

Transcriptomics Pipeline Analysis on Kidney Cancer Microarray

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StemAway-BI 2021

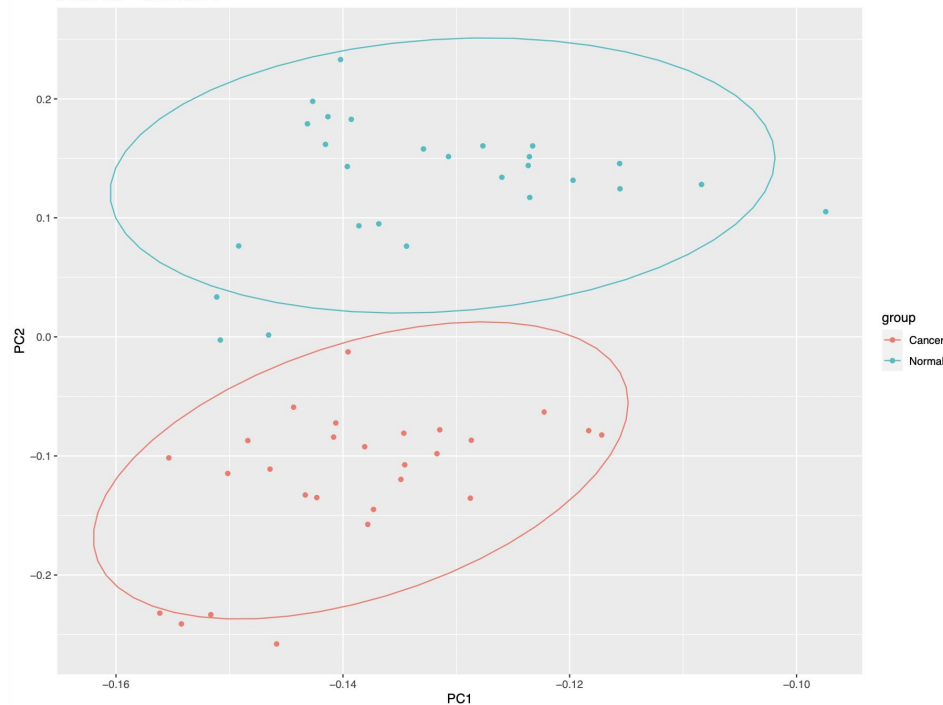
Clear cell renal cell carcinoma

- ▷ 80% of Kidney cancers
- ▷ Current therapies
- ▷ Von Hippel-Lindau syndrome
- ▷ Proximal renal tubules - Kidney's filtration system

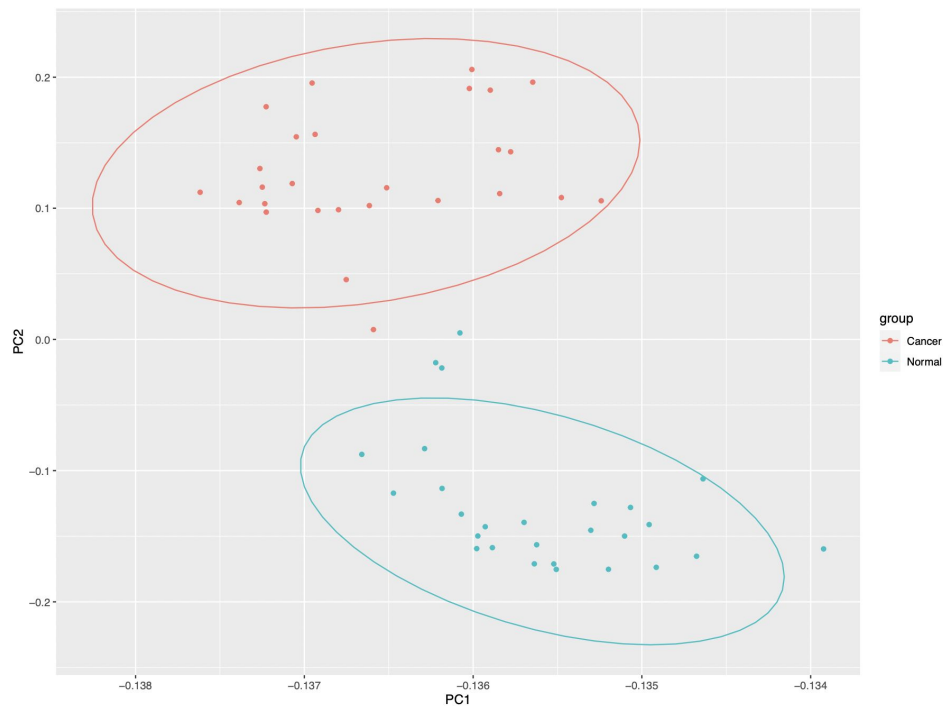
The Dataset

- ▷ GSE66272
- ▷ 27 pairs of ccRCC and Normal samples

PCA Raw – GSE98979



PCA Normalized – GSE98979



3 Outliers: "GSM1618415_K235_NC.CEL.gz" "GSM1618435_K770_NC.CEL.gz" "GSM1618437_K779_NC.CEL.gz"

topTable											
	ID	logFC	AveExpr	t	PValue	adj.PVal	B	diffexpresed	delabel		
ATPV6A4	ATPV6A4	4.51536761235315	7.03865466101795	19.3896242558048	2.34854323003517E-25	4.10211102392013E-21	47.4376586148986	UP	ATPV6A4		
ATPV1G3	ATPV1G3	4.11170368001941	6.39992238231356	19.055879957691	5.16581247245183E-25	4.10211102392013E-21	46.6680910926358	UP	ATPV1G3		
GGT6	GGT6	3.49321966202434	6.72448662673004	19.0018279181793	5.87486595109581E-25	4.10211102392013E-21	46.5423760823729	UP	GGT6		
RALYL	RALYL	4.02628813029739	6.52497098438641	18.8739100431117	7.97520740049434E-25	4.17641673545387E-21	46.2436944684804	UP	RALYL		
DMRT2	DMRT2	4.18133218088334	6.06764262942355	18.6974818292742	1.21878908039705E-24	5.10999497341541E-21	45.8290294848538	UP	DMRT2		
PAG1	PAG1	-2.62811269724523	5.71647758228256	-18.4383805679502	2.28450917663011E-24	7.96771375409587E-21	45.2142877700572	DOWN	PAG1		
CLCNKA	CLCNKA	4.64831161930214	7.44940515204044	18.3656296399418	2.72847812200134E-24	7.96771375409587E-21	45.0404332942915	UP	CLCNKA		
HK2	HK2	-3.87358742609397	7.48010185370764	-18.3210424421967	3.04299947642942E-24	7.96771375409587E-21	44.933610248481	DOWN	HK2		
TMEM213	TMEM213	5.02800305438464	7.0429576181321	18.1779333123734	4.32470847335258E-24	1.06655187101463E-20	44.5893423283497	UP	TMEM213		
SLC13A3	SLC13A3	4.82619826114605	8.9874296833239	18.1267755516161	4.90615957402029E-24	1.02769324597003E-20	44.4657638119473	UP	SLC13A3		
CLDN8	CLDN8	4.75636735663301	7.09231078379187	18.009453757996	6.69849779084773E-24	1.27557666568079E-20	44.160592916528	UP	CLDN8		
SLFN11	SLFN11	-2.70900166009453	6.13961961482011	-17.5724637362324	1.95756303134505E-23	3.31124364543904E-20	43.1087549419889	DOWN	SLFN11		
HEPACAM2	HEPACAM2	4.07780815183164	5.49211616918541	17.5532309001433	2.05500393329391E-23	3.31124364543904E-20	43.0610789280293	UP	HEPACAM2		
CWH43	CWH43	2.04439364431539	6.35871980882251	17.5042366704475	2.32611212918649E-23	3.4803621978621E-20	42.9304384254608	UP	CWH43		
SERPINA5	SERPINA5	3.65031953620813	7.81649609881859	17.1646249667284	5.52931989002562E-23	7.7215109157179E-20	42.0890296382679	UP	SERPINA5		
ACSF2	ACSF2	3.75124242247308	9.20741832173835	17.1271554475062	6.08812565437097E-23	7.97049800613179E-20	41.9944054540543	UP	ACSF2		
FOX11	FOX11	2.60381550517278	5.6147352911338	17.0886876128078	6.72186490350509E-23	8.2822773372777E-20	41.8971281543122	UP	FOX11		
TMEM178A	TMEM178A	3.94315502903855	5.52765726402111	17.059055451751	7.25506842566583E-23	8.44289425663087E-20	41.8220703162317	UP	TMEM178A		
TMEM52B	TMEM52B	4.7802666408964	7.7530390437846	17.0336701605104	7.74214532114177E-23	8.53551157589246E-20	41.7981985691083	UP	TMEM52B		
PTH1R	PTH1R	3.7396962821242	9.32252835967833	16.9385127298206	9.9077395209098E-23	1.03768709871201E-19	41.515752436839	UP	PTH1R		
LAPTM5	LAPTM5	-3.39707699169718	9.01591262958293	-16.913576166239	1.0569518317778E-22	1.05428428667863E-19	41.4821419680532	DOWN	LAPTM5		
TFCP2L1	TFCP2L1	2.77394479345249	6.93689198329357	17.799961568886	1.49625827601103E-22	1.42464191389196E-19	41.1102904205768	UP	TFCP2L1		
LCP2	LCP2	-3.2055696163378	5.9063400801384	-16.7162227925106	1.76733460275187E-22	1.609589077929754E-19	40.946485837307	DOWN	LCP2		
FCGR3B	FCGR3B	-3.94551946611426	7.03358368988317	-16.6934018192929	1.87699196233992E-22	1.6374374306306E-19	40.8877259115464	DOWN	FCGR3B		
CERKL	CERKL	-8.779934262158	5.98123985685768	-16.5886814256325	2.4690458923265E-22	2.025012662741E-19	40.6713357902693	DOWN	CERKL		
CLCNKB	CLCNKB	4.41530127683087	5.5852502021155	16.5819419998443	2.51355213544075E-22	2.025012662741E-19	40.5968913797861	UP	CLCNKB		
ENPP6	ENPP6	4.15995253010047	5.99335450751145	16.515252250283	3.01741340052008E-22	2.29827716355618E-19	40.4020031420564	UP	ENPP6		
TUBAL3	TUBAL3	2.7485034272906	5.82111095906848	16.5037293452691	3.08863796114643E-22	2.29827716355618E-19	40.397062476985	UP	TUBAL3		
SLC22A8	SLC22A8	5.28659557925223	8.92905158719081	16.4934656111589	3.18184168344532E-22	2.29827716355618E-19	40.3677941387984	UP	SLC22A8		
TM6SF1	TM6SF1	-2.84848469002507	5.69402334698293	-16.3809081875007	4.14707539854556E-22	9.890779651668134E-19	40.1079432981780N	DOWN	TM6SF1		



	logFC
CALB1	6.43110606773166
DIO1	5.80160135511906
KCNJ1	5.56067704629624
SLC22A8	5.28659557925223
TMEM213	5.02800305438464
XPNPEP2	4.90572813607569
SLC13A3	4.82619826114605
TMEM52B	4.78026668408864
CLDN8	4.75636735663301
PLG	4.65942923876741
CLCNKA	4.64831161930214
ATP6V0A4	4.51536761235315
CLCNKB	4.41530127683087
DMRT2	4.18133218088334
ENPP6	4.15995253010047
ATP6V1G3	4.11170368001941
DPEP1	4.0549841366638
RALYL	4.02628813029739
TMEM178A	3.94315502903855
FGF9	3.87131294190273
PVALB	3.75632282832795
ACSF2	3.75124242247308
CRYAA	3.75069842811326
PTH1R	3.73396962802142
ERP27	3.72300952692918
SERPINA5	3.65031953620813
GGT6	3.49321966202434
HEPACAM2	3.40780815183164
SLC7A8	3.28069579854227
TFCP2L1	2.77394479345249
TUBAL3	2.7485034272906
FOX11	2.60381550517278
LINC01187	2.58420395574394
CWH43	2.04439364431539

Top 50 Sorted by FC

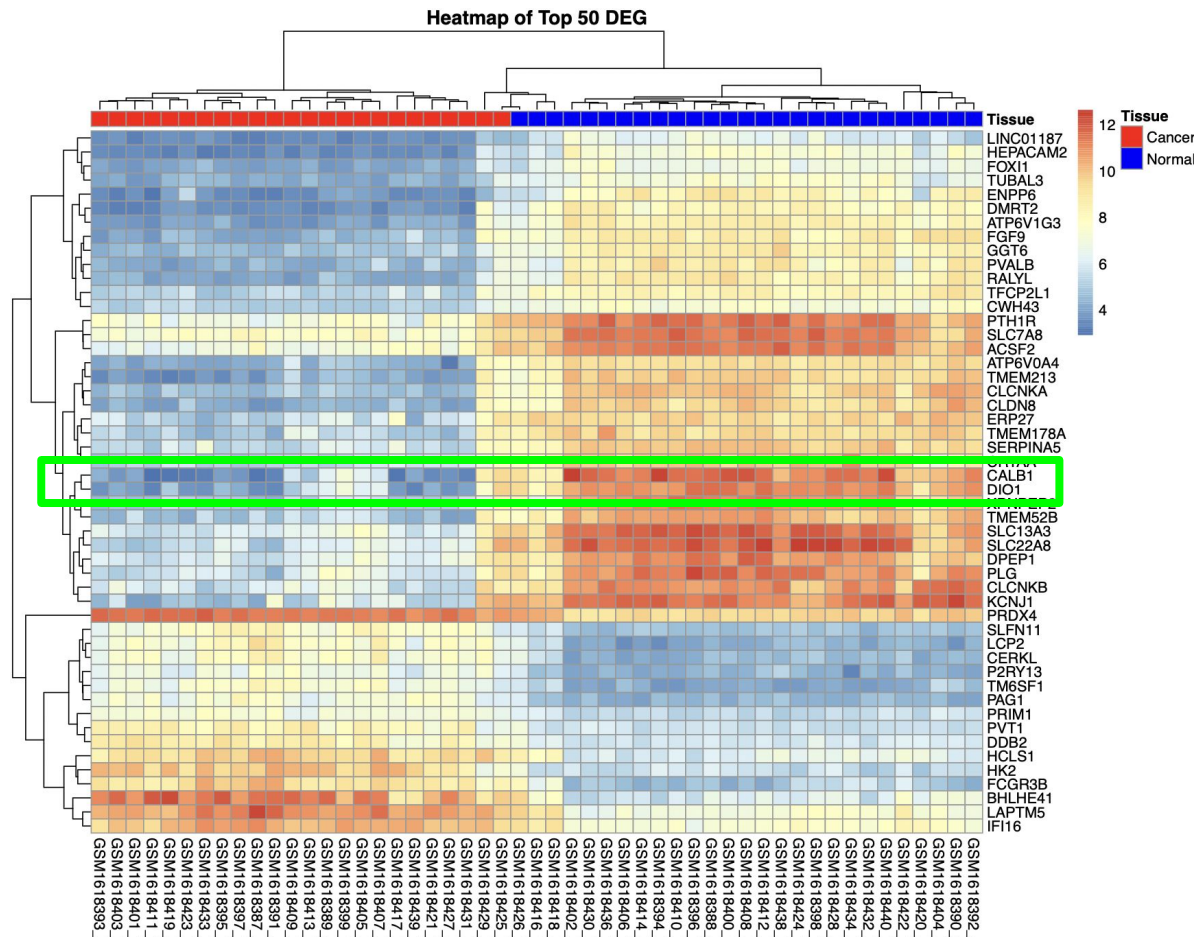
List of Differentially Expressed Genes

Corroborating Evidence

These genes have prognostic value in ccRCC:

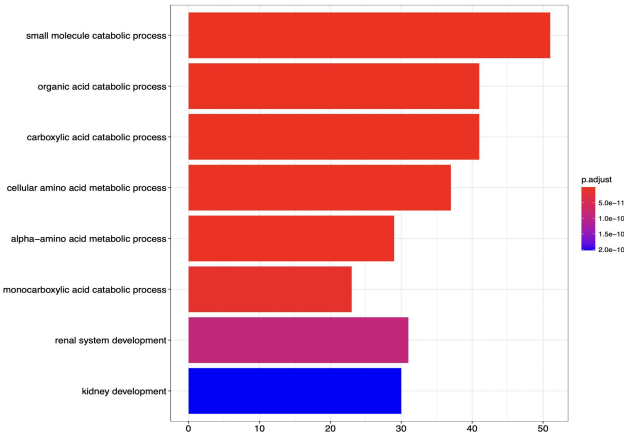
- ▷ **CALB1**: negative expression = malignant renal disease
- ▷ **DIO1**: “loss of DIO1 enhances proliferation & migration of renal cancer cells”
- ▷ **KCNJ1**: potassium balance; “downregulated in ccRCC tissues”
- ▷ **SLC22A8**: decreased expression = poor overall survival in ccRCC patients

Drugs causing upregulation = potential therapies

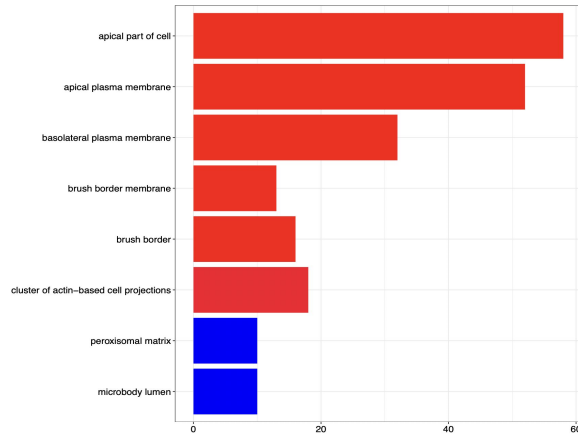


Top Upregulated Differentially Expressed Genes

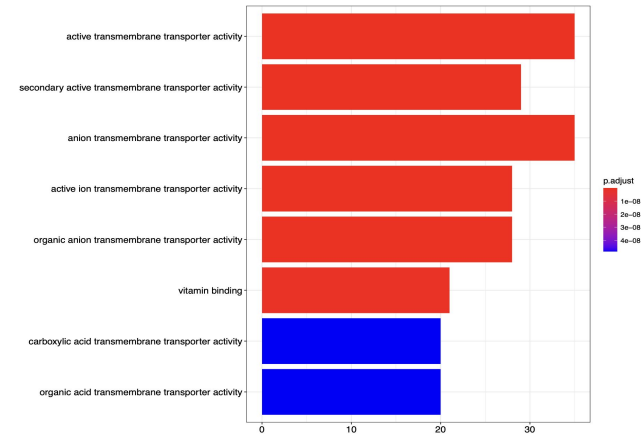
enrichGO



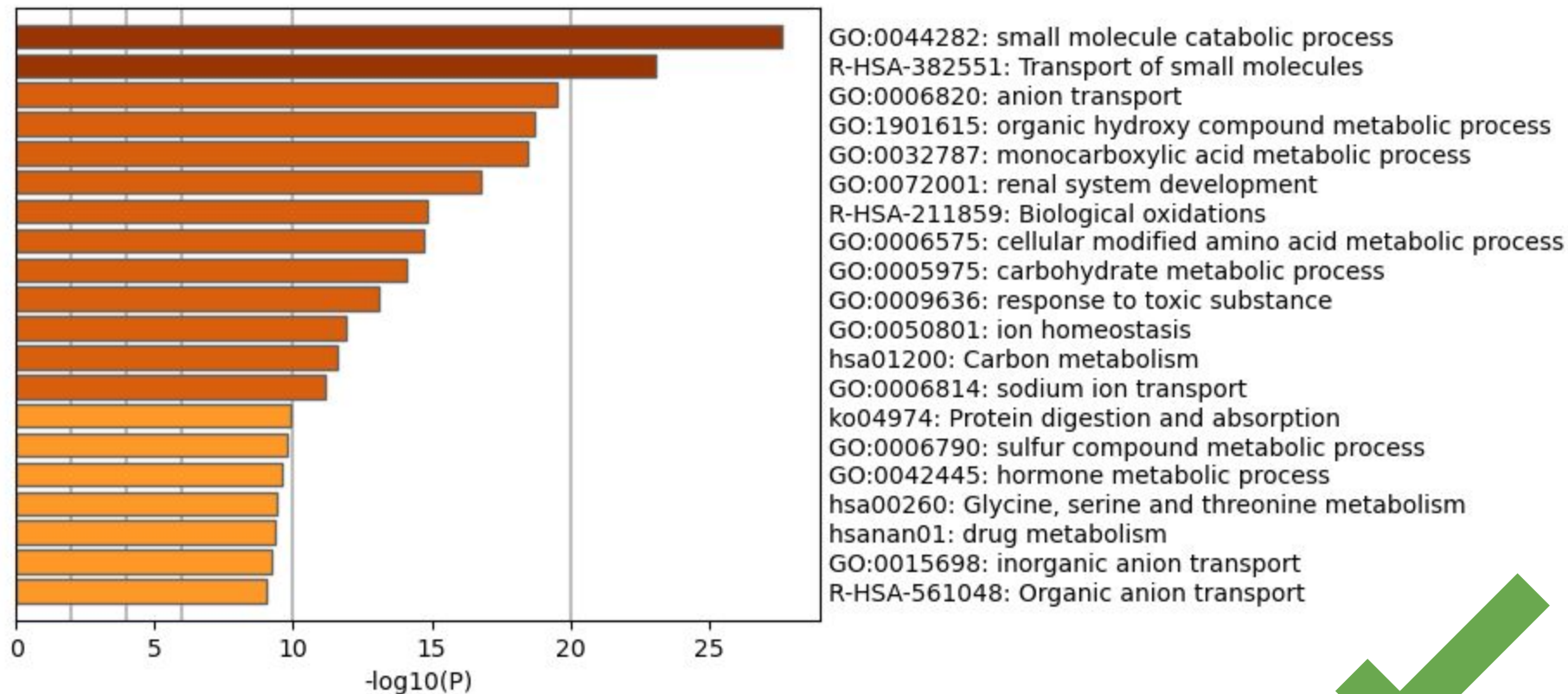
Biological Processes



Cellular Components

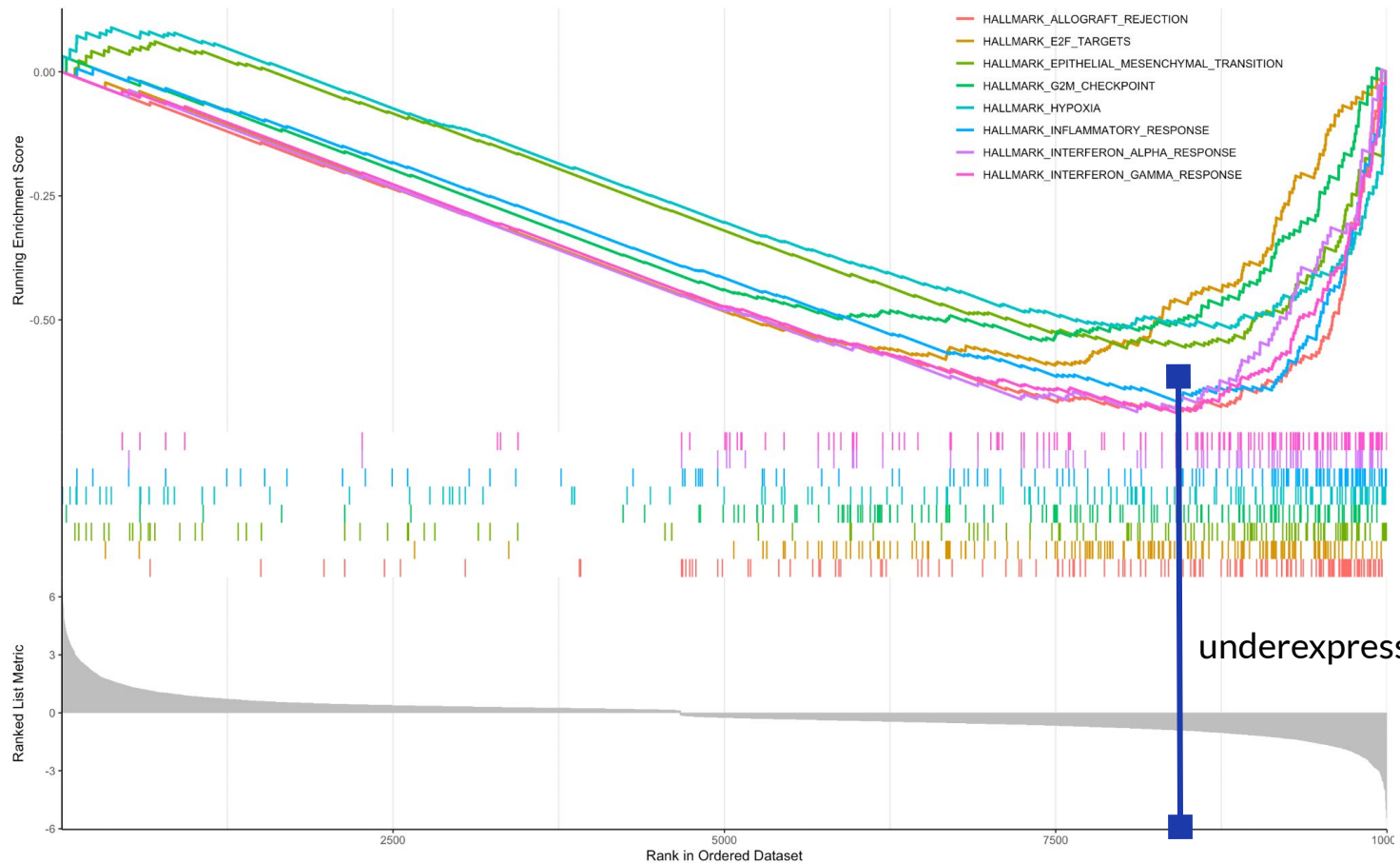


Molecular Functions



Metascope: Enrichment Bar Graph





GSEA



Challenges, Takeaways, & Thanks