WGCNA Demo

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r.Sys.time()

Installing the package and setting up the options.

```
install.packages("BiocManager", repos='http://cran.us.r-project.org')
```

```
## Installing package into '/Users/mei/Library/R/3.6/library'
## (as 'lib' is unspecified)
```

```
##
##   There is a binary version available but the source version is
##   later:
##             binary source needs_compilation
## BiocManager 1.30.7 1.30.8             FALSE
```

```
## installing the source package 'BiocManager'
```

```
BiocManager::install("WGCNA")
```

```
## Bioconductor version 3.9 (BiocManager 1.30.8), R 3.6.0 (2019-04-26)
```

```
## Installing package(s) 'WGCNA'
```

```
## Package which is only available in source form, and may need
##   compilation of C/C++/Fortran: 'WGCNA'
```

```
## installing the source package 'WGCNA'
```

```
## Old packages: 'classInt', 'styler'
```

```
## Setting options
options(stringsAsFactors = FALSE)
library(WGCNA)
```

```
## Loading required package: dynamicTreeCut
```

```
## Loading required package: fastcluster
```

```
##
## Attaching package: 'fastcluster'
```

```
## The following object is masked from 'package:stats':
##
##     hclust
```

```
##
```

```
##
## Attaching package: 'WGCNA'
```

```
## The following object is masked from 'package:stats':
##
##     cor
```

Importing data files from female and male liver tissues from mice, and exploring them.

```
mydataf <- read.csv("./FemaleLiver-Data/LiverFemale3600.csv", header = TRUE)
colnames(mydataf)
```

```
##   [1] "substanceBXH"   "gene_symbol"    "LocusLinkID"    "ProteomeID"
##   [5] "cytogeneticLoc" "CHROMOSOME"     "StartPosition"  "EndPosition"
##   [9] "F2_2"           "F2_3"           "F2_14"          "F2_15"
##  [13] "F2_19"          "F2_20"          "F2_23"          "F2_24"
##  [17] "F2_26"          "F2_37"          "F2_42"          "F2_43"
##  [21] "F2_45"          "F2_46"          "F2_47"          "F2_48"
##  [25] "F2_51"          "F2_52"          "F2_54"          "F2_63"
##  [29] "F2_65"          "F2_66"          "F2_68"          "F2_69"
##  [33] "F2_70"          "F2_71"          "F2_72"          "F2_78"
##  [37] "F2_79"          "F2_80"          "F2_81"          "F2_83"
##  [41] "F2_86"          "F2_87"          "F2_88"          "F2_89"
##  [45] "F2_107"         "F2_108"         "F2_109"         "F2_110"
##  [49] "F2_111"         "F2_112"         "F2_117"         "F2_119"
##  [53] "F2_125"         "F2_126"         "F2_127"         "F2_141"
##  [57] "F2_142"         "F2_143"         "F2_144"         "F2_145"
##  [61] "F2_154"         "F2_155"         "F2_156"         "F2_157"
##  [65] "F2_162"         "F2_163"         "F2_164"         "F2_165"
##  [69] "F2_166"         "F2_167"         "F2_169"         "F2_180"
##  [73] "F2_181"         "F2_182"         "F2_187"         "F2_188"
##  [77] "F2_189"         "F2_190"         "F2_191"         "F2_192"
##  [81] "F2_194"         "F2_195"         "F2_200"         "F2_201"
##  [85] "F2_212"         "F2_213"         "F2_214"         "F2_215"
##  [89] "F2_221"         "F2_222"         "F2_223"         "F2_224"
##  [93] "F2_225"         "F2_226"         "F2_227"         "F2_228"
##  [97] "F2_241"         "F2_242"         "F2_243"         "F2_244"
## [101] "F2_245"         "F2_247"         "F2_248"         "F2_261"
## [105] "F2_263"         "F2_264"         "F2_270"         "F2_271"
## [109] "F2_272"         "F2_278"         "F2_287"         "F2_288"
## [113] "F2_289"         "F2_290"         "F2_291"         "F2_296"
## [117] "F2_298"         "F2_299"         "F2_300"         "F2_302"
## [121] "F2_303"         "F2_304"         "F2_305"         "F2_306"
## [125] "F2_307"         "F2_308"         "F2_309"         "F2_310"
## [129] "F2_311"         "F2_312"         "F2_320"         "F2_321"
## [133] "F2_323"         "F2_324"         "F2_325"         "F2_326"
## [137] "F2_327"         "F2_328"         "F2_329"         "F2_330"
## [141] "F2_332"         "F2_355"         "F2_357"
```

```
head(mydataf)
```

```
##   substanceBXH   gene_symbol LocusLinkID ProteomeID cytogeneticLoc
## 1  MMT00000044 1700007N18Rik       69339     286025              0
## 2  MMT00000046         Mast2       17776     157466              0
## 3  MMT00000051       Ankrd32      105377     321939              0
## 4  MMT00000076             0      383154          0              0
## 5  MMT00000080          Ldb2       16826     157383              0
## 6  MMT00000102          Rdhs      216453          0     10_70.0_cM
##   CHROMOSOME StartPosition EndPosition     F2_2    F2_3     F2_14    F2_15
## 1         16      50911260    50912491 -0.01810  0.0642  6.44e-05 -0.05800
## 2          4     115215318   115372404 -0.07730 -0.0297  1.12e-01 -0.05890
## 3         13      74940309    74982847 -0.02260  0.0617 -1.29e-01  0.08710
## 4         16      49345114    49477048 -0.00924 -0.1450  2.87e-02 -0.04390
## 5          5      43546124    43613704 -0.04870  0.0582 -4.83e-02 -0.03710
## 6         10       1337265     1347607  0.17600 -0.1890 -6.50e-02 -0.00846
##      F2_19       F2_20    F2_23    F2_24   F2_26    F2_37        F2_42
## 1  0.04830 -0.15197410 -0.00129 -0.23600 -0.0307 -0.02610  0.073705890
```

```
## 2  0.04430 -0.09380000  0.09340  0.02690 -0.1330  0.07570 -0.009193803
## 3 -0.11500 -0.06502607  0.00249 -0.10200  0.1420 -0.10200  0.064289290
## 4  0.00425 -0.23610000 -0.06900  0.01440  0.0363 -0.01820  0.477874600
## 5  0.02510  0.08504274  0.04450  0.00167 -0.0680  0.00567 -0.075348680
## 6 -0.00574 -0.01807182 -0.12500 -0.06820  0.1250  0.00998 -0.037366600
##     F2_43    F2_45   F2_46    F2_47   F2_48   F2_51   F2_52   F2_54
## 1 -0.0466 -0.00673 -0.0193  0.09040  0.0290  0.0356 -0.0388 -0.0360
## 2 -0.0075  0.01700  0.0722 -0.08390  0.0273 -0.0784 -0.0178  0.1120
## 3  0.0169 -0.01590 -0.1430 -0.00492 -0.0735  0.0657 -0.0197 -0.1290
## 4  0.1440  0.11100  0.0113  0.11900  0.0225  0.0932  0.1430  0.2640
## 5 -0.0673 -0.04720  0.0701 -0.08790 -0.0180 -0.1290 -0.0469 -0.0352
## 6 -0.0402 -0.02190  0.0269  0.13300  0.0732  0.1070 -0.0362 -0.0696
##      F2_63     F2_65   F2_66    F2_68    F2_69    F2_70    F2_71   F2_72
## 1 -0.05600  0.009840 -0.0261  0.00856 -0.01180 -0.03350 -0.08310 -0.0471
## 2  0.12300  0.051700  0.0731  0.08670  0.05710  0.00693 -0.00606 -0.0390
## 3 -0.14300 -0.061600  0.0419 -0.29000 -0.10800 -0.09950 -0.00315  0.0975
## 4 -0.09280 -0.000635 -0.0126  0.06910  0.02260 -0.08630 -0.22900  0.0178
## 5 -0.00166  0.058700 -0.0206 -0.13000  0.00392  0.05450 -0.11200  0.1070
## 6 -0.19400 -0.117000 -0.0400  0.06890  0.04320 -0.00338 -0.05270 -0.0416
##      F2_78        F2_79   F2_80   F2_81   F2_83   F2_86    F2_87    F2_88
## 1 -0.02820  0.047264410  0.0296  0.0114  0.0498 -0.0249 -0.00264 -0.02050
## 2  0.01870  0.008471275 -0.0687 -0.0114 -0.0262 -0.0215 -0.09580 -0.01930
## 3  0.01030 -0.134271000  0.1010  0.0521 -0.0607 -0.0285  0.02560 -0.01350
## 4  0.00166  0.064096960  0.0103 -0.0258 -0.0837  0.1880  0.03310 -0.00652
## 5  0.01190  0.008985630 -0.1030 -0.1400 -0.0282 -0.1090  0.02070 -0.01370
## 6 -0.03040  0.025920240  0.0697  0.1150  0.0953  0.0127  0.05490  0.00311
##     F2_89  F2_107  F2_108   F2_109  F2_110  F2_111  F2_112   F2_117
## 1  0.0826 -0.0421  0.0663  0.03620  0.0808 -0.0404  0.0877  0.07240
## 2 -0.1140  0.0815  0.0285  0.00299 -0.0407 -0.0657  0.0643 -0.00022
## 3  0.0796  0.0553 -0.0380  0.12900 -0.0361  0.0441 -0.1640 -0.01420
## 4  0.1550  0.0458  0.0752  0.12200 -0.0104  0.0914 -0.0355  0.06520
## 5 -0.0288 -0.1220  0.1270 -0.09390  0.1200 -0.0850  0.1400  0.00867
## 6  0.0955 -0.1520 -0.0670 -0.00599 -0.0438  0.0634  0.1380 -0.04010
##    F2_119   F2_125   F2_126   F2_127   F2_141  F2_142   F2_143   F2_144
## 1 -0.0210  0.04540 -0.03220 -0.00654  0.03490 -0.0315 -0.02170  0.00370
## 2 -0.0877  0.00167  0.00321 -0.01260 -0.04530 -0.0579  0.05920  0.00239
## 3 -0.0279  0.00677  0.07360  0.01750  0.10900 -0.0216 -0.01250  0.05460
## 4  0.1280  0.05940  0.01630  0.00292  0.00714 -0.0565  0.10200  0.03480
## 5  0.1440  0.08710 -0.03360  0.17300  0.08270  0.0594 -0.00317 -0.06750
## 6  0.1310 -0.12600  0.00484 -0.00256 -0.06800  0.0941 -0.04220  0.12000
##    F2_145      F2_154    F2_155  F2_156   F2_157   F2_162  F2_163  F2_164
## 1  0.0322 -0.02150730 -0.000958 -0.0850  0.00462  0.03990  0.0716 -0.0923
## 2 -0.0383  0.02457782 -0.030300 -0.1260 -0.06670 -0.00637 -0.0161 -0.2340
## 3  0.0403 -0.01674888  0.059900  0.0311 -0.05190  0.01890  0.0207  0.0929
## 4  0.0245  0.06776892  0.016500 -0.0382  0.02120  0.06690  0.0512 -0.2450
## 5  0.0495  0.13520570  0.016500  0.0832  0.04350  0.19300  0.0586 -0.0768
## 6  0.1080 -0.05128296 -0.005590  0.0136  0.09910  0.06770 -0.0520  0.1550
##     F2_165  F2_166  F2_167   F2_169   F2_180      F2_181  F2_182   F2_187
## 1  0.10900  0.0102  0.0337  0.00911  0.03210  0.03144772  0.0543  0.01120
## 2 -0.09610 -0.1290 -0.0109 -0.11300 -0.00677 -0.16704700 -0.0239  0.00304
## 3  0.00917  0.0874 -0.1260 -0.00949 -0.09900  0.02700180 -0.0570 -0.05160
## 4  1.23000 -0.0402 -0.0635  0.06880  0.03790 -0.02058180  0.0227  0.04180
## 5  0.04600  0.0484  0.2810  0.07210 -0.00630  0.37074790  0.0618  0.10800
## 6  0.07890  0.0336  0.0648  0.14400  0.02770  0.09297908  0.0601  0.02960
```

```
##     F2_188  F2_189   F2_190  F2_191  F2_192  F2_194   F2_195  F2_200
## 1  0.01060  0.1130 -0.03960 -0.0504  0.0877 -0.0563 -0.00557 -0.0484
## 2 -0.03580 -0.1330 -0.01830 -0.0623 -0.0648 -0.0652  0.05020 -0.0912
## 3 -0.04970  0.1660  0.05000  0.0498  0.0431 -0.0224 -0.10700  0.0715
## 4  0.01010  0.2170  0.00206 -0.0155  0.6550  0.2820 -0.01310 -0.0387
## 5  0.12100  0.0237  0.02960  0.1130  0.0839  0.1050  0.15500  0.0823
## 6  0.00198  0.0251  0.00059 -0.0282  0.0429  0.0697  0.04930  0.0414
##    F2_201      F2_212  F2_213  F2_214   F2_215  F2_221   F2_222  F2_223
## 1 -0.0273 -0.10816380 -0.0183 -0.0132 -0.00432 -0.6630  0.01440  0.0310
## 2 -0.0180  0.05682362 -0.0238  0.0721  0.03910  0.1070  0.00923 -0.0397
## 3  0.0432 -0.13217820  0.0205 -0.0411  0.07670 -0.0783 -0.06860 -0.0254
## 4 -0.0667 -0.32395020 -0.0245  0.0865  0.06470 -2.0000  0.00874  0.0847
## 5  0.1140  0.03542023 -0.2020  0.0822  0.04260  0.1030 -0.10100  0.1630
## 6 -0.0708 -0.10881230  0.0359 -0.0678 -0.11000 -0.1420  0.08430 -0.0610
##     F2_224   F2_225   F2_226  F2_227  F2_228  F2_241  F2_242   F2_243
## 1  0.00818 -0.00892 -0.08710  0.0129  0.0937  0.0313  0.0821  0.00621
## 2 -0.06400  0.06300 -0.00152  0.0555  0.0947 -0.0387  0.0592 -0.00636
## 3 -0.05680 -0.13300 -0.07560 -0.0557 -0.0890 -0.1460 -0.0739 -0.01120
## 4 -0.09720  0.00746 -0.55200  0.0415  0.0733  0.0815  0.1100  0.21400
## 5  0.07410 -0.01640  0.08700 -0.0557 -0.1910  0.0219  0.0913  0.01120
## 6  0.08760 -0.03960  0.10200  0.0190 -0.1190  0.0687 -0.0525 -0.00716
##    F2_244   F2_245    F2_247       F2_248   F2_261  F2_263   F2_264
## 1  0.0307 -0.13700  0.075300 -0.096881950 -0.01670 -0.0928 -0.00957
## 2  0.0614  0.02850 -0.000633  0.001598228 -0.00267 -0.0198  0.16300
## 3 -0.0528  0.05050  0.027700 -0.067933370 -0.02220 -0.0684 -0.04930
## 4  0.0135 -0.13500 -0.003100  0.072318780  0.01030 -0.3150  0.08420
## 5  0.1190  0.00383  0.041700 -0.038618510  0.11800  0.0123  0.03700
## 6 -0.1460 -0.14500  0.029400  0.035281240 -0.05660  0.0917 -0.08080
##    F2_270   F2_271  F2_272   F2_278  F2_287      F2_288    F2_289  F2_290
## 1  0.0287 -0.01300 -0.0292 -0.03810 -0.0488  0.17361240 -0.097900  0.0383
## 2 -0.1310 -0.04260 -0.0514  0.07260 -0.0481 -0.16211430 -0.123000 -0.1370
## 3  0.0328  0.00537 -0.0259 -0.14400  0.0170  0.25924220 -0.041400 -0.0229
## 4  0.0351       NA  0.0730  0.00914  0.0556  0.18311140  0.051700  0.1780
## 5 -0.0142  0.00563 -0.0504 -0.05970 -0.0871  0.20897910 -0.000188 -0.0328
## 6  0.0362  0.00790 -0.0246 -0.07330  0.0125 -0.04778892  0.082500  0.1360
##     F2_291      F2_296  F2_298   F2_299    F2_300  F2_302  F2_303  F2_304
## 1  0.01850 -0.08937784  0.0230 -0.06250 -0.000142  0.0344  0.0358 -0.0139
## 2 -0.05720 -0.07416870 -0.0688 -0.06540 -0.102000 -0.0780 -0.0820 -0.1830
## 3 -0.00664 -0.05915232 -0.0134  0.09740  0.015500 -0.0934  0.1780  0.0842
## 4  0.05250 -0.21653720 -0.2210 -0.00266  0.545000  0.0127  0.0273 -0.0928
## 5 -0.16600 -0.07897525  0.1410 -0.12900  0.090600 -0.1330 -0.2120 -0.0797
## 6  0.04620  0.03811979 -0.0346  0.04690 -0.034800  0.0110  0.0323  0.1660
##    F2_305      F2_306   F2_307   F2_308  F2_309   F2_310  F2_311  F2_312
## 1  0.0134 -0.03145069  0.02780 -0.01190 -0.0744  0.00197 -0.0151 -0.0721
## 2 -0.0270 -0.09822316 -0.07890 -0.05480 -0.1320 -0.11000 -0.1130 -0.0805
## 3  0.0870  0.15520470  0.03410 -0.06830  0.0555 -0.04060  0.0835  0.0514
## 4  0.0469  0.10038160 -2.00000  0.05240  0.1260  0.07280  0.0600 -0.0455
## 5 -0.0191 -0.11958500  0.00294 -0.10600 -0.0518 -0.13200  0.0494  0.0221
## 6 -0.0866  0.05385017  0.09570 -0.00949  0.1120  0.20800  0.0872 -0.0555
##    F2_320  F2_321  F2_323    F2_324  F2_325  F2_326  F2_327   F2_328
## 1 -0.0118  0.0200  0.0222  0.047700 -0.0488  0.0168 -0.0309  0.02740
## 2 -0.1200  0.0101 -0.1610 -0.049200 -0.0350 -0.0738 -0.1730 -0.07380
## 3  0.0713 -0.1130  0.0466  0.000612  0.1210  0.0996  0.1090  0.02730
## 4 -0.0464  0.0667 -0.1850 -0.270000  0.0803  0.0424  0.1610  0.05120
```

```
## 5  0.0272 -0.0938  0.1020  0.113000 -0.0859 -0.1340  0.0639  0.00731
## 6  0.0748 -0.1420  0.0590 -0.080000 -0.1200  0.1230  0.1870  0.05410
##    F2_329  F2_330  F2_332  F2_355    F2_357
## 1 -0.0310  0.0660 -0.0199 -0.0146  0.065000
## 2 -0.2010 -0.0820 -0.0939  0.0192 -0.049900
## 3  0.1200 -0.0629 -0.0395  0.1090  0.000253
## 4  0.2410  0.3890  0.0251 -0.0348  0.114000
## 5  0.1240 -0.0212  0.0870  0.0512  0.024300
## 6  0.0699  0.0708  0.1450 -0.0399  0.037500
```

```
mydatam <- read.csv("./LiverMale3600.csv")
head(mydatam)
```

```
##   substanceBXH   gene_symbol LocusLinkID ProteomeID cytogeneticLoc
## 1  MMT00000044 1700007N18Rik       69339     286025              0
## 2  MMT00000046         Mast2       17776     157466              0
## 3  MMT00000051       Ankrd32      105377     321939              0
## 4  MMT00000076             0      383154          0              0
## 5  MMT00000080           Ldb2       16826     157383              0
## 6  MMT00000102           Rdhs      216453          0     10_70.0_cM
##   CHROMOSOME StartPosition EndPosition    F2_4    F2_5    F2_6     F2_7
## 1         16      50911260    50912491 -0.0444 -0.0179 -0.0431  0.03580
## 2          4     115215318   115372404  0.1250  0.0507  0.1290  0.13900
## 3         13      74940309    74982847 -0.1510 -0.0689 -0.0925  0.00353
## 4         16      49345114    49477048 -0.1650 -0.0285  2.0000  0.04570
## 5          5      43546124    43613704 -0.0724 -0.0603 -0.0569  0.02610
## 6         10       1337265     1347607 -0.1430 -0.0663 -0.1570 -0.23700
##      F2_8     F2_9     F2_10   F2_13   F2_16   F2_17   F2_18   F2_22
## 1  0.0263  0.15400  0.000109  0.0254 -0.0294  0.1160  0.0431 -0.0267
## 2  0.2370 -0.00483  0.007490  0.0227  0.0355  0.0836  0.1230  0.1180
## 3 -0.1610 -0.00932 -0.191000  0.0809  0.0692 -0.1350 -0.0471 -0.0785
## 4 -0.4550  0.33200  0.043500  0.0944  0.1640  0.0774  0.0169 -0.1030
## 5 -0.1130 -0.01210 -0.161000  0.0100 -0.1320 -0.1550 -0.1420 -0.0666
## 6 -0.2090 -0.09170  0.060800 -0.1330 -0.0683 -0.2010 -0.2530 -0.2020
##     F2_27    F2_28   F2_29    F2_30   F2_33   F2_34   F2_35   F2_39
## 1 -0.2160 -0.12700  0.0377 -0.07320 -0.0137  0.0434 -0.0277  0.0667
## 2  0.1200  0.16300  0.1570  0.20600 -0.0102  0.1460  0.1890  0.1170
## 3 -0.0352  0.00584 -0.1070 -0.07020 -0.0273  0.0426  0.0314  0.0751
## 4 -0.2080 -0.25600  0.0204 -0.04560 -0.8740 -0.8230  0.2260  0.1750
## 5 -0.0351 -0.03760 -0.0966  0.00728 -0.0629  0.1210 -0.2050  0.0322
## 6 -0.1110 -0.12700 -0.0948 -0.19000 -0.1610 -0.1260 -0.1760 -0.1850
##     F2_40   F2_41   F2_49       F2_50    F2_55   F2_56   F2_57       F2_59
## 1  0.0283  0.0541  0.0533 -0.06555326 -0.00713  0.0453  0.0256  0.02944015
## 2  0.2400  0.1560  0.0114 -0.02107601  0.10900  0.1700  0.2540  0.08054645
## 3 -0.1070 -0.0586 -0.0698 -0.07634149 -0.03310 -0.0901 -0.0965 -0.11589100
## 4  0.0204  0.0801 -0.0481 -0.17293770  0.13600  0.0427  0.0187  0.35591750
## 5 -0.0158 -0.0989 -0.0752 -0.03223757 -0.06150  0.0164 -0.1050 -0.05905863
## 6 -0.2190 -0.2260  0.0867 -0.08595835 -0.06300 -0.1770 -0.1320 -0.05455500
##     F2_60   F2_73   F2_74   F2_75   F2_76   F2_84   F2_85   F2_91   F2_92
## 1 -0.0459  0.0338 -0.0458  0.0201  0.0300 -0.0352 -0.1050  0.0259  0.0939
## 2  0.1890  0.1640  0.0728  0.1230  0.1360  0.2380  0.1000  0.2040  0.1950
## 3 -0.0930 -0.0391  0.0406 -0.0223 -0.0397 -0.0299 -0.0903 -0.2060 -0.1140
## 4  0.0437 -0.2150 -0.0366  0.0152  0.0448  0.4910 -0.5400  0.0573 -0.0314
## 5 -0.1030  0.0122 -0.1220 -0.0603 -0.0907 -0.0313 -0.0243 -0.2260  0.0257
## 6 -0.2250 -0.1760 -0.0801 -0.1050 -0.1510 -0.1560 -0.1650 -0.0885 -0.2140
```

```
##      F2_93       F2_94  F2_104  F2_105   F2_114  F2_115  F2_116   F2_120
## 1  0.04060  0.05805066 -0.0118  0.0143 -0.08070 -0.0418 -0.0559  0.00961
## 2  0.06750 -0.09036969  0.2950 -0.0661 -0.02010  0.0179  0.0837  0.04040
## 3 -0.01200 -0.04731417 -0.1050  0.0588  0.00895  0.1190  0.0474 -0.08880
## 4  0.08910  0.03246458  0.0498  0.0764 -0.07570  0.0532 -0.1520  0.14000
## 5  0.00118 -0.01082061  0.0462  0.0566  0.00530  0.0935 -0.0622  0.05640
## 6 -0.08690 -0.01983479 -0.2880 -0.0425 -0.10000 -0.1520 -0.1490 -0.03080
##     F2_121    F2_122   F2_123   F2_124    F2_146   F2_147  F2_148  F2_149
## 1  0.02130 -0.000128  0.04350  0.01260  0.003750  0.00994 -0.0225  0.0593
## 2  0.15900  0.004370  0.02910  0.05050  0.049400  0.17200 -0.0412  0.0968
## 3 -0.13600  0.052000 -0.00612  0.04040  0.008640  0.02550 -0.0475  0.0802
## 4 -0.03820 -0.041300  0.09380 -0.11600 -0.048700  0.07400  0.0380  0.0568
## 5  0.00566 -0.000152  0.07480 -0.00657 -0.000285  0.13500  0.1200 -0.0286
## 6 -0.10200 -0.093200 -0.04530 -0.16100 -0.085200 -0.18200 -0.0417 -0.1450
##     F2_151  F2_152  F2_153    F2_158  F2_159  F2_160  F2_170   F2_171
## 1 -0.00857  0.0288  0.0761  0.000479 -0.0189  0.0438  0.0149  0.02290
## 2  0.04930 -0.0367 -0.1340  0.138000 -0.0126  0.0757  0.0853  0.14800
## 3  0.04530  0.0184  0.0162 -0.052900  0.0576 -0.0076 -0.0349 -0.03930
## 4 -0.00238 -0.0396  0.0121  0.026400  0.0114  0.0108  0.0861  0.01890
## 5  0.15700 -0.0247  0.1090  0.004630 -0.1240 -0.0387  0.0269  0.00419
## 6 -0.04530 -0.0119  0.0662 -0.063400  0.0423 -0.0895 -0.1090 -0.11600
##    F2_172  F2_173  F2_174   F2_176   F2_178  F2_179   F2_183   F2_184
## 1  0.0812 -0.0100  0.0492  0.03220  0.07230 -0.0196 -0.05150  0.00377
## 2 -0.0538  0.1300  0.1850  0.02230  0.00528  0.0265  0.03850  0.19300
## 3  0.0696  0.0564 -0.0620  0.02440  0.00459 -0.0327  0.00872 -0.04460
## 4  0.0772  0.0169  0.0694  0.00808  0.15500 -0.1810 -0.03080 -0.01700
## 5 -0.0258 -0.1100  0.0790  0.08090 -0.02610 -0.0216 -0.08210  0.03000
## 6  0.0621 -0.1820 -0.1480 -0.09400  0.00701 -0.0180  0.06090 -0.18000
##     F2_185      F2_186   F2_197   F2_198  F2_199  F2_207  F2_208   F2_209
## 1  0.03590  0.02331811  0.08710  0.00320 -0.0152  0.0919  0.0745 -0.07960
## 2  0.06140  0.05443614 -0.09730  0.02270  0.0731  0.1870  0.1540  0.14400
## 3 -0.07370 -0.16528400  0.00276  0.00964 -0.0403 -0.0760 -0.0429 -0.12000
## 4 -0.12100 -0.04767130 -0.06740  0.00838  0.0253  0.2100 -0.3510  0.09110
## 5  0.00615  0.05199314  0.04700  0.04130 -0.0335  0.1610  0.1570  0.00777
## 6  0.00157 -0.05937405 -0.04100 -0.04790 -0.1440 -0.2910 -0.2530 -0.11300
##    F2_210    F2_216  F2_217  F2_218   F2_219  F2_220      F2_230  F2_231
## 1  0.0848 -0.093800 -0.0898  0.0472  0.00513  0.0578  0.05616089  0.1470
## 2  0.0594  0.109000  0.0791  0.2110  0.08110  0.1580  0.19241050  0.1410
## 3 -0.0627 -0.029200  0.1090 -0.0459 -0.06390 -0.1700 -0.09710876 -0.0163
## 4  0.0349 -0.024900 -0.0165  0.7450  0.04310  0.0427  0.38320980  0.1750
## 5  0.0935  0.000275 -0.0371  0.0980  0.07460  0.2250 -0.11742250 -0.0112
## 6 -0.0358 -0.042800 -0.1930 -0.1750 -0.02980 -0.1190 -0.15757000 -0.0319
##      F2_232  F2_233  F2_234      F2_235  F2_236   F2_237   F2_238   F2_239
## 1  0.018600  0.0976  0.0160  0.05150205  0.0394  0.00542 0.000242 -0.01540
## 2  0.056600  0.2570  0.2590  0.14049010  0.0965  0.04190 0.009570  0.11900
## 3 -0.000807 -0.1110 -0.1750 -0.09649123  0.0154 -0.00482 0.014500 -0.00822
## 4 -0.040400  0.0284 -0.1630  0.02090355  0.0610  0.04090 0.004970  0.19500
## 5  0.007410  0.2130  0.0578  0.06377663 -0.0739 -0.03110 0.019900 -0.02510
## 6 -0.046300 -0.2130 -0.2990 -0.10599170 -0.0209 -0.14300 0.069700 -0.08810
##     F2_249  F2_250  F2_251    F2_252   F2_254      F2_256      F2_257
## 1 -0.02430 -0.1010  0.0626 -0.060100  0.11600  0.03889860  0.07270702
## 2  0.08050  0.1460  0.0296  0.243000  0.18900  0.13016450  0.03534575
## 3  0.00863 -0.0533 -0.0225  0.011700 -0.19800 -0.06286667 -0.13364770
## 4  0.04790 -0.2420  0.1500 -0.000738  0.21100  0.06825731  0.04275748
```

```
## 5  0.03110 -0.0222      NA  0.133000 -0.00411 -0.08267811  0.08027854
## 6 -0.13200 -0.1830 -0.1090 -0.237000 -0.19800 -0.15300000  0.00877483
##    F2_265  F2_266  F2_268      F2_274   F2_275  F2_276   F2_279  F2_280
## 1 -0.0290  0.0550 -0.0312 -0.02870776  0.05570 -0.0859  0.01570  0.1010
## 2  0.0221  0.1020  0.1030  0.07293987  0.00983  0.0640  0.05220  0.2420
## 3 -0.0235 -0.0451 -0.0247 -0.68900000  0.02710 -0.0721  0.00623 -0.1590
## 4  0.2240  0.1280  0.0340  0.12850620 -0.09060  0.3490 -0.04130  0.0187
## 5 -0.0183 -0.0851 -0.0846 -0.19800000 -0.02600 -0.1410  0.00820 -0.0193
## 6 -0.0432 -0.0188 -0.1010  0.03046819 -0.05890 -0.0467 -0.10800 -0.2750
##     F2_281   F2_282  F2_284       F2_285   F2_286     F2_292      F2_294
## 1 -0.02040 -0.00133  0.0414  0.020115580 -0.00453  0.1898726  0.04873549
## 2 -0.01090  0.04050  0.0824  0.013043140  0.12100  0.0674650 -0.02203408
## 3  0.00717  0.03830  0.0193  0.007803106 -0.06740  0.1602482 -0.03922225
## 4  0.01140  0.05380  1.9100 -0.088830460 -0.00285  0.1820795 -0.14910580
## 5 -0.12600 -0.06070 -0.0211  0.206402900 -0.01670  0.1148936 -0.02899761
## 6  0.00944 -0.04300 -0.1100 -0.099250960 -0.12500 -0.1783375 -0.08796206
##     F2_295   F2_313   F2_314  F2_315       F2_316  F2_317   F2_318  F2_343
## 1  0.01950  0.00240 -0.09950 -0.0872 -0.103662100  0.0242  0.00536  0.1340
## 2 -0.01470  0.19700  0.09810  0.0618  0.098719220  0.0104  0.09670 -0.0248
## 3  0.11700 -0.00744  0.00862  0.0130 -0.002592110  0.0946  0.01590 -0.0934
## 4  0.14100  0.04860 -0.03720  0.7800  0.280451100 -0.0560  0.02180  0.2100
## 5  0.00608  0.05360 -0.04540 -0.1290  0.001011547  0.0877 -0.07280 -0.0284
## 6 -0.02930 -0.17800 -0.09560 -0.0600 -0.067627370 -0.0127 -0.07340  0.0180
##        F2_353
## 1  0.15584910
## 2  0.11533460
## 3 -0.13519600
## 4  0.24050990
## 5 -0.13719800
## 6 -0.06457439
```

```
## LocusLinkID and ProteomeID are annotations from the said databases
## http://www.ncbi.nlm.nih.gov/LocusLink/
```

Moving on, we extract expression data from the master dataframe. Recall that the rows represent genes and the columns represent different samples (mice).

```
exprdata = as.data.frame(t(mydataf[, -c(1:8)]))



# names(datExpr0) = femData$substanceBXH
# rownames(datExpr0) = names(femData)[-c(1:8)]
```