امیر سالاری تلمادره - ۶۱۰۳۹۷۱۱۹

In [7]:
```
library("affy")
library("gcrma")
library("GEOquery")
library("limma")
library("hgu133ahsentrezg.db")
library("hgu133ahsentrezgcdf")
library("hgu133ahsentrezgprobe")
```

```
Loading required package: AnnotationDbi

Loading required package: stats4

Loading required package: IRanges

Loading required package: S4Vectors


Attaching package: ‘S4Vectors’


The following objects are masked from ‘package:base’:

    expand.grid, I, unname


Loading required package: org.Hs.eg.db
```

In [8]:
```
untar("GSE19143_RAW.tar", exdir="data")
```

In [9]:
```
cels = list.files("data/", pattern = "CEL")
sapply(paste("data", cels, sep="/"), gunzip)
cels = list.files("data/", pattern = "CEL")
```

data/GSM474593.CEL.gz: 12147240 **data/GSM474594.CEL.gz:** 12173668
data/GSM474595.CEL.gz: 11791868 **data/GSM474596.CEL.gz:** 12032510
data/GSM474597.CEL.gz: 12218102 **data/GSM474598.CEL.gz:** 12057261
data/GSM474599.CEL.gz: 12151181 **data/GSM474600.CEL.gz:** 12292092
data/GSM474601.CEL.gz: 12101733 **data/GSM474602.CEL.gz:** 12078833
data/GSM474603.CEL.gz: 12096060 **data/GSM474604.CEL.gz:** 11990034
data/GSM474605.CEL.gz: 11920377 **data/GSM474606.CEL.gz:** 12244142
data/GSM474607.CEL.gz: 12065986 **data/GSM474608.CEL.gz:** 11933454
data/GSM474609.CEL.gz: 12210031 **data/GSM474610.CEL.gz:** 12099023
data/GSM474611.CEL.gz: 12039752 **data/GSM474612.CEL.gz:** 11987889
data/GSM474613.CEL.gz: 12023279 **data/GSM474614.CEL.gz:** 11927017
data/GSM474615.CEL.gz: 12070379 **data/GSM474616.CEL.gz:** 11910941
data/GSM474617.CEL.gz: 11929803 **data/GSM474618.CEL.gz:** 12129262

data/GSM474619.CEL.gz: 11986338 **data/GSM474620.CEL.gz:** 11802014
data/GSM474621.CEL.gz: 12378525 **data/GSM474622.CEL.gz:** 11927895
data/GSM474623.CEL.gz: 12075622 **data/GSM474624.CEL.gz:** 12073783
data/GSM474625.CEL.gz: 11950357 **data/GSM474626.CEL.gz:** 11930780
data/GSM474627.CEL.gz: 12064048 **data/GSM474628.CEL.gz:** 12014479
data/GSM474629.CEL.gz: 12069035 **data/GSM474630.CEL.gz:** 11742001
data/GSM474631.CEL.gz: 11798306 **data/GSM474632.CEL.gz:** 12062246
data/GSM474633.CEL.gz: 12017199 **data/GSM474634.CEL.gz:** 11795041
data/GSM474635.CEL.gz: 12042293 **data/GSM474636.CEL.gz:** 11996751
data/GSM474637.CEL.gz: 11997215 **data/GSM474638.CEL.gz:** 11987689
data/GSM474639.CEL.gz: 12055703 **data/GSM474640.CEL.gz:** 12156554
data/GSM474641.CEL.gz: 11974543 **data/GSM474642.CEL.gz:** 11976706
data/GSM474643.CEL.gz: 11899446 **data/GSM474644.CEL.gz:** 12088792

In [10]:
```
cels
```

'GSM474593.CEL' · 'GSM474594.CEL' · 'GSM474595.CEL' · 'GSM474596.CEL' ·
'GSM474597.CEL' · 'GSM474598.CEL' · 'GSM474599.CEL' · 'GSM474600.CEL' ·
'GSM474601.CEL' · 'GSM474602.CEL' · 'GSM474603.CEL' · 'GSM474604.CEL' ·
'GSM474605.CEL' · 'GSM474606.CEL' · 'GSM474607.CEL' · 'GSM474608.CEL' ·
'GSM474609.CEL' · 'GSM474610.CEL' · 'GSM474611.CEL' · 'GSM474612.CEL' ·
'GSM474613.CEL' · 'GSM474614.CEL' · 'GSM474615.CEL' · 'GSM474616.CEL' ·
'GSM474617.CEL' · 'GSM474618.CEL' · 'GSM474619.CEL' · 'GSM474620.CEL' ·
'GSM474621.CEL' · 'GSM474622.CEL' · 'GSM474623.CEL' · 'GSM474624.CEL' ·
'GSM474625.CEL' · 'GSM474626.CEL' · 'GSM474627.CEL' · 'GSM474628.CEL' ·
'GSM474629.CEL' · 'GSM474630.CEL' · 'GSM474631.CEL' · 'GSM474632.CEL' ·
'GSM474633.CEL' · 'GSM474634.CEL' · 'GSM474635.CEL' · 'GSM474636.CEL' ·
'GSM474637.CEL' · 'GSM474638.CEL' · 'GSM474639.CEL' · 'GSM474640.CEL' ·
'GSM474641.CEL' · 'GSM474642.CEL' · 'GSM474643.CEL' · 'GSM474644.CEL'

In [12]:
```
setwd(paste(getwd(),"/data/", sep=""))
```

In [13]:
```
#cdfname="HGU133A2_HS_ENTREZG"

raw.data = ReadAffy(verbose=TRUE, filenames=cels, cdfname="HGU133A_HS_ENTREZG
```

```
1 reading GSM474593.CEL ...instantiating an AffyBatch (intensity a 506944x52
matrix)...done.
Reading in : GSM474593.CEL
Reading in : GSM474594.CEL
Reading in : GSM474595.CEL
Reading in : GSM474596.CEL
Reading in : GSM474597.CEL
Reading in : GSM474598.CEL
Reading in : GSM474599.CEL
Reading in : GSM474600.CEL
Reading in : GSM474601.CEL
Reading in : GSM474602.CEL
Reading in : GSM474603.CEL
Reading in : GSM474604.CEL
Reading in : GSM474605.CEL
Reading in : GSM474606.CEL
Reading in : GSM474607.CEL
```

```
Reading in : GSM474608.CEL
Reading in : GSM474609.CEL
Reading in : GSM474610.CEL
Reading in : GSM474611.CEL
Reading in : GSM474612.CEL
Reading in : GSM474613.CEL
Reading in : GSM474614.CEL
Reading in : GSM474615.CEL
Reading in : GSM474616.CEL
Reading in : GSM474617.CEL
Reading in : GSM474618.CEL
Reading in : GSM474619.CEL
Reading in : GSM474620.CEL
Reading in : GSM474621.CEL
Reading in : GSM474622.CEL
Reading in : GSM474623.CEL
Reading in : GSM474624.CEL
Reading in : GSM474625.CEL
Reading in : GSM474626.CEL
Reading in : GSM474627.CEL
Reading in : GSM474628.CEL
Reading in : GSM474629.CEL
Reading in : GSM474630.CEL
Reading in : GSM474631.CEL
Reading in : GSM474632.CEL
Reading in : GSM474633.CEL
Reading in : GSM474634.CEL
Reading in : GSM474635.CEL
Reading in : GSM474636.CEL
Reading in : GSM474637.CEL
Reading in : GSM474638.CEL
Reading in : GSM474639.CEL
Reading in : GSM474640.CEL
Reading in : GSM474641.CEL
Reading in : GSM474642.CEL
Reading in : GSM474643.CEL
Reading in : GSM474644.CEL
```

In [14]:
```
data.norm = rma(raw.data)
```

```
Background correcting
Normalizing
Calculating Expression
```

In [15]:
```
data.norm
```

```
ExpressionSet (storageMode: lockedEnvironment)
assayData: 12316 features, 52 samples
  element names: exprs
protocolData
  sampleNames: GSM474593.CEL GSM474594.CEL ... GSM474644.CEL (52 total)
  varLabels: ScanDate
  varMetadata: labelDescription
phenoData
  sampleNames: GSM474593.CEL GSM474594.CEL ... GSM474644.CEL (52 total)
  varLabels: sample
  varMetadata: labelDescription
featureData: none
experimentData: use 'experimentData(object)'
Annotation: hgu133ahsentrezg
```

In [16]:
```
expressionMatrix = exprs(data.norm)
```

In [17]:
```
list = grep("AFFX",row.names(expressionMatrix))
```

In [18]:
```
list
```

12249 · 12250 · 12251 · 12252 · 12253 · 12254 · 12255 · 12256 · 12257 · 12258 · 12259 · 12260 · 12261 · 12262 · 12263 · 12264 · 12265 · 12266 · 12267 · 12268 · 12269 · 12270 · 12271 · 12272 · 12273 · 12274 · 12275 · 12276 · 12277 · 12278 · 12279 · 12280 · 12281 · 12282 · 12283 · 12284 · 12285 · 12286 · 12287 · 12288 · 12289 · 12290 · 12291 · 12292 · 12293 · 12294 · 12295 · 12296 · 12297 · 12298 · 12299 · 12300 · 12301 · 12302 · 12303 · 12304 · 12305 · 12306 · 12307 · 12308 · 12309 · 12310 · 12311 · 12312 · 12313 · 12314 · 12315 · 12316

In [21]:
```
expressionMatrix = expressionMatrix[-list,]
```

In [23]:
```
head(expressionMatrix)
```

	GSM474593.CEL	GSM474594.CEL	GSM474595.CEL	GSM474596.CEL	GSM474597.CEL	G
10_at	6.023091	6.691420	5.718319	5.702752	5.990415	
100_at	8.114588	7.612689	8.315290	8.937396	9.684034	
1000_at	5.556289	5.650405	5.661206	5.724150	5.528836	
10000_at	4.273728	4.799665	4.099465	4.187506	4.523982	
10001_at	6.202410	6.126851	6.506409	6.193137	5.448493	
10002_at	4.384267	4.467993	4.683126	4.406317	4.449463	

In [28]:
```
probes = row.names(expressionMatrix)
```

In [29]:
```
symbol = unlist(mget(probes, hgu133ahsentrezgSYMBOL))
```

In [30]:
```
ID = unlist(mget(probes, hgu133ahsentrezgENTREZID))
expressionMatrix = data.frame(probes, ID, symbol, expressionMatrix, stringsAs
expressionMatrix = na.omit(expressionMatrix)
```

In [32]:
```
head(expressionMatrix)
```

	probes	ID	symbol	GSM474593.CEL	GSM474594.CEL	GSM474595.CEL	GSM4745
	<chr>	<chr>	<chr>	<dbl>	<dbl>	<dbl>	
10_at	10_at	10	NAT2	6.023091	6.691420	5.718319	5.
100_at	100_at	100	ADA	8.114588	7.612689	8.315290	8.
1000_at	1000_at	1000	CDH2	5.556289	5.650405	5.661206	5.
10000_at	10000_at	10000	AKT3	4.273728	4.799665	4.099465	4.
10001_at	10001_at	10001	MED6	6.202410	6.126851	6.506409	6.
10002_at	10002_at	10002	NR2E3	4.384267	4.467993	4.683126	4.

In [33]:
```
row.names(expressionMatrix) = expressionMatrix$symbol
expressionMatrix = expressionMatrix[,-c(1:3)]
```

In [34]:
```
head(expressionMatrix)
```

	GSM474593.CEL	GSM474594.CEL	GSM474595.CEL	GSM474596.CEL	GSM474597.CEL	GSI
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	
NAT2	6.023091	6.691420	5.718319	5.702752	5.990415	
ADA	8.114588	7.612689	8.315290	8.937396	9.684034	
CDH2	5.556289	5.650405	5.661206	5.724150	5.528836	
AKT3	4.273728	4.799665	4.099465	4.187506	4.523982	
MED6	6.202410	6.126851	6.506409	6.193137	5.448493	
NR2E3	4.384267	4.467993	4.683126	4.406317	4.449463	

بخش اول

In [223…
```
expressionMatrix_infants = expressionMatrix[,1:25]
groups2_1 = c(rep("Sensitive", 13), rep("Resistance", 12))
f2_1 = factor(groups2_1, levels = c("Sensitive","Resistance"))
design2_1 = model.matrix(~ 0 + f2_1)
design2_1
```

A matrix: 25 × 2 of type dbl

	f2_1Sensitive	f2_1Resistance
1	1	0
2	1	0
3	1	0
4	1	0
5	1	0
6	1	0
7	1	0
8	1	0
9	1	0
10	1	0
11	1	0
12	1	0
13	1	0
14	0	1
15	0	1
16	0	1

	f2_1Sensitive	f2_1Resistance
17	0	1
18	0	1
19	0	1
20	0	1
21	0	1
22	0	1
23	0	1
24	0	1
25	0	1

In [224…

```
colnames(design2_1) = c("Sensitive", "Resistance")
data.fit = lmFit(expressionMatrix_infants, design2_1)
contrast.matrix = makeContrasts(Sensitive-Resistance, levels = design2_1)
data.fit.con = contrasts.fit(data.fit, contrast.matrix)
data.fit.eb = eBayes(data.fit.con)
tab = topTable(data.fit.eb, number = 12248, adjust.method="BH", sort.by = "nc
```

In [225…

```
topgenes2_1 = tab[tab$adj.P.Val < 0.001,]
length(row.names(topgenes2_1))
row.names(topgenes2_1)
```

0

بخش اول سوال ۲

با توجه به جدول تفاوتی بیانی ندارند. در سطح ۰.۰۵ هیچ تفاوتی ندارند.

In [226…

```
topups2_1 = tab[tab$logFC > 1,]
length(row.names(topups2_2))
topups2_1
```

26

A data.frame: 30 × 6

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
CD24	1.572270	7.655233	2.351907	0.0267616231	0.5117717	-3.37907923
RASGRP1	1.170472	6.279941	2.859878	0.0083773232	0.4444722	-2.47465245
TMSB15A	1.282470	6.033611	3.230740	0.0034137134	0.4064783	-1.76680853
CCN2	1.789749	8.688745	2.514204	0.0186515640	0.4789930	-3.10009117
GOLGA8A	1.196190	5.363828	3.563031	0.0014882535	0.3314205	-1.11026212
SSBP2	1.147752	7.249035	3.414148	0.0021643124	0.3736948	-1.40646146
PAN3	1.240041	5.767094	2.567978	0.0165122016	0.4789930	-3.00543036
FBXW4P1	1.080971	7.037100	3.269506	0.0031020198	0.4064783	-1.69112179
TRIB2	1.035374	6.006946	3.265339	0.0031341597	0.4064783	-1.69927078

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
HOXA5	1.562257	7.998000	1.619224	0.1178045472	0.7064897	-4.48318632
HOXA10	1.066974	7.553961	1.631539	0.1151691161	0.7028357	-4.46711015
IGHD	1.035017	7.108567	2.967731	0.0064763478	0.4326222	-2.27217763
IGHM	2.248716	9.678403	4.449598	0.0001517080	0.2834122	0.68561298
IGLL1	2.352569	6.306481	2.465409	0.0208124130	0.4843994	-3.18505535
JUND	1.006693	9.262956	2.652968	0.0135914196	0.4737275	-2.85372698
NPTX2	1.372124	7.551888	1.599950	0.1220297838	0.7078989	-4.50815491
PCDH9	1.013913	6.541638	1.999089	0.0564533482	0.6079214	-3.94585869
HERC5	1.008523	6.098850	3.990900	0.0004985997	0.2834122	-0.24705149
BACH2	1.101357	5.478319	2.246675	0.0336285679	0.5301415	-3.55415755
BCR	1.177748	7.832921	3.474727	0.0018592576	0.3672933	-1.28629203
VPREB1	2.503718	7.718512	4.140381	0.0003387963	0.2834122	0.05678432
NEIL1	1.025096	6.793235	2.550176	0.0171937831	0.4789930	-3.03688399
TRABD	1.047087	7.311072	3.463190	0.0019139340	0.3676603	-1.30921704
TCL1A	1.591531	8.314198	2.037357	0.0522067767	0.5987948	-3.88729165
CBX4	1.095505	8.309803	1.876041	0.0722379921	0.6392854	-4.12891940
H1-10	1.294417	9.374965	2.516095	0.0185721390	0.4789930	-3.09677943
GUSBP11	1.287285	7.752414	2.933766	0.0070256031	0.4326222	-2.33627031
IGLL3P	1.309902	5.800814	2.219063	0.0356777415	0.5401495	-3.59928773
MAGED1	1.017235	8.811869	2.814482	0.0093263684	0.4444722	-2.55892342
CD79A	1.038641	9.483521	2.969017	0.0064563832	0.4326222	-2.26974591

In [220…

```
topdowns2_1 = tab[tab$logFC < -1,]
length(row.names(topdowns2_1))
topdowns2_1
```

44

A data.frame: 44 × 6

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
TRIB1	-1.341634	7.894370	-3.288462	2.959790e-03	0.4064783	-1.6540134
CEBPB	-1.225227	7.908622	-2.501765	1.918174e-02	0.4815420	-3.1218352
CEBPD	-1.607517	7.541603	-3.153229	4.129891e-03	0.4064783	-1.9172850
CLC	-1.014740	6.726608	-1.981961	5.845083e-02	0.6080642	-3.9718259
PLIN2	-1.275677	9.094651	-3.722711	9.921525e-04	0.3124514	-0.7897669
ADM	-1.007957	7.104071	-1.978652	5.884378e-02	0.6080642	-3.9768242
VCAN	-1.549431	4.822951	-3.266348	3.126347e-03	0.4064783	-1.6972977
CSTA	-1.656188	6.053643	-3.330847	2.664208e-03	0.3932098	-1.5708170
CTSZ	-1.147534	6.135967	-3.436913	2.044365e-03	0.3736948	-1.3613634

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
DAD1	-1.140066	9.327583	-2.913407	7.375796e-03	0.4326222	-2.3745468
CFD	-1.170474	5.861324	-3.162916	4.033056e-03	0.4064783	-1.8985446
DUSP5	-1.239124	7.110977	-2.493373	1.954730e-02	0.4839759	-3.1364733
GPR183	-1.332991	7.345448	-2.291501	3.052821e-02	0.5192738	-3.4801675
FCER1G	-1.362316	8.242842	-3.098717	4.717865e-03	0.4098185	-2.0223796
CD93	-1.015055	7.213395	-2.479366	2.017183e-02	0.4839759	-3.1608455
COTL1	-1.185020	6.791661	-3.025544	5.634337e-03	0.4307645	-2.1624233
LY96	-1.030376	5.236582	-3.613614	1.309377e-03	0.3124514	-1.0090146
MAFF	-1.134376	7.248030	-2.295845	3.024203e-02	0.5192738	-3.4729506
FTH1	-1.129003	9.283788	-3.051500	5.291294e-03	0.4270522	-2.1128864
PARVB	-1.104145	6.482149	-3.330783	2.664632e-03	0.3932098	-1.5709429
ANXA1	-1.936922	8.247910	-3.791945	8.313140e-04	0.2909124	-0.6500964
ANXA2	-1.089765	10.902828	-3.997450	4.902472e-04	0.2834122	-0.2337515
HSPA1A	-1.982711	7.821518	-2.542838	1.748227e-02	0.4789930	-3.0498158
ITGAM	-1.010826	6.021613	-2.502793	1.913739e-02	0.4815420	-3.1200403
GSTK1	-1.038348	8.710726	-5.056668	3.119727e-05	0.2834122	1.9083208
KCNN4	-1.141171	6.021499	-4.538300	1.204060e-04	0.2834122	0.8656195
LGALS1	-1.675028	10.794373	-2.675481	1.290299e-02	0.4737275	-2.8131323
LYZ	-1.680325	8.237317	-3.002176	5.961263e-03	0.4321090	-2.2068841
TARP	-1.582314	5.970834	-3.755718	9.119892e-04	0.3018931	-0.7232254
MYC	-1.085488	7.449414	-2.200229	3.713945e-02	0.5483988	-3.6298695
PFKP	-1.141395	8.410648	-3.503843	1.727940e-03	0.3527302	-1.2283577
RBM47	-1.041692	5.169480	-3.601562	1.349990e-03	0.3124514	-1.0331637
SRGN	-1.237162	9.749169	-2.699564	1.220280e-02	0.4685262	-2.7695224
NIT2	-1.107822	6.914294	-3.638809	1.228299e-03	0.3124514	-0.9584838
RNASE2	-1.125774	7.400633	-2.470438	2.057946e-02	0.4839759	-3.1763405
S100A11	-1.259115	7.429394	-2.554812	1.701382e-02	0.4789930	-3.0287042
SGK1	-1.335173	8.712841	-2.561361	1.676255e-02	0.4789930	-3.0171347
TYROBP	-1.281226	7.510989	-3.200374	3.678751e-03	0.4064783	-1.8258997
IL1R2	-1.091540	4.770522	-1.978631	5.884627e-02	0.6080642	-3.9768558
LST1	-1.066675	8.131445	-2.269592	3.200955e-02	0.5192754	-3.5164424
FOSL1	-1.213329	6.726613	-2.438336	2.210888e-02	0.4884957	-3.2318020
CAPN2	-1.110441	7.414720	-2.694636	1.234310e-02	0.4703254	-2.7784611
CCNA1	-2.252666	8.059601	-3.431747	2.071000e-03	0.3736948	-1.3716023
MS4A3	-1.297144	5.236815	-2.299788	2.998439e-02	0.5192738	-3.4663930

بخش دوم

In [229…
```
expressionMatrix_noninfants = expressionMatrix[,26:52]
groups2_2 = c(rep("Sensitive", 14), rep("Resistance", 13))
f2_2 = factor(groups2_2, levels = c("Sensitive","Resistance"))
design2_2 = model.matrix(~ 0 + f2_2)
colnames(design2_2) = c("Sensitive", "Resistance")
data.fit = lmFit(expressionMatrix_noninfants, design2_2)
contrast.matrix = makeContrasts(Sensitive-Resistance, levels = design2_2)
data.fit.con = contrasts.fit(data.fit, contrast.matrix)
data.fit.eb = eBayes(data.fit.con)
tab = topTable(data.fit.eb, number = 12248, adjust.method="BH", sort.by = "nc
```

In [230…
```
topgenes2_2 = tab[tab$adj.P.Val < 0.05,]
length(row.names(topgenes2_2))
row.names(topgenes2_2)
```

33

'ACTR3' · 'CEACAM5' · 'ZNF271P' · 'CPD' · 'EMP1' · 'CHSY1' · 'RAB21' · 'DENND5A' · 'POLA2' · 'GCH1' · 'CHIC2' · 'GNAI3' · 'ARF4' · 'MC4R' · 'MCL1' · 'NR4A2' · 'PAEP' · 'POU2F1' · 'COMMD4' · 'PRNP' · 'SMAGP' · 'AURKC' · 'ZFP36' · 'TMEM50B' · 'MYO19' · 'ORAI2' · 'MED28' · 'TRIM56' · 'CASP6' · 'POLR1B' · 'BHLHE40' · 'TBPL1' · 'CLEC2B'

بخش دوم

با توجه به جدول بالا ژن های بالا باهم تفاوت بیانی دارند.

In [214…
```
topups2_2 = tab[tab$logFC > 1,]
length(row.namestopups2_2(topups2_2))
topups2_2
```

```
Error in row.namestopups2_2(topups2_2): could not find function "row.namestop
ups2_2"
Traceback:
```

In [215…
```
topdowns2_2 = tab[tab$logFC < -1,]
length(row.names(topdowns2_2))
topdowns2_2
```

79

A data.frame: 79 × 6

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
SH2B3	-1.124439	9.217612	-2.846247	8.324286e-03	0.150685399	-2.55490805
LPAR6	-1.745833	7.943442	-4.025161	4.110751e-04	0.066248004	0.08837408
SPRY1	-1.230976	8.527013	-3.463269	1.786577e-03	0.097253334	-1.20997197
CITED2	-1.170753	7.308950	-3.570776	1.354059e-03	0.092201365	-0.96568100
NDRG1	-1.100278	8.947949	-3.153250	3.919197e-03	0.120608869	-1.89947239
GNA13	-1.381601	6.666519	-3.422539	1.983237e-03	0.102578373	-1.30188889
RCBTB2	-1.259974	6.262623	-3.517141	1.555307e-03	0.095314840	-1.08785147
CKS2	-1.020873	9.068333	-2.956426	6.372720e-03	0.138589638	-2.32326824
ADM	-1.399912	7.678136	-2.580290	1.559993e-02	0.184073153	-3.09498744

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
CSTB	-1.009758	9.238300	-2.622776	1.413477e-02	0.180135587	-3.01066391
DUSP2	-1.514570	8.735610	-4.189372	2.655574e-04	0.059257534	0.47547114
ECM1	-1.167220	8.527253	-3.020170	5.450908e-03	0.131283392	-2.18735654
EGR3	-1.276711	7.296372	-2.548514	1.678663e-02	0.191080520	-3.15753696
EMP1	-1.610873	6.025384	-5.252647	1.523485e-05	0.020732934	3.00260714
ACSL1	-1.189480	6.283105	-2.943314	6.579890e-03	0.140022772	-2.35105875
CHSY1	-1.417594	7.351299	-5.820168	3.340394e-06	0.010228285	4.33274059
ELL2	-1.153546	5.767550	-4.065136	3.696830e-04	0.066248004	0.18237949
RAB21	-1.438252	6.869353	-4.915430	3.776217e-05	0.027612735	2.20216959
RCOR1	-1.337801	6.654967	-4.387691	1.562174e-04	0.051712195	0.94561104
FOS	-2.083052	10.408558	-3.969339	4.766100e-04	0.072068140	-0.04262209
FOSB	-1.305343	10.410375	-3.046351	5.110360e-03	0.131283392	-2.13115372
FOSL2	-1.314330	6.714523	-4.222234	2.432536e-04	0.059257534	0.55320451
MAFF	-1.743798	8.337067	-3.782443	7.799335e-04	0.078012829	-0.47844725
GCH1	-1.986567	6.466043	-6.024633	1.943552e-06	0.007934875	4.80441175
GNAI1	-1.176160	4.530123	-2.653708	1.314977e-02	0.177377137	-2.94878315
RGCC	-1.508750	9.302037	-3.229523	3.237180e-03	0.113607398	-1.73213267
MRPL15	-1.010599	7.277611	-3.732559	8.887855e-04	0.078144447	-0.59394423
CXCL2	-1.258206	5.091825	-2.212445	3.553657e-02	0.248795030	-3.78957723
HHEX	-1.053019	8.283158	-2.254419	3.244602e-02	0.239986881	-3.71377242
NR4A1	-1.572280	8.811418	-3.886808	5.927285e-04	0.076130137	-0.23563727
⋮	⋮	⋮	⋮	⋮	⋮	⋮
PRKCH	-1.181565	7.369911	-4.260959	2.193396e-04	0.059257534	0.6449022005
MAP2K1	-1.014101	8.529387	-4.412743	1.460650e-04	0.051114413	1.0051457488
PRNP	-1.119465	7.339540	-5.307125	1.316054e-05	0.020732934	3.1313765100
SERINC1	-1.009964	6.077924	-3.643584	1.120951e-03	0.083556113	-0.7989552492
SAMSN1	-1.039306	3.936396	-2.227711	3.438304e-02	0.244554841	-3.7621156436
SGK1	-1.854028	8.522696	-4.368524	1.644557e-04	0.052085811	0.9000769846
SLC2A3	-1.004841	7.899997	-2.910664	7.123833e-03	0.144506608	-2.4199974471
TIMP1	-1.022057	8.028761	-2.669202	1.268083e-02	0.175298926	-2.9176362769
UBE2G1	-1.056553	7.083275	-3.189245	3.581732e-03	0.117540545	-1.8207041144
YES1	-1.165063	5.315329	-2.081065	4.699282e-02	0.280354637	-4.0205488784
ZFP36	-1.033747	10.683868	-5.026744	2.797865e-05	0.026703461	2.4669129962
SLBP	-1.221910	8.331833	-3.987780	4.538963e-04	0.070371158	0.0006164225
BAALC	-1.011055	5.933495	-3.371126	2.261561e-03	0.107780518	-1.4173788240
NR4A3	-1.069774	6.581535	-3.372184	2.255469e-03	0.107780518	-1.4150081513
FOSL1	-1.198091	5.840216	-2.467543	2.019859e-02	0.201988726	-3.3148550712
CYRIA	-1.013276	6.572255	-3.650774	1.100178e-03	0.083556113	-0.7824391013

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
VMP1	-1.022847	5.387918	-3.223775	3.284327e-03	0.113629623	-1.7448001815
H2BC4	-1.144172	4.567023	-2.332108	2.736002e-02	0.225396651	-3.5710118751
H2BC21	-1.020727	8.020609	-2.758602	1.026658e-02	0.162684880	-2.7360068497
MIR22HG	-1.069770	6.666413	-3.630239	1.160529e-03	0.084564516	-0.8295874196
BHLHE40	-1.488081	7.857424	-4.833483	4.709203e-05	0.030357011	2.0070627961
LAMTOR3	-1.049659	6.165262	-3.850684	6.519090e-04	0.076130137	-0.3198504991
TSC22D1	-1.138243	8.623050	-2.880562	7.662847e-03	0.150057691	-2.4832268140
CD9	-1.560357	8.423493	-2.277838	3.082934e-02	0.235458001	-3.6710702219
KLF4	-1.120676	8.143648	-2.103612	4.481886e-02	0.274204033	-3.9816063905
SH3BP5	-1.534946	8.151788	-2.446576	2.118084e-02	0.206218568	-3.3550959387
TBPL1	-1.029834	6.030492	-4.510289	1.124046e-04	0.045377768	1.2371845919
CYTIP	-1.086031	7.168403	-2.457544	2.066166e-02	0.203092905	-3.3340716527
CD69	-1.209123	9.812270	-3.161454	3.839692e-03	0.119361791	-1.8815501812
CLEC2B	-1.503518	10.471637	-6.184808	1.274650e-06	0.007934875	5.1705374360

بخش سوم

In [207…

```
expressionMatrix_sensetive = expressionMatrix[,c(1:13,26:39)]
groups2_3 = c(rep("infant", 13), rep("noninfant", 14))
f2_3 = factor(groups2_3, levels = c("infant","noninfant"))
design2_3 = model.matrix(~ 0 + f2_3)
colnames(design2_3) = c("infant","noninfant")
data.fit = lmFit(expressionMatrix_sensetive, design2_3)
contrast.matrix = makeContrasts(infant-noninfant, levels = design2_3)
data.fit.con = contrasts.fit(data.fit, contrast.matrix)
data.fit.eb = eBayes(data.fit.con)
tab = topTable(data.fit.eb, number = 12248, adjust.method="BH", sort.by = "no
```

In [208…

```
topgenes2_3 = tab[tab$adj.P.Val < 0.05,]
length(row.names(topgenes2_3))
```

272

بخش سوم

با توجه به اینکه در سطح ۰.۰۵ ژن های بسیاری تفاوت دارند در سطح ۰.۰۱ بررسی میکنیم.

In [209…

```
topgenes2_3 = tab[tab$adj.P.Val < 0.01,]
length(row.names(topgenes2_3))
row.names(topgenes2_3)
```

46

'ADAM10' · 'CDKN2D' · 'SERINC3' · 'IZUMO4' · 'RPL27AP' · 'COX7A2' · 'EFNA1' · 'MLC1' · 'COTL1' · 'CORO1C' · 'FAM89B' · 'LAMP5' · 'TES' · 'CLEC2D' · 'HCK' · 'HOXA10' · 'IKBKB' · 'IL15RA' · 'MBNL1' · 'MAP3K5' · 'MME' · 'MUC2' · 'MYH9' · 'MYLK' · 'DHRS7' · 'POU4F1' ·

'PPP1CA' · 'ARHGEF10L' · 'RNF220' · 'MIS18BP1' · 'PARP6' · 'PTPRC' · 'S100A10' · 'S100A11' · 'BLVRA' · 'TAF12' · 'TMBIM6' · 'MZT2B' · 'SH3BGRL3' · 'TUBB6' · 'HRK' · 'MPZL1' · 'TM9SF2' · 'CD44' · 'FEZ2' · 'CD72'

بخش سوم

با توجه به جدول در سطح ۰.۰۱ ژن های بالا بدست امد که تفاوت بیانی دارند.

In [210…

```
topups2_3 = tab[tab$logFC > 1,]
length(row.names(topups2_3))
topups2_3
```

90

A data.frame: 90 × 6

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
ADAM10	1.077515	5.696548	4.927593	3.587196e-05	0.0096359072	2.3031836
CDKN2D	1.007759	7.746926	5.204138	1.699135e-05	0.0071704725	2.9873313
SPON2	1.079652	8.231379	2.342990	2.664966e-02	0.2013719312	-3.6676510
IGF2BP3	1.012789	5.917391	3.636321	1.133021e-03	0.0506468598	-0.8541630
GNA13	1.139160	6.549788	2.886400	7.524039e-03	0.1090584931	-2.5591165
B3GNT2	1.013101	7.374464	2.507971	1.837214e-02	0.1709893853	-3.3454862
DSTN	2.071681	7.203130	4.847180	4.458424e-05	0.0107072111	2.1039982
CRIP1	1.581389	8.607411	4.049732	3.808867e-04	0.0299044890	0.1396826
CCN2	1.957428	8.532862	2.778961	9.744460e-03	0.1248020394	-2.7884978
GPR183	1.368961	5.995781	2.828727	8.648544e-03	0.1181267756	-2.6828105
SERPINB1	1.133487	6.647913	3.768683	8.012951e-04	0.0425643445	-0.5389602
EMP3	1.384653	10.046733	3.293066	2.740651e-03	0.0698893177	-1.6541554
EVI2B	1.044538	7.154381	3.364304	2.286221e-03	0.0640598848	-1.4904825
F13A1	1.059909	7.406915	1.792934	8.405628e-02	0.3331784004	-4.6307583
ACSL1	1.116835	6.248128	2.835038	8.518173e-03	0.1169658254	-2.6693376
RHOBTB3	1.375531	5.449057	4.110053	3.243055e-04	0.0275099585	0.2866892
MLC1	1.282656	6.173397	5.643449	5.210937e-06	0.0056415089	4.0671849
FLT3	1.326557	8.428799	2.926752	6.821063e-03	0.1059244305	-2.4718225
DTX4	1.134380	8.367771	2.084941	4.654031e-02	0.2589848764	-4.1422677
COTL1	1.226441	5.586919	5.124904	2.104496e-05	0.0076128844	2.7915267
FOS	1.440135	10.099006	2.970186	6.134163e-03	0.1012139514	-2.3771959
FOSB	1.037968	10.281639	2.243716	3.314579e-02	0.2208419678	-3.8546675
CORO1C	1.903865	8.018010	6.888158	1.978408e-07	0.0008496768	7.0288908
LAMP5	3.112511	8.097528	4.998001	2.965418e-05	0.0086505774	2.4775321
TES	1.132534	5.620151	5.447557	8.817147e-06	0.0061738839	3.5871076
OSTF1	1.000337	5.735773	4.652517	7.545133e-05	0.0137277528	1.6219256

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
GREM1	1.501489	4.626619	3.067031	4.831676e-03	0.0906612628	-2.1638262
GPM6B	1.178230	5.798010	4.766739	5.541498e-05	0.0119074155	1.9047409
RGCC	1.074741	9.093069	1.997172	5.584940e-02	0.2816018449	-4.2948114
CLEC2D	1.773030	4.778370	5.788818	3.532299e-06	0.0048070670	4.4215520
⋮	⋮	⋮	⋮	⋮	⋮	⋮
PEX2	1.046459	4.973505	4.710432	6.452338e-05	0.0131713719	1.7652968
RGS2	1.125156	9.890700	2.289646	2.998032e-02	0.2109313901	-3.7688075
RGS16	1.529439	7.335273	3.031364	5.277295e-03	0.0947746381	-2.2427814
S100A4	1.644830	9.030303	3.657072	1.073330e-03	0.0488704222	-0.8049631
S100A6	1.023396	7.842969	4.560234	9.679656e-05	0.0158059051	1.3936504
S100A10	2.223556	9.334544	6.868429	2.081181e-07	0.0008496768	6.9834377
S100A11	1.477049	6.059142	5.191876	1.756321e-05	0.0071704725	2.9570432
BLK	1.266605	7.414024	3.645557	1.106064e-03	0.0498054058	-0.8322752
SPIB	1.156762	7.710401	2.748980	1.046639e-02	0.1296071559	-2.8516855
TPBG	1.200729	6.119277	2.927673	6.805770e-03	0.1059244305	-2.4698233
TYROBP	1.079411	6.336307	3.021548	5.406639e-03	0.0955563060	-2.2644344
UCK2	2.028566	6.414818	4.832891	4.634041e-05	0.0109149481	2.0686016
VIM	1.268498	11.729932	4.878967	4.091240e-05	0.0104394813	2.1827399
VLDLR	1.097656	4.955623	3.873366	6.081330e-04	0.0386007474	-0.2875316
XIST	1.278639	6.313274	1.649516	1.104875e-01	0.3753818042	-4.8497339
AHNAK	1.012315	6.901465	3.452983	1.821491e-03	0.0601343857	-1.2849156
PARP8	1.090639	7.705816	2.667006	1.270467e-02	0.1431356766	-3.0225330
CAPG	1.010193	7.627556	3.440218	1.882255e-03	0.0605410991	-1.3146268
SH3BGRL3	1.012118	10.540427	5.617542	5.585605e-06	0.0056415089	4.0038521
TUBB6	2.457284	8.416225	5.250666	1.498644e-05	0.0071704725	3.1021987
CAT	1.204012	8.327250	3.938833	5.113956e-04	0.0360820128	-0.1294395
MIR22HG	1.258408	6.757238	3.366141	2.275524e-03	0.0640598848	-1.4862446
CBX4	1.220434	8.202828	2.561460	1.624623e-02	0.1607220754	-3.2381672
PROM1	2.646354	5.798101	3.432691	1.918996e-03	0.0605710622	-1.3321260
CCNA1	2.146329	5.865410	3.759320	8.212484e-04	0.0428027681	-0.5613622
KLF4	1.224808	8.193786	2.635820	1.366803e-02	0.1471054230	-3.0867676
TM9SF2	1.083691	7.308661	5.203048	1.704143e-05	0.0071704725	2.9846387
CD44	1.969784	8.140322	4.997879	2.966397e-05	0.0086505774	2.4772300
CD48	1.106618	8.104969	4.613219	8.389853e-05	0.0140765637	1.5246840
CD72	1.436843	6.968674	5.390497	1.028061e-05	0.0061738839	3.4467966

In [211…

```
topdowns2_3 = tab[tab$logFC < -1,]
length(row.names(topdowns2_3))
topdowns2_3
```

72

A data.frame: 72 × 6

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
CD24	-1.220179	9.042608	-2.369130	2.514384e-02	0.19763897	-3.6175310
CD52	-2.220074	9.201117	-4.883165	4.045066e-05	0.01043948	2.1931382
KHDRBS3	-1.049561	5.860970	-3.279335	2.837730e-03	0.07035731	-1.6855449
TCFL5	-1.653297	6.469283	-2.698586	1.179404e-02	0.13849797	-2.9570547
CKAP4	-1.013086	6.873036	-2.511635	1.821869e-02	0.17002123	-3.3381779
PTP4A3	-1.034605	6.954255	-4.644338	7.713655e-05	0.01372775	1.6016841
ADGRA3	-1.167061	5.730660	-3.154869	3.882306e-03	0.08184248	-1.9676132
DEFA4	-1.784220	7.313698	-2.517669	1.796856e-02	0.16929144	-3.3261292
DNTT	-1.525556	7.937582	-1.882331	7.047616e-02	0.31083615	-4.4870850
DUSP6	-1.045774	7.927571	-2.425827	2.214138e-02	0.18740209	-3.5076058
ELANE	-1.107277	6.601156	-1.681536	1.040501e-01	0.36463680	-4.8021080
ELK3	-1.001517	6.257416	-3.166932	3.766796e-03	0.08055039	-1.9404774
FAM171A1	-1.118307	6.629630	-4.458633	1.272984e-04	0.01770634	1.1426886
FHIT	-1.636105	6.077299	-3.185520	3.595230e-03	0.07926220	-1.8985763
FOXO1	-1.079345	8.534016	-3.192635	3.531562e-03	0.07922082	-1.8825096
PEG10	-1.663957	5.338443	-3.113560	4.304113e-03	0.08622659	-2.0601954
RGL1	-1.410736	7.881311	-3.435552	1.904949e-03	0.06057106	-1.3254757
ALOX5	-1.472259	5.463511	-4.251218	2.223024e-04	0.02339087	0.6321746
LRIG1	-1.115523	5.585824	-2.369386	2.512947e-02	0.19763897	-3.6170378
GNG11	-2.101989	6.201339	-3.620568	1.180480e-03	0.05200906	-0.8914530
VPREB3	-1.153430	8.977962	-2.536096	1.722421e-02	0.16565226	-3.2892265
H1-0	-1.716760	8.028903	-3.636952	1.131158e-03	0.05064686	-0.8526675
HBD	-1.557675	8.799564	-2.353484	2.603551e-02	0.20034415	-3.6475725
HLX	-1.153943	7.429500	-3.895404	5.737145e-04	0.03821295	-0.2343812
ID3	-2.087963	7.117668	-4.395391	1.509263e-04	0.01942466	0.9867355
JCHAIN	-1.395344	4.399231	-2.552544	1.658398e-02	0.16226978	-3.2561499
IGLL1	-1.006368	7.957535	-1.061597	2.977076e-01	0.59775787	-5.5833771
KCNK3	-1.215798	4.798290	-3.045783	5.092617e-03	0.09395367	-2.2109130
LTB	-1.676889	7.865818	-3.157106	3.860630e-03	0.08160631	-1.9625839
LTF	-1.349702	7.897078	-1.891046	6.925987e-02	0.30835872	-4.4727937
⋮	⋮	⋮	⋮	⋮	⋮	⋮
POU4F1	-2.039179	5.318842	-5.590833	6.000354e-06	0.005641509	3.93850415
MIS18BP1	-1.254117	5.869098	-5.265221	1.440945e-05	0.007170473	3.13811093
STK32B	-1.779184	7.580731	-3.956062	4.885598e-04	0.034993454	-0.08773492
SLC35E3	-1.169754	6.281547	-4.139683	2.996343e-04	0.026134890	0.35904501
MYO5C	-1.423115	7.204073	-3.386583	2.159693e-03	0.062616921	-1.43902108

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
AZU1	-1.109093	5.749339	-1.759276	8.972004e-02	0.341164565	-4.68344388
PTPRK	-2.113920	4.899550	-3.839749	6.645694e-04	0.039902942	-0.36846340
RAG1	-1.232022	4.472311	-2.559325	1.632651e-02	0.161004071	-3.24247606
RPS4Y1	-1.856865	8.689734	-2.222061	3.474047e-02	0.225610424	-3.89474300
S100A8	-1.583137	10.786973	-1.769518	8.796323e-02	0.337946556	-4.66749499
S100A9	-1.011889	9.306379	-1.493781	1.466866e-01	0.430546486	-5.07061781
BMP2	-1.176087	6.428150	-3.236580	3.161673e-03	0.075929749	-1.78294554
SOX11	-1.616209	5.325539	-2.483466	1.942956e-02	0.176100730	-3.39419718
TCF4	-2.378744	8.240414	-4.555363	9.807714e-05	0.015805905	1.38160809
KLF10	-1.103680	7.107578	-2.938988	6.620506e-03	0.104360301	-2.44523363
WFS1	-1.311157	6.701239	-3.289114	2.768260e-03	0.069889318	-1.66319560
LST1	-1.132927	8.206885	-2.359827	2.567062e-02	0.199501112	-3.63540957
C1orf54	-1.034084	7.218489	-3.544267	1.439159e-03	0.055623872	-1.07135941
TCEAL4	-1.031397	5.980924	-2.904931	7.193091e-03	0.107312903	-2.51910302
RUBCNL	-1.383353	6.292570	-2.525166	1.766218e-02	0.167325670	-3.31113391
ARID5B	-1.105666	7.706025	-2.599226	1.488511e-02	0.154371587	-3.16158921
KLF11	-1.691583	6.364295	-3.087190	4.595931e-03	0.089067973	-2.11901268
TSPYL5	-1.297719	4.559889	-2.617022	1.428114e-02	0.150141932	-3.12527660
DDX3Y	-1.362010	6.413547	-2.065516	4.847292e-02	0.265042991	-4.17643397
TRIM24	-1.308675	6.173894	-3.590478	1.276579e-03	0.053540590	-0.96254560
IER3	-1.348699	7.525161	-3.024930	5.361741e-03	0.095487888	-2.25697844
SGCE	-1.098981	4.322758	-2.538430	1.713198e-02	0.165007174	-3.28454030
HPS4	-1.033005	6.730837	-3.776010	7.860146e-04	0.042224151	-0.52142182
ARHGAP29	-1.458105	4.966421	-2.958042	6.319311e-03	0.102515132	-2.40372328
AKAP12	-1.969239	6.506458	-3.607715	1.220635e-03	0.052789372	-0.92184368

بخش چهارم

In [198…

```
expressionMatrix_resistance = expressionMatrix[,c(14:25,40:52)]
groups2_4 = c(rep("infant", 12), rep("noninfant", 13))
f2_4 = factor(groups2_4, levels = c("infant","noninfant"))
design2_4 = model.matrix(~ 0 + f2_4)
colnames(design2_4) = c("infant","noninfant")
data.fit = lmFit(expressionMatrix_resistance, design2_4)
contrast.matrix = makeContrasts(infant-noninfant, levels = design2_4)
data.fit.con = contrasts.fit(data.fit, contrast.matrix)
data.fit.eb = eBayes(data.fit.con)
tab = topTable(data.fit.eb, number = 12248, adjust.method="BH", sort.by = "nc
```

In [202…

```
topgenes2_4 = tab[tab$adj.P.Val < 0.05,]
length(row.names(topgenes2_4))
```

504

بخش چهارم

با توجه به اینکه در سطح ۰.۰۵ ژن های بسیاری تفاوت دارند به بررسی در سطح ۰.۰۱ میپردازیم.

In [201…

```
topgenes2_4 = tab[tab$adj.P.Val < 0.01,]
length(row.names(topgenes2_4))
row.names(topgenes2_4)
```

172

'CD24' · 'DPP3' · 'TSPAN32' · 'LPAR6' · 'SPRY1' · 'NET1' · 'CD52' · 'KHDRBS3' · 'ZNF274' · 'HCP5' · 'CYB561D2' · 'PTP4A3' · 'CLTA' · 'COL5A1' · 'CRIP1' · 'CSPG4' · 'CSTA' · 'CTSW' · 'DBI' · 'DPEP1' · 'GPR183' · 'ECM1' · 'ELK3' · 'ENDOG' · 'ERG' · 'FCER1G' · 'FCGR2B' · 'FHIT' · 'PHLDA1' · 'RHOBTB3' · 'BTBD3' · 'SCMH1' · 'FOXO1' · 'RGL1' · 'MLC1' · 'IQCE' · 'SIN3B' · 'JADE2' · 'ESYT1' · 'COTL1' · 'QPRT' · 'CORO1C' · 'CD2AP' · 'GSPT2' · 'ALOX5' · 'LAMP5' · 'FUT4' · 'SERINC5' · 'SAMHD1' · 'DHRS7B' · 'LRIG1' · 'TES' · 'GREM1' · 'ZNF544' · 'GNAI1' · 'TRBC1' · 'COMMD9' · 'PYCARD' · 'PARVB' · 'MRM2' · 'ANXA1' · 'ANXA2' · 'HCK' · 'HCLS1' · 'HDLBP' · 'HIF1A' · 'HSBP1' · 'IL12A' · 'ITGA6' · 'ITPR1' · 'RAB15' · 'LGALS1' · 'SMAD1' · 'STS' · 'MBNL1' · 'MDK' · 'MEIS1' · 'MAP3K5' · 'MME' · 'CD200' · 'MRC1' · 'MT1F' · 'MYO1F' · 'P2RX5' · 'CRIM1' · 'MZB1' · 'IER5' · 'PDE4B' · 'ISYNA1' · 'PFKP' · 'PMAIP1' · 'C11orf24' · 'GSAP' · 'CYTL1' · 'SPATA6' · 'EGLN1' · 'TRMT12' · 'DMAC2' · 'PPP3CC' · 'STK32B' · 'SLC35E3' · 'PRKAG1' · 'PRKCH' · 'WSB2' · 'MYO5C' · 'PARD3' · 'PCBP4' · 'CORO1B' · 'SMAGP' · 'PTGS1' · 'ZNF512B' · 'PTPN4' · 'PTPN12' · 'RPS6KA1' · 'S100A4' · 'S100A6' · 'S100A10' · 'S100A11' · 'TSPAN31' · 'SCML1' · 'BID' · 'ZSCAN18' · 'AACS' · 'SPTA1' · 'TCF4' · 'ZEB1' · 'DYNLT3' · 'TSPAN7' · 'TYROBP' · 'UCP2' · 'UCK2' · 'WFS1' · 'YES1' · 'ZNF14' · 'DDR1' · 'PXDN' · 'AHNAK' · 'RHBDF2' · 'ZNF329' · 'AAGAB' · 'DENND1C' · 'APOL3' · 'ACTN4' · 'SLC38A1' · 'SFXN3' · 'DYRK3' · 'TUBB6' · 'KLF11' · 'IFITM1' · 'GAS7' · 'SCARF1' · 'TRIM24' · 'CCNA1' · 'CCND2' · 'HPS4' · 'MPZL1' · 'LARGE1' · 'CD22' · 'MAGED1' · 'MRPL33' · 'BABAM2' · 'AKAP12' · 'CD44' · 'FEZ2' · 'CD59' · 'EDEM1' · 'CD72' · 'USP6NL' · 'KEAP1' · 'SV2A' · 'ARNT2' · 'CLEC2B'

بخش چهارم

در سطح ۰.۰۱ ژن های بالا تفاوت بیانی دارند.

In [205…

```
topups2_4 = tab[tab$logFC > 1,]
length(row.names(topups2_4))
topups2_4
```

140

A data.frame: 140 × 6

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
DPP3	1.063822	7.216000	5.399356	1.307624e-05	0.0026692966	3.2692053
ARPC1B	1.031095	8.993892	3.565990	1.486720e-03	0.0424649990	-1.1861888
BASP1	1.702160	8.622374	3.927365	5.922401e-04	0.0256009230	-0.3259933
IFI30	1.170055	9.309242	4.166758	3.195583e-04	0.0172068916	0.2533481

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
CEBPA	1.302904	7.147432	3.241318	3.342156e-03	0.0645658221	-1.9373980
CEBPD	1.518594	7.587842	2.690813	1.248839e-02	0.1298230677	-3.1413017
IGF2BP3	1.025639	5.742099	3.318163	2.764011e-03	0.0585493396	-1.7618714
CTSC	1.008514	6.128354	3.699717	1.059587e-03	0.0359496494	-0.8703388
BTG3	1.306144	7.479863	2.099288	4.599450e-02	0.2545597155	-4.2929390
GLIPR1	1.033762	6.980093	3.998994	4.926406e-04	0.0225987341	-0.1532815
DSTN	1.341311	7.265208	3.170066	3.981269e-03	0.0705025872	-2.0987271
CORO1A	1.126239	7.764787	2.054311	5.048140e-02	0.2682413155	-4.3728514
CLNS1A	1.009904	7.803457	2.740170	1.113569e-02	0.1218606374	-3.0378194
CRIP1	2.134846	8.292904	5.252577	1.909555e-05	0.0033253050	2.9115924
CSF1R	1.101615	5.760795	3.520156	1.668705e-03	0.0447227673	-1.2936642
VCAN	1.911203	4.634829	4.164917	3.210833e-04	0.0172068916	0.2488713
CSPG4	1.262982	4.989828	5.972141	3.027166e-06	0.0009757033	4.6493309
CST3	1.493958	5.947883	3.906961	6.240790e-04	0.0263576522	-0.3750772
CSTA	2.288504	5.724838	4.513805	1.299173e-04	0.0094715870	1.1010635
CTSG	1.017606	6.448929	1.975136	5.933045e-02	0.2905555262	-4.5105451
CTSW	1.095268	6.523881	4.741229	7.192938e-05	0.0069369375	1.6589562
DAD1	1.465150	9.158539	3.732065	9.758803e-04	0.0340750126	-0.7934649
CFD	1.276012	5.806444	3.378257	2.380545e-03	0.0539398858	-1.6235651
GPR183	2.326982	6.828573	5.185473	2.271336e-05	0.0035665805	2.7477099
SERPINB1	1.585754	7.293843	3.731810	9.765129e-04	0.0340750126	-0.7940704
F13A1	1.050608	7.065968	2.247034	3.365827e-02	0.2153847807	-4.0221907
FCER1G	2.224163	7.794682	5.179984	2.303825e-05	0.0035718040	2.7342941
FCGR2B	1.554299	4.617730	4.877755	5.044508e-05	0.0059985565	1.9939884
FCN1	1.007313	5.310314	1.971489	5.976923e-02	0.2915108369	-4.5167956
FGR	1.085929	6.223452	3.019653	5.737972e-03	0.0854971837	-2.4343889
⋮	⋮	⋮	⋮	⋮	⋮	⋮
ABHD4	1.038506	7.402020	2.873399	8.140848e-03	1.035738e-01	-2.7537050
SPIB	1.041538	7.111505	3.142502	4.258797e-03	7.264867e-02	-2.1607501
STX1A	1.305349	6.672578	4.425926	1.632348e-04	1.110722e-02	0.8858235
SULT1A1	1.007364	7.622505	3.180370	3.882057e-03	6.951379e-02	-2.0754846
TUBB2A	1.150241	8.387309	2.906825	7.519305e-03	9.871002e-02	-2.6813836
TYROBP	2.499167	6.877660	6.220645	1.618936e-06	6.837493e-04	5.2383130
UCP2	1.026100	9.117708	4.516835	1.288984e-04	9.453580e-03	1.1084886
UCK2	2.657625	6.568546	7.395365	9.222940e-08	9.413547e-05	7.9174780
VIM	1.292962	12.192616	3.542150	1.578820e-03	4.378332e-02	-1.2421444
VLDLR	1.110030	4.912586	3.503563	1.739801e-03	4.582597e-02	-1.3324673
IL1R2	1.289982	4.667332	2.347596	2.706664e-02	1.921810e-01	-3.8310475

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
AHNAK	1.482230	7.399827	4.822802	5.818704e-05	6.160569e-03	1.8591512
PARP8	1.126127	8.021983	2.449136	2.162929e-02	1.720231e-01	-3.6327674
ATP8B4	1.187850	4.348018	4.144742	3.382732e-04	1.793580e-02	0.1998345
RAB11FIP1	1.203508	7.084826	3.296737	2.914681e-03	5.967442e-02	-1.8109646
CAPG	1.352070	7.399716	3.217971	3.539817e-03	6.670104e-02	-1.9904148
SH3BGRL3	1.126694	10.223732	2.426049	2.276887e-02	1.767257e-01	-3.6783009
TUBB6	3.538574	8.265792	8.560817	6.388831e-09	9.781300e-06	10.3772190
GAS7	1.017551	7.274466	4.882833	4.978395e-05	5.977979e-03	2.0064481
VAMP8	1.387172	8.235033	3.691332	1.082407e-03	3.662242e-02	-0.8902350
PROM1	2.485985	5.855843	3.266241	3.142912e-03	6.207808e-02	-1.8806396
CCNA1	4.115569	7.090891	7.828157	3.351382e-08	4.560858e-05	8.8550849
SLC7A7	1.241250	7.226902	3.681139	1.110800e-03	3.707104e-02	-0.9144085
MS4A3	1.169851	5.303007	1.738755	9.431247e-02	3.572964e-01	-4.8976866
LY86	1.055750	8.687214	3.567420	1.481364e-03	4.246500e-02	-1.1828284
MRPL33	1.115852	8.300756	5.012675	3.553917e-05	5.091561e-03	2.3248147
CD44	1.753564	8.854474	4.620586	9.842926e-05	8.309223e-03	1.3629058
CD72	1.601007	6.825645	5.786829	4.845775e-06	1.483776e-03	4.2059585
FAM30A	1.186509	6.057223	3.373198	2.410729e-03	5.430057e-02	-1.6352421
MAFB	1.203459	5.702972	3.009475	5.880452e-03	8.657253e-02	-2.4568444

In [206…

```
topdowns2_4 = tab[tab$logFC < -1,]
length(row.names(topdowns2_4))
topdowns2_4
```

156

A data.frame: 156 × 6

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
CD24	-2.545681	8.161407	-5.527831	9.397480e-06	2.123937e-03	3.5810952
LPAR6	-1.905405	7.934094	-4.590562	1.064197e-04	8.382415e-03	1.2892579
SPRY1	-2.212112	8.103483	-7.451075	8.085080e-08	9.002369e-05	8.0397395
CD52	-2.397221	8.342488	-4.710549	7.790142e-05	7.283485e-03	1.5836598
PRDX4	-1.069471	6.626019	-1.977930	5.899632e-02	2.899881e-01	-4.5057524
IFI44	-1.724494	5.650214	-4.061398	4.194782e-04	2.055108e-02	-0.0023464
KHDRBS3	-1.993821	5.962661	-4.669038	8.677939e-05	7.873141e-03	1.4817875
TCFL5	-1.547011	5.990143	-2.676629	1.290478e-02	1.312772e-01	-3.1708545
ZNF274	-1.426224	7.013756	-6.816980	3.703685e-07	2.520152e-04	6.6216380
HCP5	-1.562288	6.553503	-4.779358	6.514212e-05	6.562601e-03	1.7525347
GADD45G	-1.060119	5.037542	-3.534490	1.609576e-03	4.390665e-02	-1.2600988

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
IFI44L	-1.168817	5.417723	-2.344534	2.724861e-02	1.927938e-01	-3.8369476
CKAP4	-1.089583	7.012385	-2.325068	2.843147e-02	1.962958e-01	-3.8743321
CKS2	-1.024727	9.105806	-2.687679	1.257928e-02	1.299587e-01	-3.1478377
ARAP2	-1.223473	6.624177	-3.057208	5.240237e-03	8.186151e-02	-2.3512366
AGAP1	-1.132464	5.554972	-2.558105	1.692830e-02	1.510446e-01	-3.4144306
COL5A1	-1.715527	6.421660	-5.445235	1.161970e-05	2.496809e-03	3.3807125
DCK	-1.319648	5.346136	-3.545831	1.564244e-03	4.378332e-02	-1.2335118
ADGRA3	-1.007081	5.618106	-3.219403	3.527377e-03	6.656906e-02	-1.9871678
DNTT	-1.756479	8.508403	-2.908626	7.487127e-03	9.849875e-02	-2.6774753
DPEP1	-1.408438	5.805297	-4.820770	5.849502e-05	6.160569e-03	1.8541661
DUSP2	-1.363298	8.866559	-4.313708	2.184158e-04	1.351089e-02	0.6114609
DUSP6	-1.031717	8.520499	-3.252146	3.254140e-03	6.361838e-02	-1.9127595
ECM1	-1.631510	8.349353	-5.368152	1.417090e-05	2.740947e-03	3.1932886
EGR3	-1.202540	7.381152	-2.190643	3.796213e-02	2.307495e-01	-4.1269837
ELK3	-1.360897	6.389561	-4.811924	5.985530e-05	6.160569e-03	1.8324580
ERG	-1.129818	6.709421	-5.215045	2.104090e-05	3.346870e-03	2.8199574
FHIT	-2.405056	5.701794	-10.181741	2.097096e-10	5.137047e-07	13.4525412
BTBD3	-1.930673	5.779517	-5.237445	1.985705e-05	3.346712e-03	2.8746570
GOLGA8A	-1.645719	5.597582	-3.673060	1.133818e-03	3.753244e-02	-0.9335536
⋮	⋮	⋮	⋮	⋮	⋮	⋮
CA2	-1.409682	5.835812	-3.032981	5.556366e-03	0.0848827953	-2.40493052
PXDN	-1.742058	8.507957	-6.576683	6.678357e-07	0.0003895072	6.06965826
PVRIG	-1.171541	7.031417	-4.024500	4.613273e-04	0.0217320642	-0.09164104
NEIL1	-1.475773	7.027586	-3.977396	5.207909e-04	0.0236246203	-0.20542221
PLEKHF2	-1.067237	5.658678	-2.953134	6.732338e-03	0.0935955422	-2.58053359
TCEAL4	-1.263333	6.849462	-3.106557	4.648743e-03	0.0766323131	-2.24129675
TCL1A	-1.591435	8.314148	-2.719802	1.167631e-02	0.1247918377	-3.08064450
SLC38A1	-1.591704	8.796759	-4.778022	6.536882e-05	0.0065626010	1.74925453
NRIP1	-1.066950	7.785961	-3.316631	2.774531e-03	0.0585657674	-1.76538609
ARID5B	-1.663871	7.457406	-3.576113	1.449220e-03	0.0423661320	-1.16239669
DYRK3	-1.104183	6.871886	-6.293302	1.349803e-06	0.0006123106	5.40921003
TPST1	-1.191546	5.860839	-4.441073	1.569385e-04	0.0108597894	0.92290136
KLF11	-1.827977	6.229737	-4.531929	1.239399e-04	0.0092000944	1.14548666
IFITM1	-2.162525	8.587393	-5.225769	2.046551e-05	0.0033467119	2.84614806
TRIM24	-2.091345	6.414340	-4.850625	5.412879e-05	0.0061605686	1.92742486
IER3	-1.500173	7.844781	-3.203819	3.665069e-03	0.0677070314	-2.02247904
CCND2	-1.080965	5.865636	-5.352637	1.474917e-05	0.0027409474	3.15551792
HPS4	-1.168930	6.621712	-4.922405	4.492170e-05	0.0058062246	2.10351475

	logFC	AveExpr	t	P.Value	adj.P.Val	B
	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
HACD1	-1.436306	6.589676	-3.539274	1.590299e-03	0.0438693426	-1.24888673
TCEAL1	-1.078900	6.173098	-4.051702	4.300976e-04	0.0208214856	-0.02582594
ARHGAP29	-1.047361	4.600157	-2.805181	9.563664e-03	0.1129563751	-2.90003134
TJP2	-1.284169	5.220641	-3.472666	1.880128e-03	0.0473773924	-1.40456744
EIF2AK3	-2.106991	7.535828	-4.417364	1.669047e-04	0.0111919637	0.86486839
ITM2A	-1.020745	5.995144	-2.386016	2.487670e-02	0.1849818593	-3.75663104
MAGED1	-1.845368	9.242498	-6.901955	3.011644e-07	0.0002282802	6.81497752
AKAP12	-2.812054	6.734179	-5.220119	2.076666e-05	0.0033467119	2.83234975
SOCS5	-1.074025	5.271137	-3.462783	1.927291e-03	0.0480762892	-1.42758423
CD69	-1.992902	9.482630	-4.166498	3.197737e-04	0.0172068916	0.25271451
EDEM1	-1.134182	7.656114	-4.756984	6.904298e-05	0.0067852709	1.69762337
CLEC2B	-1.397302	10.580534	-4.670649	8.641648e-05	0.0078731405	1.48574291