G11-...
587. 4 cy88_cd_45_pos_E05_S...
588. 4 cy88_cd_45_pos_F05_S...
589. 4 CY88CD45POS_2_G05_S4...
590. 4 CY88CD45POS_7_C05_S2...
591. 4 CY88CD45POS_7_D03_S2...
592. 4 CY88CD45POS_7_F05_S2...
593. 4 CY89A_CD45_POS_4_B03...
594. 4 CY89A_CD45_POS_6_D06...
595. 4 CY89A_CD45_POS_6_G06...
596. 4 CY89A_Core_15_F06_S6...
597. 4 CY94_CD45NEG_CD90POS...
598. 4 CY94CD45POS_1_H04_S1...

10 Appendix - Unused genes

The followings genes were not used because they could not be mapped to the internal gene symbols.

1. LOC653712
2. GPR98
3. BSN-AS2
4. LOC728040
5. LOC100216546
6. PROSC
7. FLJ26850
8. KIAA1199
9. EPT1
10. TMEM180
11. C11orf93
12. GLUD1P7
13. IPW
14. LOC338758
15. LINC00597
16. AGPHD1
17. DKFZP434I0714
18. LOC100133091
19. C11orf73
20. ERBB2IP
21. RNU6-33
22. LOC729603
23. FLJ42709
24. C19orf55
25. FONG
26. LOC654342
27. RNU6-34
28. FLJ45974
29. LOC100132707
30. FLJ39739
31. BAGE4
32. LINC00675
33. PP14571
34. LOC284344
35. LOC100506172
36. EMR1
37. LOC729177
38. LOC100527964
39. LOC100128252
40. C1orf145
41. ECRP
42. LOC440311
43. LOC400752
44. LOC338799
45. LOC100132735
46. LOC653486
47. LOC392232
48. LINC00577
49. LOC340073
50. C15orf60
51. LOC574538
52. LRRC16B
53. FLJ13224
54. C7orf53
55. LOC100505474
56. LOC100133161
57. LPPR4
58. LOC100129046
59. ZMYM6NB
60. RNU6-79
61. LINC00516
62. MS4A8B
63. LOC100130155
64. LOC284412
65. LOC729852
66. KIAA0368
67. LOC100289673
68. LOC100128993
69. C2orf53
70. MGC34796
71. FOLR4
72. PARK2
73. GPR124
74. ACPL2
75. LOC728724
76. LOC649133
77. SERF2-C15ORF63
78. LOC285593
79. LOC285627
80. EFCAB4A
81. CCDC129
82. LOC100500773
83. C11orf57
84. WIBG
85. FLJ34503
86. FLJ41200
87. 7-Sep
88. KIAA1045
89. FAM73B
90. LOC399715
91. LOC100144597
92. LOC727915
93. BET3L
94. C15orf26
95. SNORD50A
96. LOC100270746
97. FAM134A
98. FLJ13197
99. FAM22F
100. C4orf32
101. LOC392196
102. SKIV2L2
103. FKSG29
104. 2-Sep
105. LOC100289187
106. OBFC1
107. C14orf79
108. LOC100128420
109. FAM134C
110. LOC493754
111. POU4F1-AS1
112. C16orf11
113. LOC284837
114. LOC285972
115. KIAA1239
116. C11orf92
117. C21orf33
118. BRE
119. TOMM70A
120. LOC100507003
121. PAR-SN
122. MGC39372
123. MGC27382
124. HFE2
125. TMEM133
126. LOC731779
127. LOC100128593
128. LOC100507537
129. LOC387723
130. LOC401109
131. SNAR-A10
132. DOPEY1
133. LOC253039
134. LOC283922
135. BREA2
136. FLJ42875
137. RABL5
138. LOC100133957
139. LOC100506054
140. LOC644961
141. LOC100506190
142. LOC100507389
143. C1orf86
144. ILF3-AS1
145. HRSP12
146. KIAA1751
147. MIR219-2
148. PHOSPHO2-KLHL23
149. LOC154761
150. LOC653160
151. PCNA-AS1
152. NUDT4P1
153. SNAR-A7
154. RTDR1
155. LOC441155
156. FAM127C
157. FAM109A
158. LOC257358
159. FP588
160. C20orf24
161. LOC285484
162. ZFP106
163. TCEB3CL
164. LOC728323
165. LOC646813
166. LINC00260
167. FDPSL2A
168. LOC100169752
169. RNU6-83
170. C14orf182
171. LOC339442
172. HP07349
173. OR9G9
174. LOC100130894
175. C20orf201
176. C9orf37
177. TMEM66
178. MT1IP
179. LEPRE1
180. LOC150776
181. LOC100507299
182. C21orf88
183. PAR4
184. LOC100506474
185. PPAP2C
186. CTSL1P8
187. C11orf34
188. FLJ31813
189. LINC00696
190. LOC100507140
191. LOC646938
192. UFD1L
193. FLJ25363
194. SLC22A20
195. LOC415056
196. CCDC104
197. LOC100128568
198. LYRM5
199. KIAA1524
200. HDGFRP3
201. LOC100132356
202. LOC100289495
203. FLJ45513
204. LOC100505841
205. DDX26B
206. LOC100499405
207. LOC100506136
208. LOC338963
209. XAGE1C
210. LOC442459
211. LOC283174
212. LOC643201
213. LOC400654
214. HOXA10-HOXA9
215. PMS2L2
216. SNORD81
217. LOC645434
218. SPANXB2
219. LOC100132077
220. 7-Mar
221. LOC100130992
222. C1orf110
223. HIAT1
224. DEFB131
225. RQCD1
226. GAGE2D
227. RFPL1-AS1
228. C5orf54
229. LOC100507373
230. PET112
231. C9orf117
232. LOC100287834
233. C3orf27
234. FAM25B
235. C9orf114
236. LOC732275
237. C21orf15
238. LOC643623
239. LOC100506025
240. LOC390660
241. KIAA1737
242. LOC100422737
243. PAPD5
244. LOC646268
245. AGAP8
246. LOC442132
247. FAM105A
248. LOC100505624
249. LOC285768
250. LOC144742
251. C17orf104
252. LOC644936
253. LPHN1
254. LOC100507433
255. LOC441204
256. LOC645638
257. C14orf1
258. SKP1P2
259. FLJ42102
260. 6-Mar
261. C2orf71
262. C15orf57
263. LOC349160
264. LOC100128338
265. FAM74A2
266. SNORA43
267. LOC100289473
268. LOC100130238
269. LOC100292680
270. C6orf195
271. RAD51L3-RFFL
272. REXO1L1
273. LOC646498
274. STL
275. NPIP
276. DSCR3
277. LOC90834
278. EMCN-IT3
279. C5orf48
280. LOC100507244
281. FAM211B
282. RNU6-67
283. RUNX1-IT1
284. LOC152217
285. APCDD1L-AS1
286. C19orf60
287. LOC283070
288. LOC730091
289. FLJ46066

290. FAM115A
291. DYX1C1
292. LOC339166
293. LOC100507651
294. C1orf213
295. PTPLAD2
296. LOC100130093
297. LOC441461
298. WDR52
299. TMEM2
300. LINC00238
301. FLJ22184
302. LOC100506233
303. LOC286184
304. GPR111
305. LOC441025
306. FAM58A
307. LOC100507472
308. LOC644172
309. FTSJ2
310. PYCRL
311. LOC283332
312. LOC100652768
313. LOC100507564
314. CARKD
315. SMEK2
316. C1orf172
317. SCXA
318. LUST
319. C10orf11
320. LOC286189
321. LOC253044
322. LOC284100
323. PTPLA
324. ZCCHC16
325. NCRNA00185
326. LOC440518
327. MESDC2
328. LOC727896
329. LOC100506343
330. 1-Dec
331. DKFZP434A062
332. FLJ35024
333. LOC100130348
334. LOC100499484-C9ORF174
335. C10orf12
336. CCDC64
337. TMEM14E
338. LOC641515
339. CCDC11
340. C15orf52
341. LOC100506388
342. FAM63B
343. AKR1CL1
344. KIAA2018
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915. FAM194A

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1312. C17orf62
1313. GYLTL1B
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1317. C20orf112
1318. MINOS1P1
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1320. SNORA45
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1353. C9orf69
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1355. C20orf166
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1360. MIR4482-1
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1372. C1orf170
1373. 11-Sep
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1376. LOC100132273
1377. C12orf23
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1379. LOC400548
1380. MGC16142
1381. SNORD79
1382. GAGE8
1383. ATPBD4
1384. RNU6-69
1385. BMS1P5
1386. KCNMB2-IT1
1387. C18orf61
1388. TMEM30C
1389. TMEM110
1390. BAIAP2-AS1
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1392. WBSCR16
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1394. C1orf200
1395. C19orf80
1396. NARR
1397. LOC100507173
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1399. LOC646719
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1403. TTLL13
1404. C1orf101
1405. TEX40
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1451. C14orf166
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1459. LOC100129427
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1472. 4-Sep
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1486. SPG20OS
1487. LOC100505633
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1489. PION
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1491. LOC100507032
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1494. LOC100873065
1495. C8orf40
1496. LOC100144595
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1498. SHFM1
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1509. CECR6
1510. SNAR-A12
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1533. LOC730101
1534. FAM64A
1535. FAM21C
1536. C19orf59
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1541. PCNXL3

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1585. RNU6-76
1586. LOC644649
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1588. CCDC176
1589. LOC653501
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1591. LOC650226
1592. FAM127A
1593. TMPRSS4-AS1
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1595. CCDC23
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1602. ZNF663
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1618. MFSD7
1619. SNORD103A
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1627. RSG1
1628. C19orf26
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1644. C10orf118
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1649. GM140
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1653. LOC100507377
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1659. PIDD
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1661. C7orf73
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1663. SRPR
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1666. MLL2
1667. C12orf70
1668. SF3B14
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1671. C9orf169
1672. C1orf228
1673. C2orf47
1674. APOBEC3A_B
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1705. LOC100506013
1706. SNORD59B
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1711. C6orf164
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1719. RGAG4
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1723. LOC340094
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1726. ATHL1
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1729. TMEM257
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2006. GAGE6
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2013. GAGE2C
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2015. NBPF24
2016. EFTUD1P1
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2040. LOC728407
2041. LOC100505659
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2167. CXorf22

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2173. FAM91A2
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2199. KIAA0317
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2220. C17orf89
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2222. FLJ37201
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2261. CXorf28
2262. C10orf2
2263. LOC440335
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2267. LOC728743
2268. CCDC74B-AS1
2269. FAM179B
2270. LOC389458
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2279. CXorf27
2280. HDGFRP2
2281. LOC553103
2282. MINA
2283. PHF15
2284. MLL5
2285. CXorf48
2286. TTTY9A
2287. LOC100128288
2288. 4-Mar
2289. KIAA0226
2290. SNAR-E
2291. LOC442497
2292. C6orf7
2293. PKI55
2294. FLJ40852
2295. SNAR-A9
2296. SNAR-G2
2297. C14orf64
2298. DYX1C1-CCPG1
2299. LOC100506060
2300. LOC729950
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2302. FAM108B1
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2304. KIAA0101
2305. MIR143HG
2306. LOC339298
2307. HEATR2
2308. LOC147093
2309. C11orf70
2310. SMIM11
2311. SNORD29
2312. HNRNPU-AS1
2313. LOC643387
2314. C21orf128
2315. LOC389765
2316. C8orf12
2317. PROSAPIP1
2318. C3orf72
2319. LOC340107
2320. SNORD78
2321. LOC390705
2322. THEG5
2323. GUCY1A3
2324. PRKCDBP
2325. LOC100129269
2326. SQRDL
2327. MIR644B
2328. KIAA0141
2329. FLJ20021
2330. CCBP2
2331. FAM22A
2332. KIAA1683
2333. LOC100133315
2334. LOC285692
2335. LOC728392
2336. LOC727677
2337. IPO11-LRRC70
2338. LOC100130264
2339. C15orf43
2340. LOC100131726
2341. LOC339529
2342. FAM26D
2343. C9orf9
2344. LOC200726
2345. LOC151174
2346. LOC284688
2347. 8-Mar
2348. LOC285626
2349. FLJ35946
2350. LINC00116
2351. C1orf111
2352. LOC440354
2353. LOC401177
2354. MGC27345
2355. NUPL1
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2363. LOC399829
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2368. HMP19
2369. TGIF2-C20orf24
2370. FAM212B
2371. CCDC42B
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2373. FLJ33581
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2393. C1QTNF9B-AS1
2394. LOC100129216
2395. C7orf10
2396. LOC100128946
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2406. T
2407. LOC284632
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2409. LOC100128361
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2414. PTGER4P2-CDK2AP2P2
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2416. PNMAL1
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2419. 2-Mar
2420. SNAR-C3
2421. MFSD4
2422. LOC100505715
2423. LOC100506714
2424. C5orf20
2425. LOC100190986
2426. BRD7P3
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2428. HOXB-AS5
2429. MGC32805
2430. LOC388499
2431. 8-Sep
2432. TMEM194A
2433. LOC100289511
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2435. LOC100127983
2436. ACN9
2437. SNORA50
2438. WBSCR28
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2440. LOC149373
2441. TMEM55A
2442. FLJ25328
2443. KIAA1804
2444. C6orf25
2445. LOC728190
2446. ADCK3
2447. FAM159B
2448. LILRA3
2449. SELRC1
2450. C1orf204
2451. SGOL2
2452. OR8U8
2453. 15-Sep
2454. CENPC1
2455. GAGE5
2456. GAREM
2457. C11orf31
2458. LOC401134
2459. KIAA0947
2460. GLTPD1
2461. LOC148709
2462. LOC150935
2463. C8orf69
2464. HPVC1
2465. CCDC67
2466. KIAA0754
2467. LOC284801
2468. SGK196
2469. FLJ41941
2470. LOC339593
2471. C6orf147
2472. DKFZP586I1420
2473. CENPVP1
2474. TNFAIP8L2-SCNM1
2475. SMEK3P
2476. 1-Mar
2477. LOC286094
2478. LOC101059948
2479. C14orf101
2480. ADRBK2
2481. LOC100093631
2482. SELO