

IO17 | Large Scale Bioinformatics for Immuno-Oncology

Signaling pathways with Omnipath

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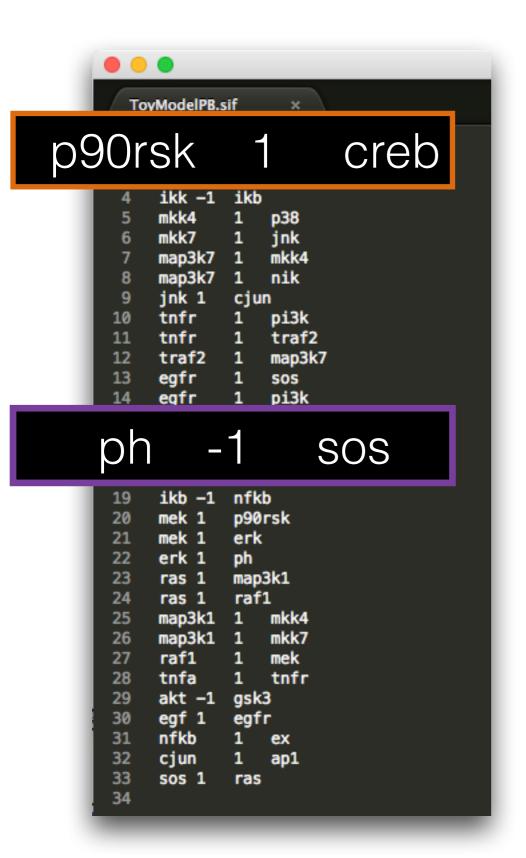
GTPB | The Gulbenkian Training Programme in Bioinformatics Instituto Gulbenkian de Ciência, Oeiras, Portugal | Sept 19th-22nd, 2017

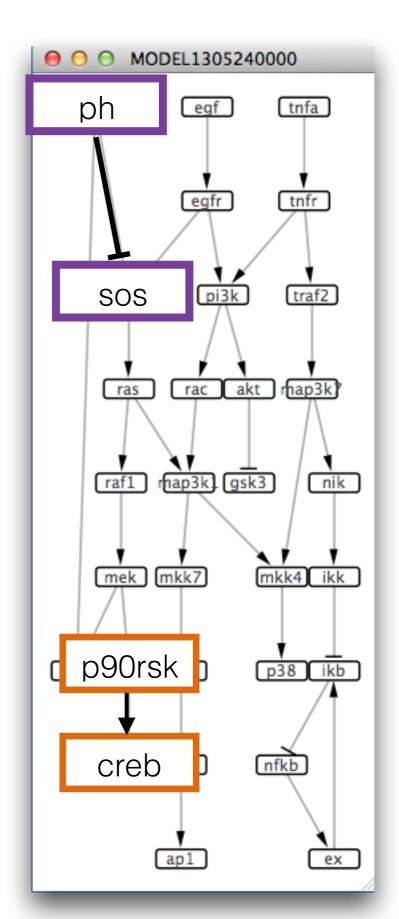


Prior Knowledge Network (PKN)

```
ToyModelPB.sif
     p90rsk 1
                creb
            map3k1
     rac 1
     nik 1
             ikk
     ikk -1 ikb
     mkk4
                p38
     mkk7
                jnk
            1
     map3k7 1
                mkk4
     map3k7
            1
                nik
     jnk 1
            cjun
     tnfr
 10
            1
                pi3k
     tnfr
                traf2
 11
 12
     traf2 1
                map3k7
 13
     egfr
                SOS
 14
     egfr
                pi3k
 15
     pi3k
            1
                rac
 16
     pi3k
                akt
             1
 17
     ph -1 sos
 18
     ex 1
             ikb
     ikb -1 nfkb
 19
 20
     mek 1
             p90rsk
 21
     mek 1
            erk
 22
     erk 1
            ph
 23
     ras 1
            map3k1
 24
     ras 1
            raf1
 25
     map3k1 1
                mkk4
     map3k1 1
                mkk7
 26
     raf1
 27
            1
                mek
 28
     tnfa
                tnfr
 29
     akt -1 gsk3
            egfr
 30
     egf 1
 31
     nfkb
                ex
 32
     cjun
                ap1
 33
     sos 1
             ras
 34
```

Prior Knowledge Network (PKN)





- Data is stored in MIDAS files
- MIDAS: Minimum Information for Data Analysis in Systems Biology
- csv file with specified structure

```
ToyModelPB.csv
TR:Cell:CellLine,TR:egf,TR:tnfa,TR:pi3ki,TR:raf1i,DA:raf1,DA:erk,DA:ap1,DA:gsk3,DA:p38,DA:nfkb,DV:raf1,DV:erk,DV:ap1,DV:gsk3,DV:p38,DV:nfkb
         ,0,0,0,0,0,0,113273458,0.157629482,0.165686548,0.900470819,0.107672569,0.135582705
         ,0,0,0,0,0,0,0.161252619,0.136127386,0.132165733,0.973463471,0.126018911,0.137593912
             0,0,0,0,0.18118642,0.171172805,0.069216889,0.833938898,0.143094829,0.111949527
         .0,0,0,0,0,0,0.204532136,0.075609551,0.16402037,0.83166228,0.145759195,0.187964898
     1,0,0,0,0,0,0,0,0.16324977,0.147945527,0.157562806,0.934339135,0.086896169,0.153629572
         .0,0,0,0,0,0,0.158026707,0.136434731,0.180032868,0.848411795,0.226635572,0.15556591
           0,0,0,0,0.135451913,0.153500205,0.135521064,0.89481319,0.05830718,0.133181325
           0,0,0,0,0,0.082807004,0.115530747,0.147297449,0.962855757,0.144970489,0.188848398
             0.0.0.0.133160344.0.153239082.0.098038148.0.852769287.0.171006652.0.125711512
           0,0,0,0,0,0.114319825,0.09963248,0.155512388,0.968806568,0.105584024,0.083550813
           2,2,2,2,2,0.198299667,0.140645582,0.175126149,0.904183049,0.094413478,0.214599563
           2,2,2,2,0.602498653,0.763488384,0.305469399,0.641274819,0.152680489,0.182447362
             2,2,2,0.155188125,0.147881622,0.380404874,0.940715143,0.184757911,0.740173257
             2,2,2,2,0.657885557,0.720306337,0.364615678,0.622286802,0.187638999,0.705852669
         ,2,2,2,2,2,0.692530243,0.801365631,0.280240963,0.887692802,0.112033162,0.198296597
         2,2,2,2,2,2,0.143369979,0.131457095,0.392918862,0.880872231,0.19777232,0.745405859
       0,2,2,2,2,2,0.669624661,0.837450417,0.326696968,0.901872707,0.04859938,0.624857712
         ,2,2,2,2,2,0.175648722,0.129299364,0.36266489,0.627175393,0.131089441,0.19785061
           2,2,2,2,0.119595368,0.163255646,0.34708573,0.903120838,0.088607025,0.691261127
           2,2,2,2,0.164973809,0.170214992,0.242168331,0.555841739,0.166428234,0.702749483
           4,4,4,4,4,0.092998769,0.066336993,0.108561619,0.937502167,0.144800969,0.182535084
             4,4,4,4,0.857535183,0.833476326,0.612769544,0.464345142,0.165753249,0.140449005
       0,4,4,4,4,4,4,0.073259441,0.152377506,0.51660454,0.849942037,0.093956969,0.431710911
                   4.0.872738158.0.799038863.0.583169724.0.412469896.0.192409925
```

Import to R:

	TR.Cell.CellLine	TR.egf	TR.tnfa	TR.pi3ki	TR.raf1i	DA.raf1	DA.erk	DA.ap1	DA.gsk3	DA.p38	DA.nfkb	DV.raf1	DV.erk	DV.ap1	DV.gsk3	DV.p38	DV.nfkb
1	1	0	0	0	0	0	0	0	0	0	0	0.1132735	0.15762948	0.16568655	0.9004708	0.10767257	0.1355827
2	1	1	0	0	0	0	0	0	0	0	0	0.1612526	0.13612739	0.13216573	0.9734635	0.12601891	0.1375939
3	1	0	1	0	0	0	0	0	0	0	0	0.1811864	0.17117281	0.06921689	0.8339389	0.14309483	0.1119495
4	1	1	1	0	0	0	0	0	0	0	0	0.2045321	0.07560955	0.16402037	0.8316623	0.14575920	0.1879649
5	1	1	0	1	0	0	0	0	0	0	0	0.1632498	0.14794553	0.15756281	0.9343391	0.08689617	0.1536296
6	1	0	1	1	0	0	0	0	0	0	0	0.1580267	0.13643473	0.18003287	0.8484118	0.22663557	0.1555659

Header

TR	treatment
DA	data acquisition
DV	data value

Treatments

Stimulated: egf, tnfa

Inhibited: pi3k, raf1

	TR.Cell.CellLine	TR.egf	TR.tnfa	TR.pi3ki	TR.raf1i	DA.raf1	DA.erk	DA.ap1	DA.gsk3	DA.p38	DA.nfkb	DV.raf1	DV.erk
1	1	0	0	0	0	0	0	0	0	0	0	0.1132735	0.15762948
2	1	1	0	0	0	0	0	0	0	0	0	0.1612526	0.13612739
3	1	0	1	0	0	0	0	0	0	0	0	0.1811864	0.17117281
4	1	1	1	0	0	0	0	0	0	0	0	0.2045321	0.07560955
5	1	1	0	1	0	0	0	0	0	0	0	0.1632498	0.14794553
6	. 1	0	1	1	0	0	0	0	0	0	0	0.1580267	0.13643473

Header

TR	treatment
DA	data acquisition
DV	data value

Experimental Data raf1, erk, ap1, gsk3, p38, nfkb

TR.raf1i	DA.raf1	DA.erk	DA.ap1	DA.gsk3	DA.p38	DA.nfkb	DV.raf1	DV.erk	DV.ap1	DV.gsk3	DV.p38	DV.nfkb
0	0	0	0	0	0	0	0.1132735	0.15762948	0.16568655	0.9004708	0.10767257	0.1355827
0	0	0	0	0	0	0	0.1612526	0.13612739	0.13216573	0.9734635	0.12601891	0.1375939
0	0	0	0	0	0	0	0.1811864	0.17117281	0.06921689	0.8339389	0.14309483	0.1119495
0	0	0	0	0	0	0	0.2045321	0.07560955	0.16402037	0.8316623	0.14575920	0.1879649
0	0	0	0	0	0	0	0.1632498	0.14794553	0.15756281	0.9343391	0.08689617	0.1536296
0	0	0	0	0	0	0	0.1580267	0.13643473	0.18003287	0.8484118	0.22663557	0.1555659

Header

TR	treatment
DA	data acquisition
DV	data value

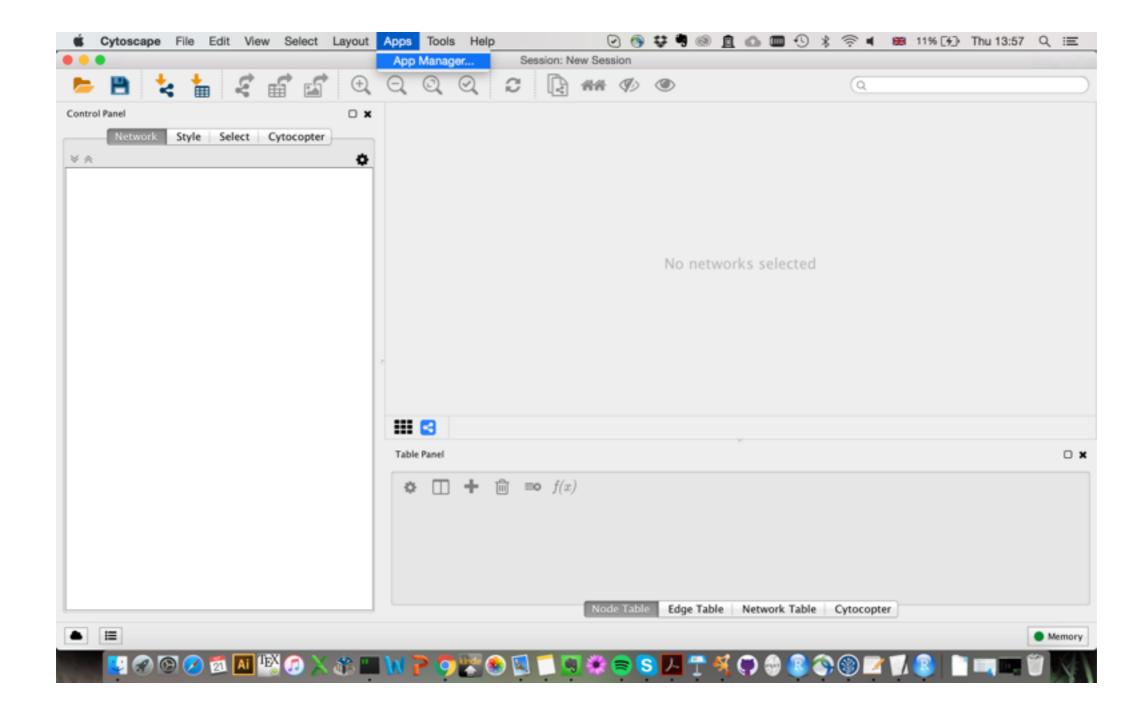
Install Cytoscape

1. To install Cytoscape from the terminal type:

scp /media/gtpb_shared_drive/Installers/Cytoscape_3_4_0_unix.sh . sh Cytoscape_3_4_0_unix.sh

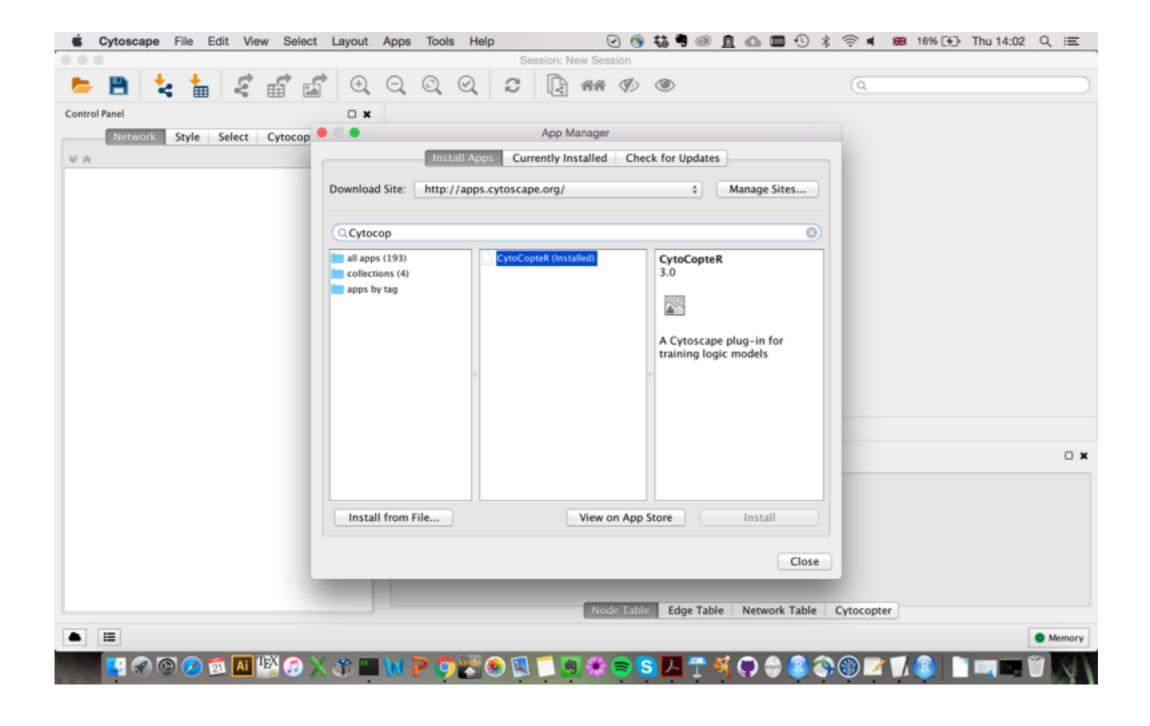
2. open Cytoscape

3. To install CytocoptR app:



Install CytocoptR app (1)

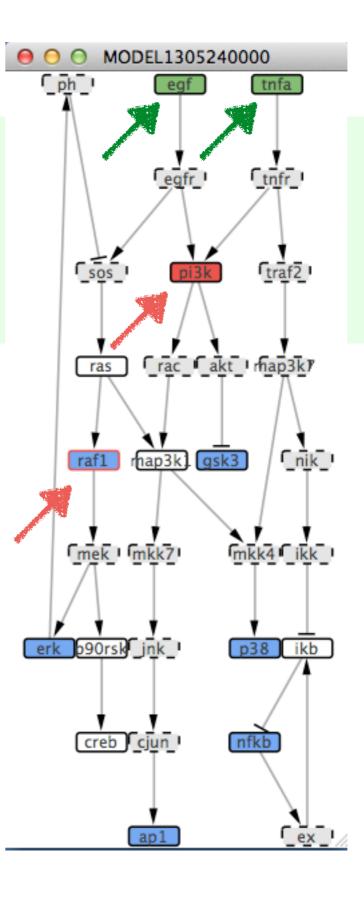
3. To install CytocoptR app:



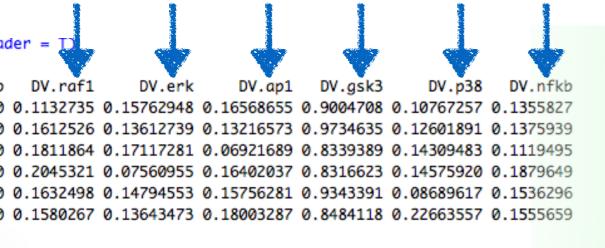
Network + experimental conditions

Stimulated

Inhibited



Network + experimental conditions



Stimulated

Measured

neither measured nor perturbed, logical consistency not impaired

