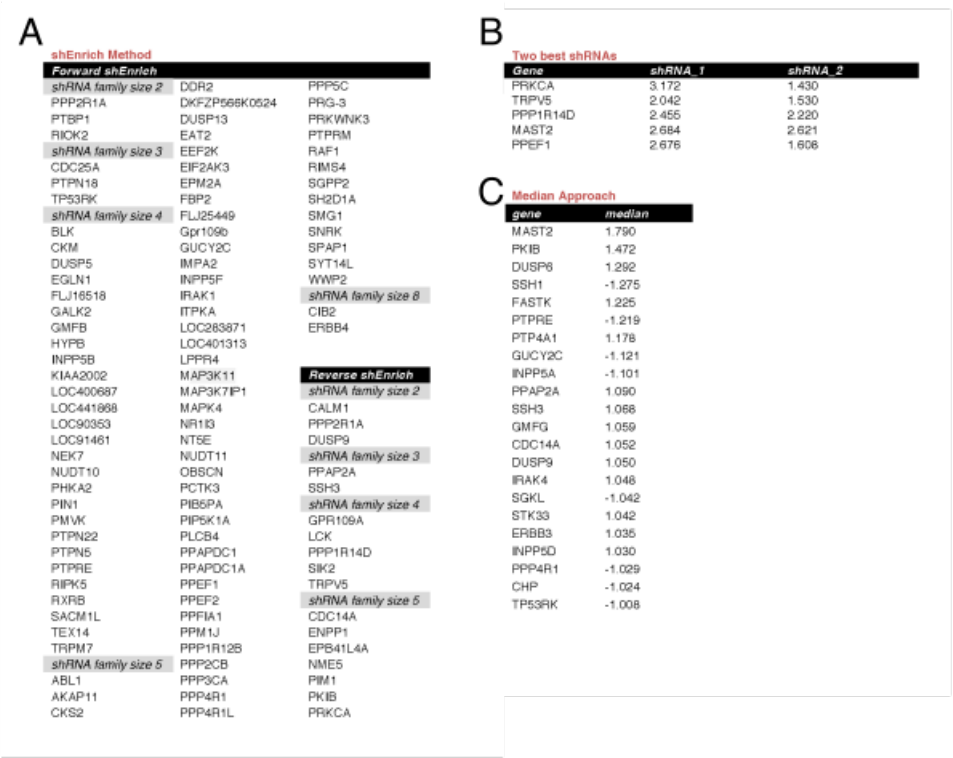

A

shEnrich Method

Forward shEnrich		
shRNA family size 2	DDR2	PPP5C
PPP2R1A	DKFZP566K0524	PRG-3
PTBP1	DUSP13	PRKWNK3
RIOK2	EAT2	PTPRM
shRNA family size 3	EEF2K	RAF1
CDC25A	EIF2AK3	RIMS4
PTPN18	EPM2A	SGPP2
TP53RK	FBP2	SH2D1A
shRNA family size 4	FLJ25449	SMG1
BLK	Gpr109b	SNRK
CKM	GUCY2C	SPAP1
DUSP5	IMPA2	SYT14L
EGLN1	INPP5F	WWP2
FLJ16518	IRAK1	*shRNA family size 8*
GALK2	ITPKA	CIB2
GMFB	LOC283871	ERBB4
HYPB	LOC401313	
INPP5B	LPPR4	
KIAA2002	MAP3K11	**Reverse shEnrich**
LOC400687	MAP3K7IP1	*shRNA family size 2*
LOC441868	MAPK4	CALM1
LOC90353	NR1I3	PPP2R1A
LOC91461	NT5E	DUSP9
NEK7	NUDT11	*shRNA family size 3*
NUDT10	OBSCN	PPAP2A
PHKA2	PCTK3	SSH3
PIN1	PIB5PA	*shRNA family size 4*
PMVK	PIP5K1A	GPR109A
PTPN22	PLCB4	LCK
PTPN5	PPAPDC1	PPP1R14D
PTPRE	PPAPDC1A	SIK2
RIPK5	PPEF1	TRPV5
RXRB	PPEF2	*shRNA family size 5*
SACM1L	PPFIA1	CDC14A
TEX14	PPM1J	ENPP1
TRPM7	PPP1R12B	EPB41L4A
shRNA family size 5	PPP2CB	NME5
ABL1	PPP3CA	PIM1
AKAP11	PPP4R1	PKIB
CKS2	PPP4R1L	PRKCA

B

Two best shRNAs

Gene	shRNA_1	shRNA_2
PRKCA	3.172	1.430
TRPV5	2.042	1.530
PPP1R14D	2.455	2.220
MAST2	2.684	2.621
PPEF1	2.676	1.606

C

Median Approach

gene	median
MAST2	1.790
PKIB	1.472
DUSP6	1.292
SSH1	-1.275
FASTK	1.225
PTPRE	-1.219
PTP4A1	1.178
GUCY2C	-1.121
INPP5A	-1.101
PPAP2A	1.090
SSH3	1.068
GMFG	1.059
CDC14A	1.052
DUSP9	1.050
IRAK4	1.048
SGKL	-1.042
STK33	1.042
ERBB3	1.035
INPP5D	1.030
PPP4R1	-1.029
CHP	-1.024
TP53RK	-1.008

Supplemental Table 1. Comparison of gene hits selected by different scoring methods. (**A**) Genes selected by shEnrich method. (**B**) Gene hits selected by scoring the top2-shRNAs. (**C**) Genes scored by taking the median of redundant shRNAs.

Comparison	Dataset Accession Number
'cancerous' vs 'normal'	E-TABM-15
'glioblastoma' vs 'normal'	E-MEXP-567
'hepatocellular carcinoma' vs 'normal'	E-GEOD-36076
'breast carcinoma' vs 'normal'	E-GEOD-10780
'multiple myeloma' vs 'normal' in 'plasma cells'	E-GEOD-6691
'malignant mesothelioma; wild type' vs 'normal; wild type'	E-GEOD-21750
'oligodendroglioma' vs 'normal'	E-GEOD-21354
'cancer tissue' vs 'surrounding noncancerous tissue' in 'hepatitis B virus induced hepatocellular carcinoma'	E-GEOD-19665
'primary node-negative infiltrating ductal breast carcinoma' vs 'normal lymph node'	E-GEOD-44408
'breast cancer' vs 'normal'	E-GEOD-54002
'glioblastoma multiforme' vs 'normal'	E-MTAB-3073
'astrocytoma' vs 'normal'	E-MTAB-3073
'pituitary cancer' vs 'normal'	E-GEOD-26966
'cancer tissue' vs 'surrounding noncancerous tissue' in 'hepatitis C virus induced hepatocellular carcinoma'	E-GEOD-19665
'metastatic prostate cancer' vs 'benign prostate tumor'	E-GEOD-3325
'colon cancer' vs 'normal' in 'colon; Fresh-frozen tissue'	E-GEOD-19249
'pancreatic cancer' vs 'normal'	E-GEOD-49515
'pancreatic carcinoma' vs 'normal'	E-GEOD-36076
'colon cancer' vs 'normal' in 'colon; Formalin-fixed paraffin-embedded tissue'	E-GEOD-19249
'tumor' vs 'paratumoral tissue'	E-GEOD-55048
'lung adenocarcinoma' vs 'normal' in 'adult'	E-GEOD-43767
'glioblastoma' vs 'normal'	E-GEOD-50161
'liver tumor' vs 'adjacent non-tumor tissue'	E-GEOD-33294
'hepatocellular carcinoma' vs 'normal'	E-GEOD-49515
'breast cancer' vs 'normal'	E-GEOD-31138
'breast carcinoma' vs 'normal'	E-MTAB-779
'ovarian cancer' vs 'normal' in 'stromal cell'	E-GEOD-40595
'astrocytic glioma' vs 'normal'	E-GEOD-21354
'oligodendroglioma' vs 'normal'	E-MTAB-3073
'osteosarcoma' vs 'normal'	E-MEXP-3628
'metastatic colorectal cancer to the liver' vs 'normal'	E-GEOD-50760
'breast cancer; breast' vs 'normal; breast'	E-GEOD-38959
'lung cancer' vs 'healthy'	E-GEOD-32175
'invasive ductal carcinoma' vs 'normal'	E-GEOD-21422
'inflammatory breast cancer' vs 'normal'	E-GEOD-45581
'lung cancer' vs 'normal' in 'lung; Fresh-frozen tissue'	E-GEOD-19249
'ovarian cancer' vs 'normal' in 'epithelial cell'	E-GEOD-40595
'glioblastoma' vs 'control'	E-GEOD-22866
'metastasis; tumor' vs 'metastasis; normal adjacent tissue'	E-GEOD-18105
'glioblastoma' vs 'normal'	E-GEOD-35493
'astrocytoma' vs 'normal'	E-MEXP-567

Supplemental Table 2. Data accession numbers for Expression Atlas studies. The table contains accession numbers for each comparison plotted in **Figure 6F** and **Supplemental Fig 10.**