Identification of differentially expressed proteins

In this section, we will identify DEPs of Explant patient data, preprocssed by Mimi.

```
clear
clc
close all
```

1. data loading

```
filename='Explant_ResponseGroup_Allprot.xlsx';
% expression data
tbl_exp_dat = readtable(filename,...
    'Range','B1:AP3767',...
    'Sheet','DataMatrix',...
    'ReadVariableNames',true,...
    'ReadRowNames',true);

tbl_exp_dat
```

```
tbl_exp_dat = 3766×40 table
```

...

	V_1	V_2	V_3	V_9	V_15	V_19	V_21	V_28
1 RBM47	8.3337e+03	1.2791e+04	1.0708e+04	1.1339e+04	1.0064e+04	4.4274e+03	4.3326e+03	7.3342e+03
2 UBA6	2.7440e+04	4.1477e+04	8.5287e+03	1.2567e+04	1.0023e+04	6.4335e+03	7.6965e+03	6.0267e+03
3 ESYT2	1.1391e+04	1.0063e+04	8.3896e+03	1.5221e+04	1.2910e+04	6.0932e+03	1.0184e+04	7.4676e+03
4 SHTN1	639.8431	931.4450	3.6667e+03	7.5335e+03	2.3868e+03	2.8809e+04	2.3142e+04	2.5784e+04
5 ARHGAP10	1.4545e+03	1.2023e+03	1.2049e+03	1.9071e+03	1.3341e+03	1.2217e+03	2.1491e+03	4.8895e+03
6 ILVBL	7.5139e+03	6.2419e+03	6.3918e+03	9.8173e+03	4.9366e+03	6.7772e+03	7.9066e+03	8.9803e+03
7 SH3PXD2B	8.7206e+03	8.7163e+03	1.0603e+04	1.7855e+04	7.7758e+03	9.0845e+03	6.5910e+03	7.4512e+03
8 NBAS	5.3424e+03	2.9640e+03	3.2221e+03	6.0090e+03	3.6652e+03	2.0846e+03	3.3536e+03	1.9737e+03
9 VWA8	2.2070e+03	3.3086e+03	3.5912e+03	5.0866e+03	4.3061e+03	3.3202e+03	2.9421e+03	3.3199e+03
10 XIRP2	1.0059e+05	4.0372e+04	4.8236e+04	1.8574e+04	3.9405e+04	1.0448e+05	2.3328e+05	1.4769e+05
11 VPS37C	0	0	4.3957e+03	1.0777e+04	4.2193e+03	1.8423e+03	2.5587e+03	2.7123e+03
12 CNOT1	6.9426e+03	6.3231e+03	4.4042e+03	6.7137e+03	5.2475e+03	6.2749e+03	4.0529e+03	3.7637e+03
13 C5orf51	4.9908e+03	3.8460e+03	4.5480e+03	3.9211e+03	3.9662e+03	7.1573e+03	1.6021e+04	5.7716e+03
14 FBLL1	5.2554e+04	6.2422e+04	1.1795e+05	1.3836e+05	1.4192e+05	5.1396e+04	1.6129e+04	3.2822e+04
15 SMCHD1	1.9008e+03	3.1592e+03	2.5855e+03	4.1882e+03	2.8990e+03	1.4408e+03	2.4061e+03	458.6655
16 NUDT19	3.7628e+03	4.8714e+03	5.7046e+03	1.2487e+04	5.4421e+03	2.7670e+03	4.6387e+03	6.6755e+03
17 DNASE2	1.9256e+03	3.1576e+03	3.3266e+03	5.1215e+03	4.9738e+03	2.3618e+03	4.4683e+03	4.0716e+03
18 AGPS	3.4117e+03	2.2603e+03	2.8290e+03	5.4152e+03	3.2642e+03	5.7443e+03	3.2395e+03	3.9980e+03

	V_1	V_2	V_3	V_9	V_15	V_19	V_21	V_28
19 KIF2A	2.9775e+03	2.9877e+03	4.1766e+03	1.6152e+03	3.7257e+03	4.3662e+03	7.8460e+03	3.7829e+03
20 TK2	3.3758e+03	3.1945e+03	7.0283e+03	7.3005e+03	1.0186e+04	2.0088e+03	5.1354e+03	5.0541e+03
21 DDX39A	335.8877	1.8278e+03	2.1771e+03	424.7372	3.4717e+03	4.3455e+03	2.3553e+03	4.9591e+03
22 PDLIM1	3.2263e+04	2.4238e+04	2.5554e+04	2.5790e+04	3.2091e+04	2.9637e+04	2.5373e+04	3.3243e+04
23 ACOT7	1.4432e+04	1.1463e+04	1.8108e+04	1.6554e+04	1.7256e+04	1.3768e+04	9.8486e+03	1.4904e+04
24 MYO1C	1.3368e+05	8.3473e+04	9.0855e+04	1.5287e+05	1.0296e+05	6.9574e+04	1.1219e+05	9.6925e+04
25 SNAP23	1.3171e+04	1.2674e+04	1.6343e+04	3.4155e+04	2.2370e+04	5.4496e+03	2.0411e+03	4.3087e+03
26 HAX1	892.3767	1.5144e+03	1.5087e+03	1.1906e+03	1.4664e+03	2.7731e+03	678.8716	2.7160e+03
27 AIP	8.8749e+03	8.4552e+03	1.2192e+04	1.5799e+04	1.3202e+04	6.1740e+03	6.1053e+03	4.5948e+03
28 GTPBP1	2.6864e+03	3.1134e+03	5.4855e+03	7.0954e+03	5.4730e+03	3.4221e+03	1.7570e+03	2.0877e+03
29 LGALS9	823.6581	1.0926e+03	9.7536e+03	3.2187e+03	9.4773e+03	4.5688e+03	3.7661e+03	4.7846e+03
30 STXBP3	3.9277e+04	6.3300e+04	8.0256e+04	1.0220e+05	7.0430e+04	1.1710e+04	1.3860e+04	1.1452e+04
31 SMAP	0	0	5.5870e+03	4.3799e+03	4.9580e+03	9.0735e+03	2.6174e+03	9.2586e+03
32 RAB27B	1.6988e+04	1.7297e+04	1.9646e+04	3.2336e+04	1.9928e+04	8.7877e+03	8.2288e+03	1.2705e+04
33 AP3B1	1.2082e+04	1.1326e+04	1.3387e+04	2.0747e+04	1.8143e+04	9.4072e+03	5.5201e+03	6.0982e+03
34 SULT2B1	1.9949e+03	5.8188e+03	3.2999e+03	2.3492e+03	6.5468e+03	2.4890e+03	797.9304	2.6765e+03
35 LGALS8	688.9147	1.1937e+03	3.9671e+03	3.1619e+03	2.3872e+03	1.6925e+03	1.2089e+03	1.6021e+03
36 NDUFS8	4.4129e+04	5.6214e+04	5.2154e+04	5.2158e+04	6.5171e+04	2.5156e+04	2.4891e+04	3.9738e+04
37 PSMD11	2.9987e+04	3.2942e+04	4.4320e+04	2.5342e+04	3.4343e+04	1.6616e+04	2.1901e+04	1.8540e+04
38 PSMD12	1.8081e+04	2.1537e+04	4.3006e+04	6.2231e+04	4.5412e+04	2.4124e+04	1.4345e+04	4.7207e+04
39 PSMD9	3.6806e+03	3.3876e+03	5.1628e+03	1.2723e+04	5.2410e+03	2.7786e+03	1.2346e+03	8.9727e+03
40 ATOX1	3.8417e+03	3.5115e+03	6.7978e+03	4.2627e+03	2.0665e+03	3.4820e+03	611.3593	2.1862e+03
41 PGRMC1	9.6406e+04	6.0617e+04	1.0536e+05	1.5766e+05	9.7884e+04	6.5212e+04	6.9536e+04	7.0818e+04
42 SUPT5H	817.0474	2.2366e+03	2.0233e+03	1.3454e+03	1.0976e+03	2.0996e+04	1.8472e+04	2.1845e+04
43 DFFA	5.8986e+03	5.7257e+03	9.1522e+03	4.9357e+03	6.4235e+03	3.2305e+03	1.8462e+03	1.5874e+03
44 HIP1	2.2114e+04	5.8024e+03	5.0277e+03	9.1073e+03	9.6553e+03	1.7441e+04	1.5965e+04	2.3530e+04
45 CLIC1	1.3267e+05	1.1326e+05	2.3152e+05	2.2526e+05	2.0132e+05	8.2892e+04	8.0384e+04	6.7723e+04
46 EIF3F	2.9872e+04	2.6190e+04	2.1808e+04	3.2493e+04	2.2550e+04	8.4485e+03	3.4834e+03	7.5814e+03
47 PDHX	9.0524e+03	1.0036e+04	1.0029e+04	9.8992e+03	8.7741e+03	7.9985e+03	9.9685e+03	1.0374e+04
48 MATN2	3.4666e+04	2.4376e+04	2.1272e+04	3.2512e+04	1.8494e+04	2.1134e+04	2.5310e+04	1.6298e+04
49 QSOX1	8.1030e+03	5.1867e+03	5.9166e+03	4.4955e+03	1.7404e+03	8.6222e+03	2.7252e+03	3.1846e+03
50 SLC33A1	4.2463e+03	4.3343e+03	4.0067e+03	3.4552e+03	4.5587e+03	2.1945e+03	1.3691e+04	1.1818e+04
51 IPO5	1.0397e+04	6.5092e+03	9.5030e+03	1.0254e+04	1.0819e+04	9.6662e+03	3.6047e+03	5.3535e+03
52 SAP18	1.2236e+04	8.6793e+03	7.7543e+03	8.7741e+03	1.1002e+04	5.0692e+03	6.1498e+03	5.9074e+03

	V_1	V_2	V_3	V_9	V_15	V_19	V_21	V_28
53 DNM1L	1.1834e+04	1.4872e+04	2.3809e+04	1.8920e+04	1.2858e+04	1.1670e+04	6.4633e+03	8.8684e+03
54 RTCA	1.0172e+04	1.2094e+04	1.3760e+04	1.8351e+04	1.5868e+04	8.2721e+03	2.0430e+03	5.4871e+03
55 MANBA	4.1081e+03	3.2630e+03	6.0308e+03	6.5045e+03	5.0377e+03	2.5108e+03	1.7530e+04	1.6313e+03
56 AGRN	1.3766e+04	2.0431e+04	3.2257e+04	4.0670e+04	2.8391e+04	2.2163e+04	2.0339e+04	2.4041e+04
57 PLOD2	1.0993e+03	1.3297e+03	2.7131e+03	1.3278e+03	2.1700e+03	2.8336e+03	4.3391e+03	1.4835e+04
58 EXOC5	4.2318e+03	3.7272e+03	4.1320e+03	4.2516e+03	4.3855e+03	2.3815e+04	9.6893e+03	3.0202e+04
59 NDUFA4	3.4025e+04	2.5532e+04	3.8582e+04	8.3158e+04	6.6067e+04	1.4603e+04	6.8503e+03	7.9361e+03
60 PSMD14	2.2550e+04	2.2703e+04	2.7843e+04	2.7656e+04	2.4035e+04	1.4892e+04	1.3965e+04	1.5869e+04
61 BIN1	2.0993e+04	8.7271e+03	9.3417e+03	3.6086e+03	8.7525e+03	7.5137e+03	5.4190e+03	5.5305e+03
62 KPNA3	1.0001e+04	8.6997e+03	1.0682e+04	1.2672e+04	9.9215e+03	5.9944e+03	3.4641e+03	3.6997e+03
63 LAD1	2.5147e+03	5.3685e+03	2.8979e+03	2.1084e+03	2.9397e+03	3.5369e+03	1.2688e+03	2.0092e+03
64 FAAH	2.3378e+03	8.3590e+03	1.0102e+04	7.0085e+03	1.0370e+04	4.2882e+03	8.0269e+03	8.2092e+03
65 VWA5A	1.1840e+04	8.8178e+03	1.0483e+04	1.6428e+04	1.1159e+04	6.5945e+03	7.0730e+03	4.1592e+03
66 PES1	2.5410e+03	2.7507e+03	4.9326e+03	4.8975e+03	5.4396e+03	2.8279e+03	2.5489e+03	7.1418e+03
67 SDCBP	8.6787e+03	6.7489e+03	1.7154e+04	6.5751e+04	1.2708e+04	4.6409e+03	5.1357e+03	5.3340e+03
68 NOP56	1.4510e+04	1.7247e+04	5.7887e+04	8.4250e+04	5.1069e+04	3.4331e+04	1.8154e+04	6.3367e+04
69 DDX3X	1.1042e+05	1.0245e+05	1.5709e+05	2.0664e+05	1.8161e+05	8.8228e+03	1.0114e+04	9.3183e+03
70 RNASET2	1.0635e+04	1.5019e+04	4.0014e+04	3.9313e+04	2.6596e+04	7.3898e+03	5.2598e+03	7.6380e+03
71 KPNA4	5.2935e+03	4.6057e+03	3.8510e+03	3.6012e+03	4.0731e+03	5.9235e+03	7.3839e+03	4.2575e+03
72 PPP6C	5.2719e+03	6.4818e+03	8.5650e+03	6.3506e+03	7.6397e+03	3.6771e+03	3.1513e+03	2.5171e+03
73 NME4	1.0042e+03	1.4205e+03	2.7159e+03	2.4351e+03	2.0693e+03	5.2989e+03	2.1049e+03	2.8364e+03
74 MAN2B1	7.3189e+03	1.8830e+04	2.0770e+04	1.8034e+04	1.5628e+04	4.0631e+03	4.8783e+03	3.8565e+03
75 PDXK	5.9943e+03	4.5296e+03	2.8091e+03	2.9810e+03	3.6643e+03	2.7641e+03	6.1749e+03	1.0284e+03
76 SCD	0	0	1.3519e+03	1.0364e+03	1.4246e+03	2.4334e+03	3.4363e+03	2.4629e+03
77 PLPP1	8.0231e+03	1.8027e+04	2.5919e+04	3.2999e+04	1.3074e+04	3.7947e+03	2.0211e+03	5.0572e+03
78 PLPP3	5.9933e+03	1.1262e+04	8.9011e+03	1.8463e+04	9.9807e+03	5.3311e+03	3.4405e+03	5.7334e+03
79 COX7A2L	1.8538e+03	2.7786e+03	2.7875e+03	4.7267e+03	2.4170e+03	3.8235e+03	3.5600e+03	3.3652e+03
80 GAPDHS	0	0	871.6332	1.7746e+03	9.1086e+03	2.7529e+03	5.3557e+03	1.5275e+03
81 HSPB6	9.2549e+04	8.4640e+04	6.8478e+04	1.0407e+05	8.0545e+04	4.9788e+04	5.1135e+04	5.8338e+04
82 NDUFAB1	7.8674e+03	1.0934e+04	1.0572e+04	8.3621e+03	1.4520e+04	6.8416e+03	2.9846e+03	5.9266e+03
83 UBFD1	1.7030e+03	2.5567e+03	2.9986e+03	5.5156e+03	4.0156e+03	3.0171e+03	4.2186e+03	5.1071e+03
84 CYB561D2	3.4698e+03	2.1568e+03	1.8270e+03	4.1066e+03	3.4994e+03	2.6002e+03	7.5330e+03	2.2023e+03
85 COPE	1.4828e+04	1.5813e+04	1.8323e+04	1.5066e+04	2.0079e+04	1.0668e+04	1.3031e+04	9.3520e+03
86 AP3D1	6.9933e+03	7.2226e+03	5.7694e+03	9.4308e+03	8.8563e+03	5.1582e+03	4.0912e+03	2.7867e+03

	V_1	V_2	V_3	V_9	V_15	V_19	V_21	V_28
87 CCS	6.0583e+03	7.5048e+03	7.4385e+03	8.6012e+03	6.8026e+03	2.8532e+03	7.8343e+03	6.7680e+03
88 GOSR2	3.0790e+03	5.0177e+03	5.8095e+03	5.8269e+03	3.8983e+03	6.8993e+03	1.3437e+04	2.3854e+03
89 TOR1A	2.2975e+03	2.6259e+03	2.4559e+03	5.1689e+03	2.9691e+03	2.9803e+03	3.2197e+03	4.6281e+03
90 TOR1B	2.9598e+03	5.3575e+03	5.9573e+03	3.8654e+03	7.4836e+03	1.6761e+03	6.3085e+03	1.0143e+03
91 ADAM10	1.1279e+04	1.0623e+04	1.6184e+04	2.6387e+04	1.6253e+04	8.8465e+03	4.6659e+03	1.4310e+04
92 ACOT8	3.6050e+03	4.9094e+03	3.1926e+03	5.0668e+03	3.2516e+03	6.0468e+04	6.7983e+03	3.6904e+04
93 CDIPT	4.1134e+04	3.1259e+04	4.4936e+04	8.1231e+04	6.2034e+04	1.2445e+04	1.3392e+04	1.9562e+04
94 PDCD5	1.9805e+04	1.3290e+04	2.0783e+04	1.6723e+04	1.8290e+04	9.4876e+03	6.6725e+03	8.2664e+03
95 PRMT5	8.8136e+03	1.2651e+04	1.7555e+04	1.5043e+04	1.1961e+04	1.0792e+04	8.8445e+03	1.0306e+04
96 SLC9A3R1	1.2613e+04	1.0861e+04	1.6592e+04	2.5818e+04	1.5594e+04	1.0468e+04	7.4087e+03	9.1585e+03
97 HSD17B6	2.8972e+03	6.1539e+03	4.0314e+03	1.0341e+04	4.4097e+03	4.2260e+03	7.3219e+03	6.2069e+03
98 TPP1	1.3509e+04	1.8261e+04	4.6371e+04	1.7879e+04	2.5437e+04	4.6616e+03	8.9247e+03	1.0402e+04
99 TCERG1	4.8345e+03	4.8472e+03	7.9606e+03	3.3758e+03	5.8569e+03	3.0247e+03	4.5513e+03	2.3874e+03
100 NRP1	2.7800e+03	3.7937e+03	6.4692e+03	1.3570e+04	1.3163e+04	3.5450e+04	2.1675e+04	1.8041e+04

⋮

```
% response data (labels for ML)
tbl_label_dat = readtable(filename,...
    'Range','C3770:AP3770',...
    'Sheet','DataMatrix',...
    'ReadVariableNames',false);


tbl_label_dat.Properties.VariableNames = tbl_exp_dat.Properties.VariableNames;
tbl_label_dat
```

```
tbl_label_dat = 1×40 table
```

...

	V_1	V_2	V_3	V_9	V_15	V_19	V_21	V_28
1	'NR'	'NR'	'NR'	'NR'	'NR'	'NR'	'NR'	'NR'

```
% Read Ki67 response data
tbl_Ki67_dat = readtable(filename,...
    'Range','C3768:AP3769',...
    'Sheet','DataMatrix',...
    'ReadVariableNames',false);
tbl_Ki67_dat.Properties.RowNames = {'DMSO','17AAG'}
```

```
tbl_Ki67_dat = 2×40 table
```

...

	Var1	Var2	Var3	Var4	Var5	Var6	Var7	Var8
1 DMSO	22.8302	23.0000	34.6386	7.5408	27.3056	12.9282	9.7744	23.7718
2 17AAG	25.1567	20.0903	25.7218	7.1726	23.1959	11.1207	7.8176	18.8270

```
Ki_ratio = array2table(table2array(tbl_Ki67_dat(2,:))./table2array(tbl_Ki67_dat(1,:)));

tbl_Ki67_ratio_dat = [tbl_Ki67_dat;Ki_ratio];
tbl_Ki67_ratio_dat.Properties.RowNames{3} = 'Ratio';


%[pval(ii,1),tbl,stats] = anova1(table2array(tbl_exp_dat(1,:))',table2array(tbl_label_dat)','of


% % composition of data table
% exp_data = table2array(tbl_exp_dat(:,2:end));
% resp_class = table2array(tbl_label_dat);
% gene_names=tbl_exp_dat.GeneName;
```

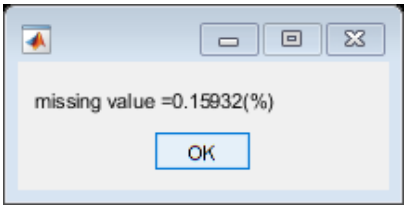
IMPUTATION OF MSSING VALUE

Note: the missing values are idnciated by a number less than 1.

```
tmp_exp = table2array(tbl_exp_dat);

[rr,cc]=size(tmp_exp);

msg = strcat( 'missing value = ',num2str(length(tmp_exp(tmp_exp<1))/(rr*cc) * 100),'(%)');
f = msgbox(msg);
```




```
% imputation
loc_undect = (or(tmp_exp==1,tmp_exp==0));
sz_undect = sum(loc_undect(:));
% numcl2(loc_undect)

% uniform dist from 0 to 1
ub = 1; lb = 0;
% for conrol random number generator
rng(1)
rand_num= ub - (ub - lb)*rand(sz_undect,1);

% imputate the rowdata
tmp_exp = tmp_exp;
```

```
tmp_exp(loc_undect)=rand_num;

tbl_exp_dat_imp=array2table(tmp_exp);
tbl_exp_dat_imp.Properties.VariableNames = tbl_label_dat.Properties.VariableNames;
tbl_exp_dat_imp.Properties.RowNames = tbl_exp_dat.Properties.RowNames;

tmp_exp = [];
```

ANOVA analysis

```
parfor ii = 1:size(tbl_exp_dat_imp,1)
    % disp(ii)
    [pval(ii,1),~,~] = anova1(table2array(tbl_exp_dat_imp(ii,:))',table2array(tbl_label_dat)','
end
```

Regression analysis

```
parfor ii = 1:size(tbl_exp_dat_imp,1)
    % disp(ii)
    [rho(ii,1),pval2(ii,1)] = corr(table2array(tbl_exp_dat_imp(ii,:))',table2array(tbl_Ki67_rat
end

%tbl_exp_dat_short = tbl_exp_dat_imp;
%tbl_exp_dat_short(~and(abs(rho)>0.3, pval <0.05),:)=[];
```

DEGs

```
cut_off = 0.05;
tbl_exp_deg = tbl_exp_dat_imp;
tbl_exp_deg(pval>cut_off,:) = []

tmp_pval = pval;
tmp_pval(tmp_pval>cut_off,:) = [];
DEG_pval = array2table(tmp_pval,'RowNames',tbl_exp_deg.Properties.RowNames);
```

heatmap

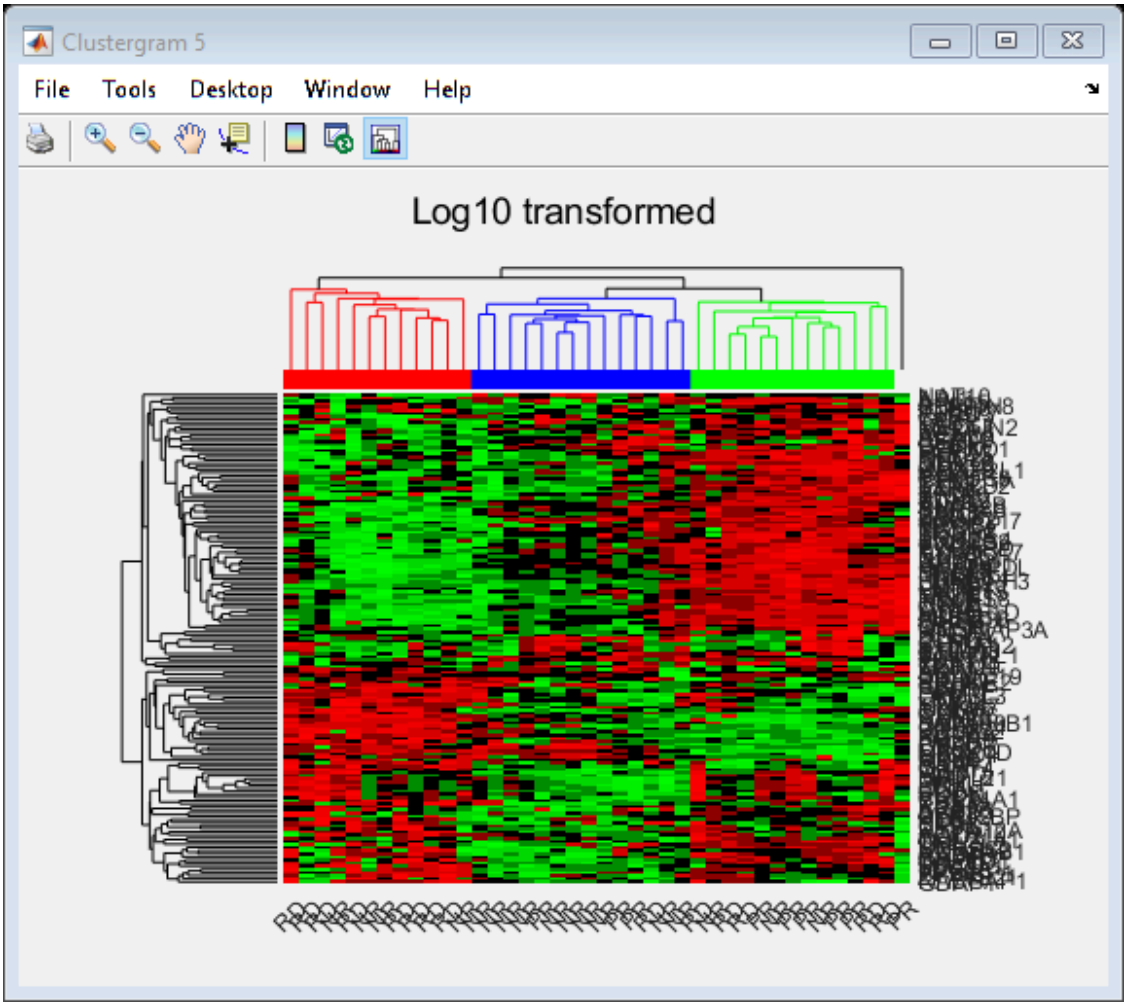
```
Column_Labels = table2array(tbl_label_dat);
Row_Labels = tbl_exp_deg.Properties.RowNames;
exp_dat = log10(table2array(tbl_exp_deg));

hmo = clustergram(exp_dat,...
    'Cluster','all',...
    'Standardize',2,...
    'RowLabels',Row_Labels,...
    'ColumnLabels',Column_Labels,...
```

```
    'ColumnLabelsRotate',45);

cm = struct('GroupNumber',{36,33,31},...
    'Annotation',{'Group1','Group2','Group3'},...
    'Color',{'Red','Blue','Green'});
set(hmo,'ColumnGroupMarker',cm)
% hmo.RowLabels = {};
hmo.addTitle('Log10 transformed')

Group1 = clusterGroup(hmo,36,'column','Color','Red');
Group2 = clusterGroup(hmo,33,'column','Color','Blue');
Group3 = clusterGroup(hmo,31,'column','Color','Green');
```




```
%% code for future
% import bioma.data.*
% DMobj = DataMatrix(table2array(tbl_exp_deg), tbl_exp_deg.Properties.RowNames, tbl_exp_deg.Pro
%
% clustergram(DMobj,...
%     'Cluster','all',...
%     'Standardize',2,...
%     'ColumnLabelsRotate',45)
```

Making a color bar for classes

```
figure('Position',[681   927   560    52]);
colormap([0 0 0.515625;0.453125 1 0.546875;0.5 0 0])

ColumnLabels = hmo.ColumnLabels;

A_bar = zeros(size(ColumnLabels));
A_bar(ismember(ColumnLabels,{'NR'}))=1;
A_bar(ismember(ColumnLabels,{'RD'}))=2;
A_bar(ismember(ColumnLabels,{'PR'}))=3;

% plot with standard settings

im = imagesc(A_bar);
caxis([1 3]);
xticklabels({})
xticks({})
yticklabels({})
yticks({})

mycb = colorbar();
set(mycb, 'YTick', [1 2 3], 'YTickLabel', {'NR', 'RD', 'PR'});
```

Pie chart

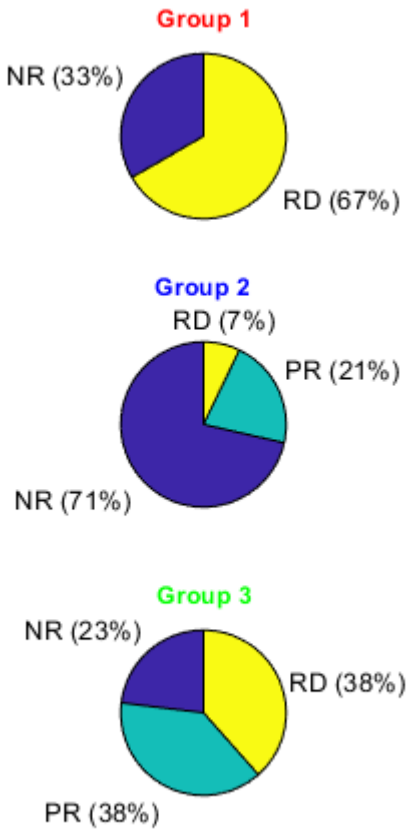
```
figure('Position',[681   498   231   481]),
X1 = categorical(Group1.ColumnLabels);
subplot(3,1,1),pie(X1)
pbaspect([4 3 1])
title('Group 1','Color','red')

X2 = categorical(Group2.ColumnLabels);
subplot(3,1,2),pie(X2)
pbaspect([4 3 1])
th1 = title('Group 2','Color','blue');
get(th1,'Position')
```

```
ans = 1×3
    0.0000    1.2508         0
```

```
set(th1,'Position',[0.0000 1.5 0]);

X3 = categorical(Group3.ColumnLabels);
subplot(3,1,3),pie(X3)
pbaspect([4 3 1])
title('Group 3','Color','green')
```



Save the DEG data

```
fpath = 'outcomes\Explant_ResponseGroup_Allprot_DEGs.xlsx';

writetable(tbl_exp_deg,fpath,...
    'Sheet','DEG expression',...
    'WriteVariableNames',true,...
    'WriteRowNames',true)

writetable(DEG_pval,fpath,...
    'Sheet','DEG pvals',...
    'WriteVariableNames',true,...
    'WriteRowNames',true)

writetable(tbl_label_dat,fpath,...
    'Sheet','Target labels',...
    'WriteVariableNames',true,...
    'WriteRowNames',true)
```