

Table S1. The genes in distinct modules	
gene	color
AARS1	blue
ABCE1	turquoise
ABCF1	turquoise
ACTL6A	blue
AHCTF1	turquoise
AKIRIN2	blue
ALG11	turquoise
ALG1L	grey
ANAPC1	turquoise
ANAPC10	grey
ANAPC11	grey
ANAPC2	grey
ANAPC4	turquoise
ANAPC5	turquoise
ANKLE2	turquoise
AQR	turquoise
ARCN1	turquoise
ARIH1	turquoise
ARL 2.00	brown
ATP1A1	turquoise
ATP2A2	turquoise
ATP5MF	grey
ATP6V0B	grey
ATP6V0C	grey
ATP6V1A	turquoise
ATP6V1B2	turquoise
ATP6V1E1	grey
ATP6V1F	grey
ATP6V1G1	turquoise

AURKA	blue
AURKB	blue
BANF1	blue
BANP	turquoise
BIRC5	blue
BRF1	grey
BRF2	turquoise
BUB1B	blue
BUB3	turquoise
BUD23	blue
BUD31	blue
BYSL	blue
C1orf131	turquoise
CACTIN	grey
CARS1	blue
CCNA2	blue
CCNK	turquoise
CCT2	blue
CCT3	blue
CCT4	blue
CCT5	blue
CCT6A	blue
CCT7	blue
CCT8	blue
CDC123	blue
CDC16	turquoise
CDC20	blue
CDC23	turquoise
CDC27	turquoise
CDC37	brown
CDC45	blue

CDC5L	turquoise
CDC6	blue
CDC7	blue
CDC73	turquoise
CDCA8	blue
CDK1	blue
CDK7	turquoise
CDK9	grey
CDT1	blue
CENATAC	grey
CENPK	blue
CENPN	blue
CENPW	blue
CFAP298	grey
CHAF1A	blue
CHAF1B	blue
CHD4	brown
CHEK1	blue
CHERP	turquoise
CHMP2A	grey
CHMP6	grey
CIAO3	grey
CKAP5	blue
CLNS1A	grey
CLP 1	blue
CLTC	turquoise
CNIH4	blue
CNOT3	grey
COPA	turquoise
COPB1	turquoise
COPB2	turquoise

COPG1	grey
COPS2	turquoise
COPS5	grey
COPS6	grey
COPS8	turquoise
COPZ1	turquoise
CPSF1	grey
CPSF2	turquoise
CPSF3	blue
CPSF4	blue
CPSF6	turquoise
CRCP	turquoise
CRNKL1	turquoise
CSE1L	blue
CTCF	blue
CTDP1	grey
CWC22	blue
DAD1	grey
DARS1	blue
DBR1	turquoise
DCTN5	turquoise
DDB1	turquoise
DDX10	blue
DDX18	turquoise
DDX20	turquoise
DDX3X	turquoise
DDX41	turquoise
DDX42	turquoise
DDX46	turquoise
DDX47	turquoise
DDX49	blue

DDX54	turquoise
DDX56	blue
DHDDS	turquoise
DHX15	turquoise
DHX16	turquoise
DHX37	turquoise
DHX8	turquoise
DNAJC17	grey
DNAJC8	turquoise
DNM2	turquoise
DONSON	blue
DTL	blue
DTYMK	blue
DUT	blue
DYNC1H1	turquoise
DYNC1I2	turquoise
DYNLRB1	grey
ECD	turquoise
EEF1A1	brown
EEF1G	grey
EEF2	brown
EEF2KMT	turquoise
EFTUD2	turquoise
EIF1AD	blue
EIF1AX	turquoise
EIF2B1	turquoise
EIF2B2	turquoise
EIF2B3	blue
EIF2B4	grey
EIF2B5	turquoise
EIF2S1	turquoise

EIF2S2	blue
EIF2S3	turquoise
EIF3A	turquoise
EIF3B	blue
EIF3D	brown
EIF3F	brown
EIF3G	brown
EIF3I	grey
EIF4A3	blue
EIF4E	turquoise
EIF5	turquoise
EIF6	blue
ELOB	grey
ELOC	grey
EPRS1	turquoise
ERCC3	turquoise
ERH	grey
ESPL1	blue
ESS2	blue
ETF1	turquoise
EXOSC4	grey
EXOSC6	blue
FARSA	blue
FARSB	blue
FAU	brown
FBL	brown
FBXO5	blue
FCF1	turquoise
FIP1L1	turquoise
FTSJ3	turquoise
GARS1	blue

GBF1	turquoise
GEMIN5	turquoise
GGTLC2	grey
GIN51	blue
GIN52	blue
GIN54	blue
GNL2	blue
GNL3	turquoise
GPN1	blue
GPN2	turquoise
GPN3	turquoise
GPS1	blue
GRPEL1	turquoise
GSPT1	turquoise
GTF2A2	grey
GTF2B	turquoise
GTF2E1	turquoise
GTF2E2	grey
GTF2F2	grey
GTF2H1	turquoise
GTPBP4	blue
H2AC12	blue
H2AC16	grey
H2AC17	grey
H2BC11	blue
H2BC15	grey
H2BC4	grey
H2BC5	grey
H2BC6	grey
H3C13	grey
HARS1	turquoise

HAUS1	blue
HAUS3	turquoise
HAUS5	blue
HAUS6	turquoise
HAUS7	grey
HAUS8	blue
HCFC1	turquoise
HEATR1	turquoise
HINFP	turquoise
HMGCS1	turquoise
HNRNPC	turquoise
HNRNPK	turquoise
HNRNPL	turquoise
HSPA5	grey
HSPA9	turquoise
HSPD1	blue
HSPE1	blue
IARS1	turquoise
IFTM3	grey
IGBP1	grey
IK	turquoise
IMP3	brown
INCENP	blue
INTS1	grey
INTS11	grey
INTS3	turquoise
INTS4	turquoise
INTS8	blue
INTS9	turquoise
ISCU	grey
ISY1	blue

KANSL3	turquoise
KARS1	blue
KAT8	turquoise
KIF11	blue
KIF23	blue
KIN	blue
KPNB1	turquoise
KRR1	turquoise
KRT8	grey
LARS1	turquoise
LCE5A	grey
LONP1	blue
LRR1	blue
LSM 2.00	blue
LSM 3.00	blue
LSM 4.00	blue
LSM 5.00	blue
LSM 6.00	blue
LSM 7.00	brown
LSM 8.00	turquoise
LTO1	grey
LUC7L3	turquoise
MAD2L1	blue
MAK16	turquoise
MARS1	blue
MASTL	blue
MAT2A	turquoise
MCM2	blue
MCM3	blue
MCM4	blue
MCM5	blue

MCM6	blue
MCM7	blue
MDN1	turquoise
MED11	grey
MED14	turquoise
MED20	turquoise
MED22	turquoise
MED28	turquoise
MED30	blue
MED4	turquoise
MED6	turquoise
MED8	blue
MEPCE	grey
MFAP1	turquoise
MMS22L	blue
MPHOSPH10	blue
MTBP	blue
MTREX	turquoise
MYC	brown
MZT1	turquoise
NAA50	turquoise
NACA	brown
NAPA	turquoise
NARS1	turquoise
NCAPD2	blue
NCAPG	blue
NCBP1	turquoise
NCBP2	turquoise
NDC80	blue
NEDD1	turquoise
NEDD8	grey

NFS1	turquoise
NIFK	blue
NIP7	blue
NLE1	turquoise
NOL10	blue
NOL6	turquoise
NOP16	blue
NOP56	blue
NOP58	blue
NPLOC4	blue
NRF1	turquoise
NSA2	brown
NSF	turquoise
NUDT21	blue
NUF2	blue
NUP133	turquoise
NUP160	turquoise
NUP205	turquoise
NUP214	turquoise
NUP85	blue
NUP88	turquoise
NUP93	blue
NUS1	blue
NUTF2	blue
NVL	turquoise
NXF1	turquoise
ORC1	blue
ORC6	blue
PABPN1	turquoise
PAFAH1B1	turquoise
PAM16	turquoise

PCBP1	grey
PCNA	blue
PDCD11	turquoise
PDRG1	grey
PFDN2	blue
PFDN6	blue
PHAX	turquoise
PHB	grey
PHB2	brown
PHF5A	blue
PLK1	blue
PMF1	brown
PMPCA	turquoise
PMPCB	turquoise
POLA2	blue
POLD1	blue
POLD2	blue
POLD3	turquoise
POLE	turquoise
POLE2	blue
POLR1A	turquoise
POLR1B	turquoise
POLR1C	blue
POLR1F	turquoise
POLR2B	turquoise
POLR2C	blue
POLR2D	blue
POLR2E	brown
POLR2F	blue
POLR2G	blue
POLR2H	blue

POLR2I	brown
POLR2L	brown
POLR3A	turquoise
POLR3B	turquoise
POLR3C	turquoise
POLR3F	turquoise
POLR3H	turquoise
POLR3K	grey
POP5	grey
PPIL2	turquoise
PPP1R11	turquoise
PPP1R8	turquoise
PPWD1	turquoise
PRC1	blue
PRELID1	blue
PRELID3B	blue
PRIM1	blue
PRMT5	turquoise
PRPF19	turquoise
PRPF31	grey
PRPF38A	blue
PRPF38B	turquoise
PRPF4	turquoise
PRPF6	grey
PRPF8	turquoise
PSMA1	blue
PSMA2	turquoise
PSMA3	blue
PSMA4	blue
PSMA5	blue
PSMA6	grey

PSMA7	blue
PSMB1	blue
PSMB2	blue
PSMB3	grey
PSMB4	blue
PSMB5	blue
PSMB6	grey
PSMB7	grey
PSMC1	turquoise
PSMC2	turquoise
PSMC3	blue
PSMC4	blue
PSMC5	grey
PSMC6	turquoise
PSMD1	turquoise
PSMD11	blue
PSMD12	turquoise
PSMD13	blue
PSMD14	blue
PSMD2	blue
PSMD3	grey
PSMD4	blue
PSMD6	turquoise
PSMD7	blue
PSMD8	blue
PSMG3	blue
PUF60	grey
PWP2	grey
QARS1	brown
RABGGTA	grey
RABGGTB	turquoise

RACGAP1	blue
RACK1	brown
RAD21	blue
RAE1	blue
RAN	blue
RANGAP1	blue
RBBP4	turquoise
RBBP6	turquoise
RBM14	turquoise
RBM17	blue
RBM22	turquoise
RBM25	turquoise
RBM39	turquoise
RBM8A	turquoise
RBMX	turquoise
RBMX2	blue
RBX1	grey
RCC1	blue
RFC2	blue
RFC3	blue
RFC5	blue
RIOK2	turquoise
RNF113A	grey
RNGTT	blue
RNPC3	turquoise
RNPS1	grey
RPA1	turquoise
RPA2	turquoise
RPA3	turquoise
RPAIN	turquoise
RPAP1	turquoise

RPAP2	turquoise
RPL10A	brown
RPL11	brown
RPL12	brown
RPL13	brown
RPL13A	brown
RPL14	brown
RPL15	brown
RPL18	brown
RPL18A	brown
RPL19	brown
RPL21	brown
RPL23	brown
RPL23A	brown
RPL24	brown
RPL26	brown
RPL27	brown
RPL27A	brown
RPL3	brown
RPL30	brown
RPL31	brown
RPL32	brown
RPL35	brown
RPL35A	brown
RPL36	brown
RPL37	brown
RPL37A	brown
RPL38	brown
RPL4	brown
RPL5	brown
RPL6	brown

RPL7	brown
RPL8	brown
RPLP0	brown
RPLP1	brown
RPLP2	brown
RPS10	grey
RPS11	brown
RPS12	brown
RPS13	brown
RPS15	brown
RPS15A	brown
RPS16	brown
RPS18	brown
RPS19	brown
RPS2	brown
RPS20	brown
RPS21	brown
RPS23	brown
RPS24	brown
RPS25	brown
RPS27A	brown
RPS29	brown
RPS3	brown
RPS4X	brown
RPS5	brown
RPS6	brown
RPS7	brown
RPS8	brown
RPS9	brown
RPSA	brown
RRM1	blue

RRM2	blue
RRN3	turquoise
RSL1D1	turquoise
RUVBL1	blue
RUVBL2	brown
SACM1L	turquoise
SAP18	grey
SAP30BP	blue
SARS1	grey
SART1	brown
SART3	turquoise
SBDS	turquoise
SBNO1	turquoise
SCFD1	turquoise
SDE2	turquoise
SEC13	blue
SEC61A1	turquoise
SEC61G	blue
SF1	turquoise
SF3A1	turquoise
SF3A2	brown
SF3A3	blue
SF3B1	turquoise
SF3B2	blue
SF3B3	blue
SF3B4	blue
SF3B5	grey
SF3B6	blue
SFPQ	turquoise
SGO1	blue
SKP1	turquoise

SLC39A7	turquoise
SLU7	turquoise
SMC1A	turquoise
SMC2	turquoise
SMC4	turquoise
SMG1	turquoise
SMG5	turquoise
SMR3B	grey
SMU1	turquoise
SNAPC1	turquoise
SNAPC2	brown
SNAPC4	turquoise
SNAPC5	turquoise
SNRNP200	turquoise
SNRNP25	grey
SNRNP27	turquoise
SNRNP35	grey
SNRNP70	grey
SNRPA1	blue
SNRPB	blue
SNRPC	blue
SNRPD1	blue
SNRPD2	brown
SNRPF	blue
SNU13	grey
SNW1	turquoise
SOD1	grey
SON	turquoise
SPC24	blue
SPC25	blue
SPCS2	grey

SPDL1	blue
SPOUT1	grey
SRBD1	turquoise
SRCAP	turquoise
SRP54	turquoise
SRP72	turquoise
SRP9	turquoise
SRSF1	turquoise
SRSF2	turquoise
SRSF3	turquoise
SRSF7	turquoise
SS18L2	grey
SSRP1	blue
SSU72	brown
STX5	grey
SUPT16H	turquoise
SUPT5H	turquoise
SUPT6H	turquoise
SYMPK	turquoise
TAF6	turquoise
TANGO6	grey
TARS1	blue
TCP1	blue
THOC1	turquoise
THOC2	turquoise
THOC3	blue
THOC5	blue
THOC7	grey
TICRR	blue
TIGD1	blue
TIMELESS	blue

TINF2	turquoise
TIPIN	blue
TNPO3	turquoise
TOMM40	blue
TONSL	blue
TOP 1.00	turquoise
TOP2A	blue
TOPBP1	turquoise
TRAPPC3	blue
TRAPPC5	grey
TRAPPC8	turquoise
TRMT112	brown
TRRAP	turquoise
TSG101	turquoise
TSR2	grey
TTC27	turquoise
TUBA1B	blue
TUBB	blue
TUBG1	grey
TUBGCP2	turquoise
TUBGCP3	turquoise
TUBGCP4	turquoise
TUBGCP5	turquoise
TUT1	grey
TXNL4A	blue
U2AF2	grey
U2SURP	turquoise
UBA1	turquoise
UBA2	blue
UBA52	brown
UBE2I	turquoise

UBL5	grey
UBR4	turquoise
UBTF	turquoise
UFD1	blue
UPF1	turquoise
UPF2	blue
URI1	turquoise
USP36	blue
USP39	blue
USP5	grey
USPL1	turquoise
UTP11	blue
UTP15	turquoise
UTP20	turquoise
UTP4	blue
VAR51	turquoise
VCP	turquoise
VIRMA	grey
VPS25	turquoise
VPS28	grey
WARS1	blue
WBP11	turquoise
WDR12	blue
WDR33	turquoise
WDR43	blue
WDR5	turquoise
WDR70	turquoise
WDR74	brown
WDR75	blue
WDR77	blue
WDR82	turquoise

WEE1	turquoise
XAB2	brown
XPO1	turquoise
XRCC6	turquoise
YARS1	blue
YJU2	brown
YKT6	blue
YRDC	blue
ZBTB11	turquoise
ZMAT2	turquoise
ZMAT5	grey
ZNF131	turquoise
ZNF207	turquoise
ZNF335	turquoise
ZNF830	turquoise
ZNHIT2	brown
ZPR1	blue

Table S2 The candidate drugs identified by CMAP		
Name	Score	MOA
SB-225002	-77.42	CC chemokine receptor antagonist
ofloxacin	-78.51	Bacterial DNA gyrase inhibitor
norgestimate	-78.99	Progesterone receptor agonist
z-leu3-VS	-79.33	Proteasome inhibitor
imperatorin	-79.73	CDK inhibitor
podophyllotoxin	-79.86	Microtubule inhibitor, Tubulin inhibitor
phorbol-12-myristate-13-acetate	-79.94	PKC activator
cefatrizine	-79.99	Bacterial cell wall synthesis inhibitor
YM-155	-80.1	Survivin inhibitor

amcinonide	-80.35	Glucocorticoid receptor agonist
SSR-69071	-80.47	Leukocyte elastase inhibitor
linifanib	-80.76	PDGFR receptor inhibitor, VEGFR inhibitor
JNJ-26854165	-81.96	HDAC inhibitor
oxibendazole	-82.54	Tubulin inhibitor
WH-4023	-83.53	SRC inhibitor
ingenol	-83.82	PKC activator
AG-592	-83.83	Tyrosine kinase inhibitor
MG-132	-84.11	Proteasome inhibitor
radicicol	-84.26	HSP inhibitor
chelidonine	-84.46	Tubulin inhibitor
ON-01910	-84.58	PLK inhibitor
acetyl-farnesyl-cysteine	-86.31	Inhibitor of methylation of endogenous isoprenylated proteins
nocodazole	-87.05	Tubulin inhibitor
16,16-dimethylprostaglandin-e2	-87.52	Prostanoid receptor agonist
manumycin-a	-88.1	Farnesyltransferase inhibitor, NFkB pathway inhibitor
SCH-79797	-88.95	Proteasome inhibitor
pyrvinium-pamoate	-89.49	AKT inhibitor
pipamperone	-90.03	Dopamine receptor antagonist
parthenolide	-90.23	NFkB pathway inhibitor, Adiponectin receptor agonist
vincristine	-90.35	Tubulin inhibitor
MLN-2238	-90.84	Proteasome inhibitor
MLN-4924	-90.94	Nedd activating enzyme inhibitor
KF-38789	-91.26	P-selectin inhibitor
PD-168077	-91.33	Dopamine receptor agonist
biotin	-91.75	Vitamin B
devazepide	-92.14	CCK receptor antagonist
BNTX	-92.95	Opioid receptor antagonist
LY-2183240	-93.44	FAAH inhibitor
BCI-hydrochloride	-94.16	Protein phosphatase inhibitor
prostratin	-94.5	PKC activator

DY-131	-94.8	Estrogen receptor agonist
flubendazole	-94.97	Tubulin inhibitor
terreic-acid	-95.07	BTK inhibitor
motesanib	-95.24	KIT inhibitor, PDGFR receptor inhibitor, VEGFR inhibitor
SA-792574	-96.68	Microtubule inhibitor
CAY-10585	-96.72	HIF modulator
NPI-2358	-97	Tubulin inhibitor
vinorelbine	-97.53	Tubulin inhibitor
neurodazine	-97.82	Neurogenesis of non-pluripotent C2C12 myoblast inducer
peucedanin	-98.84	Apoptosis stimulant