

Table S2. Overlapping of drug-related targets and disease-related targets

ingredients and metabolites	drug Target	vitiligo-associated genes	overlapping genes
C13	PRKCA	CYP2A6	TYR
C13	MMP12	CYP1A2	FKBP1A
C13	MMP2	CYP1A1	MTOR
C13	AKR1B1	CYP2A13	ABCB1
C13	HSP90AA1	TYR	ALB
C13	ADORA2A	FKBP1A	SYK
C13	MMP13	MTOR	PTPN22
C13	ADORA3	CYP3A4	MAOA
C13	TNF	CYP3A5	PAH
C13	F3	ABCB1	IL2
C13	SLC28A2	ABCA5	TNF
C13	ALDH2	ALB	VDR
C13	MMP7	ORM1	TPH1
C13	MMP8	SLCO1B1	ACE
C13	SLC28A3	VAMAS6	GSTM1
C13	IMPDH1	NLRP1	REN
C13	SLC29A1	NALP1	MIF
C13	MMP1	KIAA0926	COMT
C13	PARP1	DEFCAP	PTGS2
C13	APP	CARD7	TAP1
C13	AKR1B10	VAMAS1	IGF1
C13	MGMT	MSPC	G6PD
C13	YARS	AIADK	NOS2
C13	ANG	JRRP	GSTP1
C13	SRC	JAK-2	HGF
C13	HMGCR	MAO-A	CDK2
C13	GSK3B	JAK-3	CASP7
C13	MMP13	MAO-B	SLC1A2
C13	YARS1	SYK	AR
C13	DHFR	JAK-1	ARG1
C13	HK1	MC1R	F2
C13	HDAC8	FBXO11	GRK6
C13	RBP4	PTK	SHBG
C13	HEXB	PTPN22	ESR1
C13	ACP3	AIRE	XDH
C13	ABO	CAT	PNMT
C13	TGM3	KITLG	AHR
C13	GP1BA	PMEL	BCHE
C13	GNPDA1	CTLA4	PIK3CB
C13	ELANE	TYRP1	KIT
C13	HINT1	HLA-B	CASP3
C13	EPHA2	DCT	CCL5
C13	MMP16	MLANA	MAPK1
C13	CLEC4M	DSTYK	PON1
C13	STAT1	PRDX5	SOD2
C13	ACAT1	FOXD3	PARP1
C13	GCDH	POMC	ACHE
C13	ARL5A	CD8A	DPP4
C13	CD209	MITF	PDE10A
C13	RND3	FGF2	PMS2
C13	SELE	CCR6	PTPN1
C24	GC	MCHR1	AHCY

C24	SEC14L2	TG	ESRRA
C24	PPARD	CD4	PFKFB3
C24	WAS	PCBD1	AKT1
C24	TTPA	GCH1	RORA
C24	SORD	MAOA	MMP2
C24	PLA2G2A	NPY	CASP1
C24	NR1H4	PAH	MAPK14
C24	FABP3	IL2	MMP1
C24	ADH5	DDC	PIK3CG
C24	ADK	TPO	PIK3R1
C24	EPHB4	ICOSLG	DDX39B
C24	TRAPPC3	PDCD1	BRAF
C24	HSP90AA1	CIITA	GSTM2
C24	SERPINA1	CD274	ABO
C24	FABP7	C4B	CBR1
C24	PPARA	NUDT10	NR1H2
C24	MMP2	HLA-DRB1	ALOX15
C24	MAP2K1	FAS	ALOX12
C24	NR1I2	HLA-A	SEC14L2
C24	HMGCR	HLA-DQB1	PPARG
C24	RXRΒ	AIS3	PPARD
C24	MME	IL10	PIK3CD
C24	MAPK12	HLA-C	PIK3CA
C24	HGF	HLA-DQA1	HSPA1B
C24	INSR	TNF	HSPA1A
C30	PDE5A	IL2RA	MAOB
C30	GC	PLCG2	
C30	MMP13	DCLRE1C	
C30	PTPN1	IFNG	
C30	EGFR	TH	
C30	FNTA	IL17A	
C30	PTPN11	NBN	
C30	HSD17B1	AIS4	
C30	HSD11B1	IL6	
C30	HDAC8	ACP5	
C30	TRAPPC3	VDR	
C30	ADH5	SLX4	
C30	PDK2	AIS2	
C30	FABP6	FOXP3	
C30	FABP7	IL4	
C30	HNF4G	CYP21A2	
C30	IGF1	TRAC	
C30	FABP3	CXCR3	
C30	THRA	RAG1	
C30	RARG	GZMB	
C30	CYP2C8	CXCL10	
C30	CTSG	ABCD1	
C30	FECH	TRPS1	
C30	PLEKHA4	RAG2	
C30	HSP90AB1	AA1	
C30	RXRΒ	AA2	
C30	HGF	GAD2	
C30	DCPS	IKZF4	
C30	CASP1	ICAM1	

C30	HSD11B2	CRH	
C30	HSD11B1	GAD1	
C31	ANG	IL1B	
C31	TTR	IL1RN	
C31	SULT2A1	FASLG	
C31	AHCY	CXCR4	
C31	PTPN11	POGZ	
C31	F10	GPX1	
C31	CBR1	CYP11A1	
C31	CES1	TLR2	
C31	REN	FANCA	
C31	LCK	TPH1	
C31	THRA	ARMC9	
C31	RNASE3	ACE	
C31	FABP6	MTHFR	
C31	ABO	CXCL9	
C31	ACP3	INS	
C31	HEXB	CYP17A1	
C31	IGF1	HLA-DRB4	
C31	BST1	TP53	
C31	TPH1	PTPRC	
C31	MMP2	NFKB2	
C31	S100A9	GLRB	
C31	PRKCQ	GPHN	
C31	ZAP70	FANCD2	
C31	ARG2	GLRA1	
C31	PDE5A	CNTNAP2	
C31	HRAS	GABARAP	
C31	STAT1	GLRA2	
C31	ATIC	AMPH	
C31	APAF1	LGI1	
C31	F11	DPP6	
C31	ITPKA	CSAD	
C31	UAP1	GLRA3	
C31	GMPR2	DPYSL5	
C42	CDK6	EMC1	
C42	GSR	GLRA4	
C42	CHEK1	GSTM1	
C42	HSD17B1	GSTT1	
C42	PDE4D	FGFR1OP	
C42	SRC	NFE2L2	
C42	NQO2	SOD1	
C42	ADH5	IL1RAPL1	
C42	HEXB	ATM	
C42	FGFR1	CASR	
C42	PDE5A	REN	
C42	PLA2G2A	LIG4	
C42	FKBP1A	SPP1	
C42	VDR	NR0B1	
C42	ARL5A	IRF8	
C42	GART	XRCC6	
C42	TRDMT1	XRCC5	
C42	FKBP3	NHEJ1	
C42	NOX4	ALG6	

C42	AKR1B1	ARHGEF6	
C42	CDK5R1	CCK	
C42	CDK5	ZMYND11	
C42	XDH	KIR3DL1	
C42	MAOA	KIR3DL2	
C42	FLT3	TRAPPC10	
C42	CYP19A1	KIR2DL1	
C42	ESR1	SLAMF8	
C42	CCNB3	KIR3DL3	
C42	CCNB1	DIP2C	
C42	CDK1	H2AC18	
C42	ACHE	SOD3	
C42	ADORA1	PSMB8	
C42	PTGS2	DDR1	
C42	ESR2	MIF	
C42	CDK6	COMT	
C42	ADORA2A	EDN1	
C42	SYK	IL18	
C42	GSK3B	PTGS2	
C42	ABCC1	CHEK2	
C42	HSD17B1	ATR	
C42	TTR	RAD51	
C42	CSNK2A1	BRCA1	
C42	CFTR	RAD50	
C42	CYP1B1	NR5A1	
C42	ABCG2	MC2R	
C42	AKR1B10	CYP27B1	
C42	TNKS2	GK	
C42	TNKS	FANCC	
C42	ALOX5	NOTCH4	
C42	PARP1	HSD3B2	
C42	CA2	IL1R1	
C42	CA7	STAR	
C42	CA12	CYP11B2	
C42	ABCB1	AICDA	
C42	ALOX12	WRN	
C42	CA4	SMC1A	
C42	PTPRS	IL13	
C42	GLO1	ERCC6	
C42	APP	FANCL	
C42	MMP9	KRT16	
C42	MMP2	IL1A	
C42	MMP12	RAD51C	
C42	CD38	RAD17	
C42	TOP1	FANCG	
C42	ARG1	PALB2	
C42	ESRRA	MRE11	
C42	PFKFB3	FANCM	
C42	AMY1A	FANCE	
C42	GRK6	FANCF	
C42	ALOX15	FANCI	
C42	TYR	TERF1	
C42	HSD17B2	MDC1	
C42	AHR	TERF2	

C42	CA1	CRHBP	
C42	CA9	GK2	
C42	CBR1	FLG	
C42	AR	KLRK1	
C42	TERT	MICA	
C42	PIM1	FANCB	
C42	EGFR	ULBP3	
C42	CDK1	CLEC16A	
C42	KDM4E	H2AX	
C42	LCK	STX17	
C42	AURKB	ZNF627	
C42	TBXAS1	TCHH	
C42	NAE1	SLX1B	
C42	IGF1R	FAAP100	
C42	KDR	FAAP24	
C42	PLK1	SLX1A	
C42	MET	RNASET2	
C42	ALK	BTNL2	
C42	AXL	SMOC2	
C42	BCHE	TAP1	
C42	ADORA3	CD80	
C42	CDK2	LPP	
C42	HTR2C	IGF1	
P1	ACE	CXCR5	
P1	REN	LTA	
P1	SLC1A2	ASIP	
P1	F2	HMGB1	
P1	LTA4H	PSMB9	
P1	NR1H4	C12orf10	
P1	ITGA2B	IFIH1	
P1	ITGB3	RAB5B	
P1	ARG1	KIF1B	
P2	TREM1	TF	
P2	MIF	RPGRIP1L	
P2	ACE	ZMIZ1	
P2	ADH5	APEX1	
P2	UCK2	G6PD	
P2	PITPNA	MBL2	
P2	DPEP1	AQP3	
P2	NT5M	DKK1	
P2	ESR1	TSLP	
P2	ESR2	TSBP1	
P3	BMP7	HMOX1	
P3	CHIT1	GAST	
P3	PYGL	NOS2	
P3	HK1	HLA-DRA	
P3	PAH	RERE	
P3	HSD17B1	RBM17	
P3	F2	C1QTNF6	
P3	NCS1	UBASH3A	
P3	GALK1	HCG9	
P3	MMP8	TSBP1-AS1	
P3	AMY2A	GSTP1	
P3	PDE3B	HGF	

P3	CBR1	CDH1	
P3	HMGCR	CXCL8	
P3	SOD2	ERBB3	
P3	CDA	CDK2	
P3	ALDH2	ATXN2	
P3	TPI1	SUOX	
P3	HEXB	DGKA	
P3	AHCY	DDX6	
P3	LYZ	SLC29A3	
P3	RNASE3	TREH	
P3	LGALS2	RPS26	
P3	SERPINA1	CDH23	
P3	FHIT	PA2G4	
P3	B3GAT1	KCNK12	
P3	B3GAT1	ATP8B1	
P3	GCK	UNC5B	
P3	ABO	PHLDB1	
P3	GNPDA1	HUNK	
P3	NMNAT1	MRPS17P7	
P3	CTSF	AIS1	
P3	GP1BA	CP	
P3	CLEC4M	CCN3	
P3	CD209	CASP7	
P3	HPRT1	SLC1A2	
P3	F11	CD44	
P3	WARS1	SH2B3	
P3	PKLR	TICAM1	
P3	EIF4E	HERC2	
P3	RAN	OCA2	
P3	DUT	BACH2	
P3	EEA1	SLA	
P3	FKBP1B	TOB2	
P3	TNF	CLNK	
P3	IL2	TNC	
P3	ALDH2	CCR4	
P3	ADORA1	IL19	
P3	AKR1B1	MAP2K2	
P3	XDH	AR	
P3	CA1	APOE	
P3	CA12	PRKDC	
P3	CA9	ARG1	
P3	CA13	CXCR2	
P3	ADORA3	CYP2D6	
P3	HSP90AA1	NF1	
P3	CA2	F2	
P3	TOP1	ADRB2	
P4	RORA	CASK	
P4	GC	KRT18	
P4	ADAM17	IGF2	
P4	MMP13	CD40LG	
P4	SULT2A1	GATA2	
P4	NR1H4	TPMT	
P4	MMP12	LEP	
P4	AKR1C1	GGT1	

P4	PTPN11	GHR	
P4	WAS	GLDC	
P4	F2	KRT8	
P4	ADH5	USP9X	
P4	TRAPPC3	PDE6A	
P4	DPP4	CXCL12	
P4	LCK	DLAT	
P4	JAK3	KDM6A	
P4	GSTA1	IGFBP3	
P4	ITK	GRK6	
P4	MET	CYP7B1	
P4	NR1H2	SAG	
P4	RBP4	FMR1	
P4	PPARA	GH1	
P4	SULT2B1	IGFBP1	
P4	MAP2K1	SLC17A5	
P4	CYP2C8	SEPSECS	
P4	RARA	AMH	
P4	RARG	ARRB1	
P4	ZAP70	ARRB2	
P4	REN	TP53BP1	
P4	RARB	CLCN1	
P4	HMGCR	PRL	
P4	FECH	SLC33A1	
P4	PPP1CC	CHGA	
M2	CHEK1	DOCK8	
M2	BMP7	FTCD	
M2	PYGL	XRCC4	
M2	PAH	PEX3	
M2	HK1	PEX5	
M2	IGF1R	SHBG	
M2	AMY2A	KIF1C	
M2	DPP4	HAX1	
M2	EPHB4	HBG2	
M2	MMP8	SLC3A2	
M2	PDPK1	PDE6H	
M2	TPI1	PAPPA	
M2	TGM3	GPT	
M2	RNASE3	G6PC3	
M2	CCL5	BMP15	
M2	B3GAT1	ACKR3	
M2	LGALS2	KDM4C	
M2	HEXB	TBX19	
M2	BST1	TMC8	
M2	ACP3	SPG21	
M2	ARHGAP1	CTSW	
M2	GNPDA1	CSF3	
M2	GCK	GHRH	
M2	ABO	ASGR1	
M2	CRABP2	ASGR2	
M2	PLEKHA4	BGLAP	
M2	GP1BA	IFNA1	
M2	CLEC4M	SLC25A17	
M2	PKLR	SERPINA7	

M2	CDK7	SPG11	
M2	OAT	GRK3	
M2	SULT2B1	GOLM1	
M2	PMS2	RPS4X	
M2	CD209	ZFYVE26	
M2	ACAT1	SHOX2	
M5	SRC	SHOX	
M5	PDE4B	ZFR	
M5	CDK6	SRY	
M5	BCAT2	PEX11A	
M5	CDK2	JAKMIP1	
M5	TPI1	EFHC2	
M5	HSD17B1	RPS4Y1	
M5	IMPDH2	GET4	
M5	RNASE4	TSPY1	
M5	SHMT1	SOGA3	
M5	MMP8	WASHC5	
M5	RNASE3	SPART	
M5	INSR	CGB3	
M5	FGFR1	XAGE3	
M5	BHMT	PAXX	
M5	DTYMK	TRA	
M5	GPI	MIR663AHG	
M5	PLEKHA4	EMC1-AS1	
M5	GSTT2B	CCR5	
M5	PKLR	MIR196A2	
M5	UCK2	PDGFRA	
M5	SULT1E1	TGFB1	
M5	CLK1	ITGB1	
M5	PPCDC	HSPA4	
M5	RNASE2	ESR1	
M5	GP1BA	XDH	
M5	HINT1	HLA-G	
M5	NMNAT3	PNMT	
M5	NME2	TLR4	
M5	MME	CLEC11A	
M5	DDX39B	STAT4	
M5	HGF	FOXP1	
M5	HADH	SLC44A4	
M5	ERI1	QDPR	
M5	ACAT1	AHR	
M5	RFK	NR1H3	
M5	CD209	HLA-DQA2	
M5	GSTM2	TXNDC5	
M5	ITPKA	TGFBR2	
M5	G6PD	XBP1	
M5	GSTM1	UVRAG	
M5	Arl5b	BCHE	
M5	PMS2	PIK3CB	
M5	AKR1B1	FOXO3	
M5	TNF	LAMB1	
M5	IL2	CD28	
M5	ADORA1	VCAM1	
M5	XDH	HNRNPA1P2	

M5	RPS6KA3	TXN	
M6	PDE5A	RB1	
M6	ADAM17	CD59	
M6	SHBG	CD46	
M6	GSR	CD14	
M6	CHEK1	FCGR3A	
M6	HSD17B1	CCL20	
M6	ADH5	BMP6	
M6	CDK6	KLRD1	
M6	PDE3B	DEFB1	
M6	NQO2	KIT	
M6	HMGCR	CASP3	
M6	MAPKAPK2	CREB1	
M6	MMP8	IFNAR1	
M6	BHMT	S100B	
M6	TK1	CCL5	
M6	MTHFD1	ARNT	
M6	GPI	IL22	
M6	NMNAT1	EIF5B	
M6	CDK7	IL26	
M6	ARL5A	MAPK1	
M6	CMA1	MPO	
M6	GP1BA	TNFRSF1A	
M6	GSTM1	VEGFA	
M6	DUT	LEF1	
M6	GSTM2	IL10RB	
M6	G6PD	USF1	
M6	PMS2	IL20	
M6	RFK	IL20RA	
M6	RAP2A	IL22RA1	
M6	DCPS	LOC111365141	
M6	AKR1B1	NOTCH1	
M6	TNF	SIRT1	
M6	ADORA1	CD27	
M6	IL2	MC4R	
M6	PTGS2	SP1	
M6	RPS6KA3	CSF2	
M6	XDH	CCR8	
M6	EGFR	CXCL16	
M6	ALDH2	CXCR6	
M6	SLC29A1	LPO	
M6	F10	CCL22	
M6	CA2	NUDT6	
M6	CA7	SOX10	
M6	CA12	JAK1	
M6	CA4	EDNRA	
M6	NQO2	EDNRB	
M6	PRKCG	NRG1	
M6	PRKCD	PON1	
M6	PRKCA	ERCC1	
M6	PRKCB	VDAC1	
M6	PRKCE	CALCA	
M6	PRKCH	SST	
M6	CD38	IL33	

M9	PNPO	DNAH5	
M9	SRC	STRN3	
M9	PDE4B	CDK5RAP1	
M9	TPI1	MIR25	
M9	OTC	IDDM8	
M9	CDK6	IL21	
M9	SHMT1	BCL2	
M9	PCK1	SOD2	
M9	SDS	PCNA	
M9	FGFR1	PARP1	
M9	ALDOA	CDKN1A	
M9	RNASE3	BAX	
M9	DHFR	CFLAR	
M9	CCL5	CRHR1	
M9	GPI	MAGEA1	
M9	DTYMK	MIR155	
M9	NMNAT1	IS1	
M9	PKLR	SERPINE1	
M9	EPHA2	TAT	
M9	CLK1	HAVCR2	
M9	CDK7	CALM1	
M9	PLEKHA4	MSRA	
M9	MME	FRS2	
M9	HAGH	MSRB2	
M9	SULT1E1	LGALS9	
M9	GSTA3	IFNE	
M9	SULT2B1	F2RL1	
M9	RNASE2	MDH2	
M9	GART	OGG1	
M9	BHMT	FURIN	
M9	UCK2	ACHE	
M9	HGF	MX1	
M9	ATIC	MIR211	
M9	NDST1	STAT3	
M9	RAB5A	DPP4	
M9	HINT1	ITGAM	
M9	REN	PDE10A	
M9	ERI1	ICA1	
M9	DDX39B	GCHFR	
M9	ACAT1	CORO2A	
M9	NME2	WASF5P	
M9	NMNAT3	C4A	
M9	GSTM1	RPL13	
M9	RFK	MSH6	
M9	Pfkfb1	PMS2	
M9	G6PD	ACADS	
M9	PMS2	IFNA2	
M9	AKR1B1	FOXN1	
M9	TNF	ITGA5	
M9	IL2	IL4R	
M9	XDH	TNFRSF10A	
M9	ADORA1	OPRL1	
M9	PTGS2	MIA	
M9	SQLE	PNOC	

M9	RPS6KA3	SIAE	
M9	NOX4	PMCH	
M9	ADRA2C	PVT1	
M9	CA2	PRO2268	
M9	CA7	CCDC22	
M9	CA12	ICOS	
M9	CA4	MAPK8	
M10	BMP7	TRAF2	
M10	ANG	IL2RG	
M10	CDK6	SHTN1	
M10	AHCY	MIR3940	
M10	SOD2	PPP3CA	
M10	ALDH2	PTPN1	
M10	TPI1	AHCY	
M10	ATOX1	FLI1	
M10	HSD17B1	IL2RB	
M10	PAH	RIPK1	
M10	PDE3B	MSH2	
M10	CDA	PLCB3	
M10	AMY2A	KAT2A	
M10	NCS1	ITCH	
M10	GPI	TNFSF11	
M10	ARSA	IRF3	
M10	ELANE	BAD	
M10	UMPS	ESRRA	
M10	IGF1	FEN1	
M10	RAB11A	PCYT1A	
M10	SHMT1	CYBA	
M10	RNASE3	BCL2L11	
M10	BST1	TNFRSF11A	
M10	RAB5A	SMARCC2	
M10	ACP3	PTGES3	
M10	UCK2	PFKFB3	
M10	ALDOA	HLA-DPB1	
M10	HINT1	IRF4	
M10	KIT	TAP2	
M10	CLK1	TMPRSS6	
M10	HEXB	GALNS	
M10	TPH1	CDH15	
M10	HRAS	ABCG1	
M10	FDPS	BRD2	
M10	GSTT2B	RPS27A	
M10	GCK	RHOH	
M10	CLEC4M	CDK10	
M10	GSTM1	FAP	
M10	SELE	BEST1	
M10	DTYMK	FADS1	
M10	GSTA3	FADS2	
M10	GSTM2	HLA-DMB	
M10	AKR1B1	PNPT1	
M10	TNF	PLIN3	
M10	IL2	IL15RA	
M10	ADORA1	CNP	
M10	XDH	RNF168	

M10	RPS6KA3	CPT1C	
M10	EGFR	ACSF3	
M10	CA2	HLA-DOA	
M10	ACHE	HLA-DOB	
M10	CA4	HLA-DPA1	
M10	NQO2	RAB5C	
M10	NOX4	HCRT	
M10	ADRA2C	CHRNA9	
M10	ALDH2	RPL13A	
M10	SQLE	AGPAT1	
M10	PTGS2	HLA-DMA	
M10	NMUR2	RPS11	
M10	ADRA2A	STK25	
M10	CA7	SERPINB9	
M10	CA12	INCENP	
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M16	NR1H4	RF00017-5418	
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M30	BMP1		
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M30	ADAM10		
M30	CDK1		
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M30	PIK3CD		
M30	PIK3CB		
M30	PIK3CG		
M30	PIK3CA		
M30	RAF1		
M30	DNM1		
M30	TYR		
M30	SIGMAR1		
M30	MKNK1		
M30	SYK		
M30	MAPKAPK2		
M30	LNPEP		
M30	AURKA		
M30	ADORA2A		
M30	COMT		
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M30	PIM3		
M30	CASP3		
M30	CASP7		
M30	TBK1		
M30	TOP1		
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M30	PDK1		
M30	SRC		
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M30	BRAF		
M30	PLK1		
M30	ALPL		
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M30	CDK4		
M30	CCNE2		
M30	CDK2		
M30	MBD2		
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M30	EGFR		
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M30	CDC7		
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M30	AKT1		
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M30	CDK2		
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M30	CSNK1G1		
M30	RPS6KA1		
M30	CCNE1		
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M30	PDE10A		
M30	ECE1		
M30	TAAR1		
M30	CA2		
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M30	PIK3CA		
M30	PIK3R1		
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M31	ME2		
M31	KIF5B		
M31	PCK1		
M31	AKR1B1		
M31	ADH5		
M31	ESRRG		
M31	INSR		
M31	BST1		
M31	PLEKHA4		
M31	DHFR		
M31	HSPA1A		
M31	HSPA1B		
M31	GSTT2B		
M31	SULT1E1		
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M31	MAPK12		
M31	PPP1CC		
M31	RAB11A		
M31	PMS2		
M31	EIF4E		
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M32	ALB		
M32	MIF		
M32	CHEK1		
M32	CCNA2		
M32	IMPDH2		
M32	CDK6		
M32	PCK1		
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M32	TPI1		
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M32	CYP2C9		
M32	RNASE3		
M32	PPARA		
M32	GPI		
M32	AGXT		
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M32	NR1H4		
M32	CTSG		
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M32	UCK2		
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M32	PFKFB4		