

SUPPORTING INFORMATION

A network medicine approach to investigation and population-based validation of disease manifestations and therapeutics for COVID-19

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*Corresponding author

Feixiong Cheng, PhD

E-mail: chengf@ccf.org

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Table S1. Four SARS-CoV-2 target lists with lung expression specificity.

HCoV-PPI		SARS2-DEG		SARS2-DEP		SARS2-PPI	
Gene	Lung Z score						
MT-ND4L	-0.62	CYP2B7P	5.56	MRPL24	-0.83	FAM162A	-1.10
MT-CO2	-0.59	EGFL6	5.53	SLC16A1	-0.74	EXOSC5	-0.91
NDUFA10	-0.59	ICAM1	5.23	PLA2G2A	-0.61	ACADM	-0.81
SNAP47	-0.47	CXCL8	5.17	HTRA1	-0.55	ECSIT	-0.65
TUBB2A	-0.47	CSF3	5.10	COQ6	-0.54	SMOC1	-0.65
BCL2	-0.47	DRAM1	4.57	SLC39A14	-0.45	PTGES2	-0.62
MKRN3	-0.40	C6orf223	4.37	ILVBL	-0.45	TOMM70	-0.61
ZCRB1	-0.40	IL7R	4.21	UQCRCB	-0.43	DNAJC19	-0.58
IFTAP	-0.37	TCIM	4.14	MDH2	-0.42	PKP2	-0.51
ACO2	-0.36	PTGS2	3.79	TSPYL1	-0.39	NDUFAF1	-0.50
MACROH2A2	-0.34	CTSH	3.78	ALDH4A1	-0.38	DCAKD	-0.50
ACE2	-0.33	CCL20	3.74	PSPH	-0.38	STOML2	-0.49
TERF1	-0.33	SOCS3	3.17	NDUFB9	-0.38	FBN2	-0.47
SPEC1	-0.32	LIF	3.10	PAK1	-0.37	TLE1	-0.46
TUBB4A	-0.31	NEDD9	3.02	SOX11	-0.37	SLC9A3R1	-0.45
CAMLG	-0.30	BMP2	2.99	IDH2	-0.37	NDUFAF2	-0.41
NACA	-0.26	WNT7A	2.96	FAM98A	-0.35	MARK1	-0.40
SNX9	-0.26	IRAK2	2.81	TIMM8B	-0.35	TIMM9	-0.40
LAS1L	-0.25	MAP3K8	2.78	GSTA2	-0.35	CCDC86	-0.40
FGL2	-0.23	HELZ2	2.78	SLC15A1	-0.34	NDUFB9	-0.38
HSPA9	-0.22	NFKBIA	2.74	OAT	-0.33	SIGMAR1	-0.37
DDX1	-0.20	PARP12	2.72	GCNT3	-0.31	MRPS27	-0.36
TUBA4A	-0.20	TNFAIP2	2.70	ANXA13	-0.31	FAM98A	-0.35
FLNA	-0.18	OAS3	2.69	ATP5MD	-0.31	TIMM8B	-0.35
ATF5	-0.18	PARP9	2.66	ALDH1A2	-0.30	CEP68	-0.35
CLEC4G	-0.17	RND1	2.58	ISYNA1	-0.30	MRPS2	-0.35
EIF3F	-0.16	ZC3H12A	2.55	MICOS13	-0.29	ETFA	-0.34
VIM	-0.14	BCL3	2.55	ATP23	-0.29	SCCPDH	-0.34
PARP1	-0.12	EDN1	2.55	NME1	-0.29	BCKDK	-0.33
RPL13A	-0.12	NFKBIZ	2.53	CDHR2	-0.28	C1orf50	-0.33
CEACAM1	-0.09	PDGFB	2.52	TSFM	-0.27	PRKAR2B	-0.33
EIF3E	-0.07	THBD	2.48	NDUFA7	-0.27	SLC25A21	-0.33
VKORC1	-0.06	CD86	2.46	DHFR	-0.26	REEP6	-0.32
ANPEP	-0.05	OAS2	2.43	POLR2J	-0.26	TY SND1	-0.32
KIF11	-0.05	CXCL16	2.38	LYPD3	-0.26	HS6ST2	-0.31
RPL19	-0.05	STAT1	2.33	LGALS2	-0.25	GHITM	-0.31
NPM1	-0.04	PLAUR	2.32	PMVK	-0.25	PRKACA	-0.31
IFITM1	-0.04	IL6	2.30	DNAJB2	-0.24	HOOK1	-0.28
MKRN2	-0.02	IFI44	2.27	NDUFA4	-0.24	PMPCB	-0.28
BTF3	0.00	HBEGF	2.24	ATP6V0A4	-0.23	COL6A1	-0.28
PRKRA	0.01	RELB	2.22	SLC26A3	-0.23	NLRX1	-0.27
SGTA	0.06	IL32	2.20	HSPA9	-0.22	CEP250	-0.25
UBE2I	0.06	TNFAIP3	2.15	KRT14	-0.22	ATP1B1	-0.25
HSPD1	0.07	SAMD9L	2.12	SMARCA1	-0.22	SCARB1	-0.25
KPN2A	0.09	SBNO2	1.99	GJA9	-0.21	MFGE8	-0.24
ACBD5	0.09	EPST1	1.98	LAD1	-0.20	SLC27A2	-0.24
RSL24D1	0.10	FOSL1	1.95	STMN1	-0.19	RAE1	-0.23
PABPC4	0.11	IRAK3	1.94	APOA1	-0.19	TARS2	-0.23
HNRNPA1	0.11	SPRY4	1.89	ACTA1	-0.19	ERO1B	-0.22
PHB	0.12	EFNA1	1.89	TTR	-0.19	PLEKHA5	-0.22
CHMP2B	0.13	NFKB2	1.89	VTN	-0.19	BZW2	-0.22
EEF1A1	0.17	PLSCR1	1.85	SELENOW	-0.19	PTBP2	-0.22
TFEB	0.19	GBP5	1.80	KRT1	-0.18	NINL	-0.21
NCL	0.19	SELENOP	1.67	IGF2BP1	-0.18	RPL36	-0.21
PFDN5	0.20	IFIH1	1.67	ACAA2	-0.18	CEP43	-0.21
RPS20	0.22	BIRC3	1.55	ID12	-0.18	PCSK6	-0.19
SKP2	0.23	TCF4	1.53	MUC17	-0.18	INHBE	-0.18
PSMD1	0.23	CXCL2	1.50	KRT2	-0.18	PCNT	-0.18
DDAH2	0.25	RHOF	1.49	APOA2	-0.18	FOXRED2	-0.18
BCL2L2	0.26	LGALS9	1.48	CST3	-0.16	SAAL1	-0.17
SYNCRIP	0.29	TP53INP1	1.45	C12orf29	-0.16	JAKMIP1	-0.16
KPN44	0.29	IER3	1.39	APOE	-0.16	NUP88	-0.16
CHMP4B	0.31	SLC6A14	1.37	HKDC1	-0.15	DPH5	-0.16
RCAN3	0.31	TGM2	1.36	ASGR1	-0.15	CDK5RAP2	-0.16
CHEK2	0.31	TNIP1	1.36	TFAM	-0.15	DCTPP1	-0.15
GSK3A	0.32	PRDM1	1.34	MRPS6	-0.14	MTARC1	-0.14
RRM2	0.32	SERPINB1	1.33	TRAPPCL	-0.14	USP13	-0.14
XPO1	0.34	IRF7	1.31	TGFB11	-0.14	GTF2F2	-0.14
DCTN2	0.34	ADRB2	1.28	PHPT1	-0.14	CISD3	-0.14
TUBB6	0.34	IFITM3	1.27	IARS2	-0.14	IDE	-0.14
SMAD3	0.35	DUSP10	1.27	AURKA	-0.14	GRPEL1	-0.14
BAG6	0.37	ZSWIM4	1.27	TBL2	-0.13	FYCO1	-0.13
IFITM2	0.37	ALOX15B	1.25	VAPB	-0.13	PDE4DIP	-0.13
SCFD1	0.37	OAS1	1.24	OCIAD1	-0.11	ZYG11B	-0.13
ACTB	0.43	PLAU	1.21	TIMM50	-0.11	NPTX1	-0.12
CD209	0.44	CDC42EP2	1.19	USP11	-0.10	CENPF	-0.11
PSMC2	0.45	RAB15	1.17	AAMP	-0.10	MEPCE	-0.11
NOMO3	0.48	IFI35	1.10	KIF1B	-0.10	IMPDH2	-0.10
SRP54	0.48	TNF	1.06	DECRI	-0.10	ATP5MG	-0.10
PABPC1	0.49	IRF9	1.02	BUB1B	-0.09	PRIM2	-0.10
GBF1	0.49	CYRIA	1.01	ELOB	-0.09	SCAP	-0.09
PP1G	0.51	IL1B	0.98	IDH1	-0.09	ELOB	-0.09
TWF2	0.52	MAFF	0.94	EEF1B2	-0.09	DDX10	-0.09
ATP6V1G1	0.52	IL6R	0.94	PGRMC1	-0.09	NAT14	-0.09
CD9	0.52	INHBA	0.94	PIN4	-0.09	EXOSC3	-0.09

G3BP2	0.54	MMP1	0.89	SSBP1	-0.08	NEK9	-0.09
DNAJB1	0.55	CHST2	0.84	VDAC1	-0.07	NARS2	-0.09
PPIH	0.55	BID	0.80	SFN	-0.07	NUP214	-0.09
STAT5A	0.56	TLCD1	0.79	CEBPA	-0.07	ALG8	-0.08
STX5	0.57	MXRA5	0.79	C7orf50	-0.07	UBXN8	-0.07
YKT6	0.57	FAM167A	0.78	TMEM97	-0.06	BCS1L	-0.07
COPB2	0.59	CXCL5	0.71	MVK	-0.05	MIPOL1	-0.06
EIF3I	0.61	EHD1	0.71	TBC1D17	-0.04	TMEM97	-0.06
CLEC4M	0.61	PLAT	0.70	IDH3B	-0.04	TIMM10	-0.06
DPP4	0.61	NID1	0.67	NPM1	-0.04	MPHOSPH10	-0.05
NMT1	0.65	SOD2	0.61	LRP2	-0.04	PLOD2	-0.04
MIF4GD	0.66	G0S2	0.61	SNUPN	-0.02	PRKAR2A	-0.04
HNRNPA2B1	0.67	STAT5A	0.56	TUBA1A	-0.02	GGH	-0.03
IRF3	0.69	LRMP	0.54	RRM1	-0.02	F2RL1	-0.03
KPNB1	0.71	IRF2BPL	0.54	RPL36A	-0.01	SIRT5	-0.02
TMRSS2	0.72	TUBA1C	0.52	HIRIP3	0.00	FKBP7	-0.02
NUCCD1	0.73	VNN3	0.52	PPM1G	0.01	PDZD11	-0.01
NONO	0.73	SLAMF7	0.52	SCD	0.01	ACAD9	-0.01
HGS	0.75	TSC22D3	0.49	CCNA2	0.01	ZNF318	0.00
HNRNPA3	0.87	SAMHD1	0.48	MICU2	0.02	THTPA	0.00
JUN	0.89	IKBKE	0.47	ITGA6	0.03	MYCBP2	0.01
VCP	0.93	ZC3H12C	0.45	PWWP2A	0.04	CHPF	0.01
IKBKB	0.94	MCOLN3	0.42	DPY30	0.04	CWC27	0.01
PPP1CA	0.96	ADAM8	0.42	TRIP6	0.05	RBM41	0.02
PSMA2	0.97	CXCL1	0.42	CCK	0.06	RAB10	0.02
ABHD17A	0.99	METTL7A	0.42	SGPL1	0.06	RBM28	0.02
TGFB1	1.06	DUSP4	0.41	HSPA4	0.06	MDN1	0.02
SERPING1	1.09	C1R	0.39	CCT2	0.06	SBN01	0.02
G3BP1	1.18	STON1	0.36	HSPD1	0.07	BAG5	0.03
PPIA	1.21	C1S	0.36	S100P	0.08	PMPCA	0.03
PTBP1	1.23	TRIM47	0.33	PLBD2	0.08	UGGT2	0.04
GSK3B	1.25	SEMA3E	0.32	EGFR	0.08	HECTD1	0.05
IFITM3	1.27	ZBED2	0.32	UBL5	0.09	LARP7	0.05
ANXA2	1.29	C3	0.29	DHCR7	0.10	QSOX2	0.06
DDX5	1.44	MAF	0.28	ATP8B1	0.10	PUSL1	0.06
ARF1	1.46	BST2	0.27	EDF1	0.10	TIMM29	0.07
CAV1	1.46	SLC25A37	0.24	GLG1	0.10	COQ8B	0.07
FURIN	1.57	FEZ1	0.24	SNRPC	0.10	PSMD8	0.08
MARK3	1.59	BPGM	0.22	CNNM2	0.10	CYB5R3	0.08
RYBP	1.60	SLF2	0.19	ZMPSTE24	0.11	PRIM1	0.08
CTSL	1.88	FOXO1	0.18	MYCBP	0.11	GOLGB1	0.08
BCL2L1	2.06	CENPA	0.18	SERBP1	0.15	TOR1AIP1	0.09
FKBP1A	2.21	PDE5A	0.17	BRD3	0.15	CSDE1	0.09
STAT3	2.27	CORO1A	0.17	RTF2	0.18	DNAJC11	0.09
TPSAB1	2.66	PROS1	0.16	NUSAP1	0.18	TRIM59	0.10
MCL1	2.70	ITGA5	0.16	UBE2C	0.18	RAB18	0.10
BCL2A1	2.80	SLPI	0.15	VPS35L	0.19	PABPC4	0.11
SFTP4	5.65	POU2F2	0.14	DDX19A	0.20	GIGYF2	0.11
TMRSS11D	NA	CYP27B1	0.13	CDH1	0.20	TBCA	0.11
		DTD2	0.13	RANGAP1	0.21	MIB1	0.11
		SGPP2	0.12	LPGAT1	0.21	NGLY1	0.11
		S100A12	0.09	TIMMDC1	0.22	ERC1	0.12
		TNFSF14	0.09	ATOX1	0.22	ATE1	0.13
		CSGALNACT1	0.09	CDC42EP4	0.23	EXOSC2	0.13
		TNC	0.09	RPS28	0.23	NUP62	0.13
		COL8A1	0.08	CYP51A1	0.25	FKBP10	0.13
		PHTF2	0.08	TMEM230	0.25	GFER	0.14
		S100P	0.08	SPINT2	0.26	CEP350	0.14
		HCAR3	0.07	EXOG	0.27	AAR2	0.15
		WFDC21P	0.06	BRK1	0.28	CSNK2A2	0.16
		S100A8	0.06	SHH	0.28	RAP1GDS1	0.16
		SPTLC3	0.05	P4HB	0.28	LARP1	0.17
		VNN1	0.05	MORF4L1	0.29	ZNF503	0.17
		ANGPT1_4	0.01	NKAP	0.29	GCC1	0.18
		P2RY6	0.01	TPM3	0.30	NOL10	0.18
		GPNMB	0.01	SDHAF2	0.30	CUL2	0.18
		NR1D2	0.00	ELAVL1	0.31	SIL1	0.19
		LCA5	0.00	ARFGAP2	0.31	USP54	0.19
		S100A9	-0.01	IGF1R	0.31	CIT	0.20
		TUBA1A	-0.02	DBI	0.31	POLA1	0.20
		VAV3	-0.03	TFIP11	0.32	HDAC2	0.20
		MYLK	-0.03	RRM2	0.32	GPAA1	0.20
		IFITM1	-0.04	H2AX	0.33	ADAMTS1	0.20
		CFB	-0.04	TUBB6	0.34	NGDN	0.20
		DUOX2	-0.05	NUCB2	0.34	RAB2A	0.22
		PDZK1P1	-0.06	TGFBRAP1	0.34	REEP5	0.22
		OLFML2A	-0.08	PEX11B	0.35	SPART	0.22
		LTB	-0.09	YBX1	0.35	PITRM1	0.22
		EXTL2	-0.09	DDX17	0.36	RETRREG3	0.23
		PDK4	-0.12	AKAP12	0.36	CEP112	0.24
		NRCAM	-0.13	HMGBl	0.36	CYB5B	0.24
		RAB30	-0.13	RHBDD2	0.37	SLC30A9	0.24
		IFITM10	-0.14	HMCES	0.37	NDFIP2	0.25
		TRIML2	-0.15	MYH10	0.37	AKAP8L	0.25
		CXCL6	-0.15	ST14	0.37	NUP54	0.25
		MN1	-0.16	UBE2D2	0.38	TBKBP1	0.25
		GULP1	-0.16	XRCC6	0.38	CLCC1	0.25
		PI3	-0.16	SEPTIN10	0.40	AASS	0.26
		ALDH3A1	-0.16	SPC25	0.41	TRMT1	0.26
		IL36G	-0.17	TMPO	0.41	RDX	0.27
		C15orf48	-0.17	NEDD4	0.41	GOLGA2	0.27
		CYP4F3	-0.17	HYOU1	0.42	UBAP2	0.28
		ITGB3	-0.17	CCAR2	0.42	CNTRL	0.28

TGM1	-0.17	CDS1	0.43	CSNK2B	0.28
SLTRK6	-0.18	ALDH1A1	0.43	POFUT1	0.28
TCN1	-0.18	FOSL2	0.43	YIF1A	0.29
SPRR2E	-0.18	SDCBP2	0.43	AKAP8	0.30
RHCG	-0.19	PRPF3	0.44	PIGO	0.30
PRSS3	-0.19	SP1	0.46	FAM8A1	0.31
SPRR1A	-0.19	MET	0.49	MRPS25	0.32
OTUB2	-0.20	PABPC1	0.49	SUN2	0.32
SAA2	-0.21	SRSF1	0.50	POGLUT2	0.32
BIK	-0.21	YWHAZ	0.51	PPIL3	0.32
CDH10	-0.21	TUBA1C	0.52	EXOSC8	0.33
CREG2	-0.21	MICU1	0.52	TMEM39B	0.33
TFCP2L1	-0.21	PNPT1	0.52	TM2D3	0.34
HEPHL1	-0.22	KRT8	0.53	GOLGAT	0.34
PTPRZ1	-0.23	PDIA4	0.53	TUBGCP3	0.34
HSD17B3	-0.23	PGD	0.54	SNIP1	0.34
PPARGC1A	-0.23	TAPT1	0.54	FBN1	0.35
PADI3	-0.24	EPHA2	0.55	ERMP1	0.36
CCDC24	-0.24	HSP90B1	0.55	VPS11	0.36
SPRR2D	-0.24	PPP3R1	0.56	SLU7	0.36
PGLYRP4	-0.25	CANX	0.56	ALG5	0.36
LY6D	-0.25	OTUB1	0.58	AATF	0.37
ATG9B	-0.25	ITGAV	0.58	HS2ST1	0.37
CLCA2	-0.25	HMGB2	0.59	PRRC2B	0.38
S100A7	-0.25	DST	0.59	FBXL12	0.38
CRCT1	-0.26	HNRNPH3	0.62	INTS4	0.38
NCCRP1	-0.26	CTSA	0.62	AP3B1	0.38
PBX1	-0.27	HK2	0.63	POGLUT3	0.39
ASS1	-0.27	SDF4	0.64	SEPSECS	0.39
BLNK	-0.27	SPINT1	0.64	GOLGAT	0.39
STC1	-0.29	LSS	0.64	AP2M1	0.40
XDH	-0.29	H3-3A	0.64	PLD3	0.40
RHOV	-0.30	MRTFB	0.65	TCF12	0.41
KRT6B	-0.30	JUNB	0.65	HYOU1	0.42
SYT5	-0.30	PTK7	0.65	EMC1	0.43
KRT15	-0.30	ASNS	0.67	AGPS	0.43
KRT23	-0.31	HNRNPA2B1	0.67	WFS1	0.45
TUBB3	-0.33	HMGN2	0.67	NUP210	0.45
OSBP2	-0.33	DHX9	0.67	ITGB1	0.46
C1QTNF1	-0.34	GANAB	0.69	ELOC	0.47
MAP7D2	-0.34	ENO1	0.69	FASTKD5	0.47
ZNF488	-0.34	HNRNPC	0.69	HMOX1	0.47
VTEN1	-0.36	PPIB	0.71	CEP135	0.47
MYEOV	-0.36	GALK2	0.72	TIMM10B	0.47
TMEM171	-0.36	HNRNPR	0.73	FBLN5	0.48
BBOX1	-0.37	YWHAB	0.73	RRP9	0.48
PRELID2	-0.39	RAB6A	0.74	SRP54	0.48
FGF1	-0.40	ARPP19	0.75	VPS39	0.48
EFCAB7	-0.40	SON	0.75	EIF4H	0.48
PCDH7	-0.42	ATP6V1A	0.75	EIF4E2	0.49
NANOS1	-0.47	TKT	0.76	SRP19	0.49
PRKACB	-0.48	HNRNPK	0.81	PABPC1	0.49
SOX6	-0.50	HMGCS1	0.81	SRP72	0.50
RBM20	-0.52	PSMA5	0.82	UPF1	0.51
CXCL14	-0.57	TRADD	0.83	CRTC3	0.51
EPHA4	-0.57	CLINT1	0.83	ZC3H18	0.52
DBP	-0.58	CLTC	0.83	ERLEC1	0.53
ZP3	-0.65	KRT19	0.87	ALG11	0.53
CSF2	NA	NANS	0.87	G3BP2	0.54
MMP10	NA	HNRNPA3	0.87	CHMP2A	0.54
MMP13	NA	MRPS5	0.92	MARK2	0.54
SPRR2A	NA	HNRNPH1	0.95	TAPT1	0.54
KRT75	NA	PPP1CA	0.96	CHPF2	0.55
SLAMF9	NA	PDIA3	0.96	NUP98	0.55
MRGPRX3	NA	TOM1	0.96	NUTF2	0.55
KRT24	NA	ARF3	0.97	POR	0.56
MUC21	NA	ATP1A1	0.99	NSD2	0.58
MIR221	NA	MTPN	1.04	CLIP4	0.59
		SLC12A7	1.04	TLE5	0.59
		MAPK1	1.05	TLE3	0.60
		PANK4	1.05	HSBP1	0.60
		CTNND1	1.06	MOV10	0.62
		RHOA	1.07	BRD2	0.63
		SLC25A5	1.09	ZDHHC5	0.64
		WIP11	1.10	SDF2	0.64
		GAK	1.11	MAT2B	0.64
		HSPA5	1.12	SLC30A6	0.65
		SLC12A4	1.13	ARL6IP6	0.65
		KRT18	1.15	AKAP9	0.67
		PSAP	1.15	PLAT	0.70
		NAP1L1	1.18	RAB8A	0.70
		HEXA	1.19	TUBGCP2	0.70
		NEU1	1.20	GDF15	0.70
		PTBP1	1.23	MTCH1	0.72
		CYFIP1	1.25	POLA2	0.72
		MARCKS	1.28	NIN	0.74
		SQOR	1.28	RNF41	0.74
		ANXA2	1.29	ARF6	0.74
		TK1	1.29	RIPK1	0.74
		LPIN2	1.33	ATP6V1A	0.75
		CDV3	1.37	COMT	0.80
		ERAP1	1.39	PIGS	0.81
		TMBIM6	1.41	AP2A2	0.81

COLGALT1	1.44	GCC2	0.82
SPCS3	1.46	MAP7D1	0.82
CCDC47	1.55	IL17RA	0.82
GGCX	1.61	WASHC4	0.82
APLP2	1.65	TOR1A	0.82
NOP10	1.67	SELENOS	0.84
CPD	1.81	STC2	0.88
PLSCR1	1.85	MRPS5	0.92
MYL12B	1.99	BRD4	0.92
SDC4	2.10	GORASP1	0.93
ATP6V1B2	2.11	RTN4	0.96
LAMA3	2.20	LMAN2	0.98
HPGD	2.36	ABCC1	1.00
CD74	2.40	LOX	1.00
TMEM165	2.47	OS9	1.03
NPC2	2.55	SLC44A2	1.03
RPS6KA3	2.60	RBX1	1.04
TFRC	3.14	GRIPAP1	1.05
GPC3	3.56	DNMT1	1.05
RAB11FIP1	3.96	UBAP2L	1.06
AFP	NA	RHOA	1.07
SCO2	NA	ACSL3	1.09
		PPT1	1.11
		HEATR3	1.12
		GNB1	1.14
		TBK1	1.15
		ZC3H7A	1.15
		RAB14	1.15
		ERGIC1	1.15
		G3BP1	1.18
		NEU1	1.20
		MOGS	1.22
		RAB7A	1.22
		ANO6	1.25
		ATP13A3	1.28
		EDEM3	1.32
		DCAF7	1.35
		NUP58	1.40
		COLGALT1	1.44
		ERP44	1.48
		PLEKHF2	1.48
		DPY19L1	1.48
		RAB5C	1.49
		FAR2	1.50
		DDX21	1.53
		RAB1A	1.55
		MARK3	1.59
		GGCX	1.61
		GPX1	1.68
		LARP4B	1.96
		FKBP15	1.98
		TMED5	2.08
		ATP6AP1	2.17
		SLC30A7	2.17
		GNG5	2.17
		PVR	2.29
		STOM	2.45
		ADAM9	2.53
		NPC2	2.55
		GLA	2.62
		RALA	3.10

Table S2. Additional virus target lists for comparisons with SARS-CoV-2 targets.

Gene trapped
MAPK1IP1L, RAB30, ARL6IP1, SNORD26, PDLIM1, SYNPO, ZMYM5, CCDC80, ARMT1, RPL29P2, AP2S1, SNORD81, CDH17, PSMA3, MAP7D1, MAPT, HAVCR1, LNX2, RBMX, NANOGP4, HERC4, RMI1, HNRNPF, FAM200B, MBD6, CDH9, MAP2K5, DLX2, ACLY, LIPH, STMN1, MIR22, HSP90AB1, MIR7-1, CBX5, RPL18AP3, AIF1, DRG1, ARL3, NPEPPS, BMPR2, RPL35A, MTAP, RAP2A, FNBP4, ATP6V1A, CEP95, TRBV9, SF11, HSP90AB4P, DUSP16, AHCY, HLA-DMA, DNAJB9, FKBP7, RAB13, NADK, RPL22L1, CD70, MBNL3, DDX18, MIR21, SERP1, DDX10, CNPY3, STEAP4, FRG2, MCTS2P, GAN, TMEM108, C17orf75, GASK1, CEPL, SNORD36A, PDE4B, ITPRIP, LIPC, PKP1, ARHGAP27P1, MATR3, SNORA3B, SLC51A, BST1, F3, USP10, DAB2, HSPD1, MARCHF7, RFWD3, SNORA6, SNORA8, MALAT1, CLEC2D, NPFFR2, SNORD25, THRAP3, TACK1, RCC1, SNORD60, SYNPR, POLH, SNORD5, ZWILCH, IST1, ITGB1, SLC39A14, NAP1L4, WDR5, ARF4, DMTF1, GART, HSPE1, SNORD93, POU5F1P5, SLC3A2, KAZN, SNORD43, AKT2, RMND1, ZNF131, RSL24D1P4, AZIN1, FLVR2, USP9X, POLR1D, LGALS2, KATNB1P2, CSGALNACT2, SNORA38, AK5, SEC31A, SNORD17, SEMA7A, SLC01A2, DNAJ1A, CALD1, TOMM7, DSCAML1, GASS, MIR1227, B2BC19P, MTF2, BOLA1, GPR15, INHBA, NPAS2, PRR15L, SNORA73A, TCF25, FGL1, CHMP1B, DLEU1, PTPRM, GALNT4, C18orf32, PLIN2, SRRM1P1, RBM39, DDX42, ARL6IP5, NECTIN3, CPEB4, RPL35, ZNF827, HNRNPK, HIPK3, RPL7AP14, SERAC1, SMURF2, FHL2, SNORA3A, COMM1, JUNB, NUMB, MICAL2, ZNF362, CCM2L, SMAD7, DLEU2, NHL51, TRAF7, CSM2D, PPP1R10, CHN2, CHEK1, BZW2, GRB2, CABOCO1, LINC02731, RPS2P29, SUPV3L1, ZNF7, FNDC3A, EIF5, PPP1R2B, CASC8, ZDHHC22, TEM2, PHGDH, SNORD76, RPL17, ZFX, FTH1, E2F2, ZNF207, GIGYF1, AGAP1, EIF4B, ZBTB43, EIF1, CD200R1, PSMA4, SRSF10, HGD, IL6ST, SNORD58A, HNF1B, HNRNPL, OPCML, DCAF6, WDR25, TRB, MGM1, RPRD1A, OSER1, CANX, SEMA3C, SNORA19, POP7, TCTA, GATA4, TPA, NAP1L1, MAP4, PREPL, TOB2, CAMKMT, AP1G1, ATAT1, STH, B3GN75, LINC00907, DDT13, TWISTNB, CALM2, GTF2H5, RSPH3, TASOR, SNORD31, TMBIM6, PLCB3, MRPS18B, SLC5A7, PFAS, SAV1, DYRK1A, WDR74, PPARG, BBS7, ABCA4, C11orf54, CPS1, RPL34, SHISA6, HNRNCP, CELSR2, MRPL45, CRYZ, ADGRA3, SNORD29, TRIM66, TAF1, SNORD83A, SRP19, RPL62A, PRRC1, SPATA19, CBLN2, CLTC, SM6C, STA2, SRSF3, BRD2, APTX, DNHA2, NPTX1, CYP11A1, AREG, SRSF1, SNORD79, RYK, C5TF2, CLDND1, MYH9, SNORA73B, TAF4, CEP170, ACRV1, SNORD139, POC1B, ATP6V0C, SNORD36B, MIR107, S100A6, SEMA3F, SNORD58C, ADAM10, ASB6, KLHL24, SNORD24, PSMA7, SNORD58B, ECT2, SNORD74, SMIM14, TRIM13, ANXA2, VPS33A, PAIP2, RPL3, IL18, ABHD5, RPL4, CCDC57, XPO5, APBB1P, HDAC9, USP45, RPF2P1, PMV1, ANO1, SNORD78, KRT8P14, CSR1, FKBP8, KALRN, ARHGEF3, ALX, JADE2, MGAT1, NXPE3, TUBA1B, ZMYND8, SPEN, RPS12, MANBAL, TM9SF4, UBA52, MGAT3, IGF2R, EEFSEC, G2E3, H2C21, C11orf54, CPS1, RPL34, SHISA6, HNRNCP, CELSR2, MRPL45, CRYZ, ADGRA3, SNORD29, TRIM66, TAF1, CEP55, SFXN2, SNORD18C, RAB3B, SNORD36C, EID3, PBRM1, CTC1, SNORD6, WTAP, IQCG, SCN11A, SRC, MOB4, FOSL2, PLEKHJ1, SLC35E2B, TMEM14C, HNRNPU, POMZP3, TMEM207, MTO, TTC23L, TEK21P, MYL12A, RLNS, EHD1, SNORD18B, DNAJB2, LINC00216, RPS3P1, TGF1, KCNIP4, PARD6B, MPC2, GTPBP8, ANXA3, SNORD30, SYT19, GRAP, TTR, RAP2C, RPSA, COL1A1, SNORA70, PPM1A, RHOA, AIMP1, DHX9, FKBP4, MIR155, NFIC, PNISR, TYW3, CAV2, RPL27A, SNORA54, SNORD101, SNORA28, ZBTB20, WDR81, SNORD104, AHR, POU3F3, SINHCAF, H2AC3P, SNORD44, SNORD22, EEF1A1, MAPKBP1, LGALS3BP, RPS16, RBMS, ZC3H4, NTRK3, RPS10, RAB5C, ROR1, MICALCL, RPL28, MIR632, PLD5, YPEL2, SNORD1, KNCN1, C11orf54, GDF15, SMC3, MIR17, TES, EBNA1BP2, PTS, ANXA4, AIMP1P1, SELENO1, ALS2, NIBAN2, MIR192, TXNRD1, PTPRK, CCT4, DUSP5, ANXA1, IOP7P2, GUCD1, RSL24D1, SNORA25, SNORD28, JAK1, SLC44A3, SNORD3B-2, RAB9A, ABC4, BABAM2, PINX1, MIR1208, RPS18, FTSJ1, KMTE2, NQO1, NAV3, BRD3, PPP1R9A, SLC51B, SNORA74A, KIF13B, PUM3, KYNU, THAP5, KCTD1, CUX1, IPO9, SNORD18A, JUND, LIMCH1, GLRB, ARID4A, SF3B4, STK35, CEP152, TM4SF1, KAZALD1, MIR22HG, EIF3A, RPS9, C6orf62, DHX8, ZC3H10, GALNT7, PPIA, TTC9C, SREBF2, NYFA, YWHAZ, UBIAD1, GC, CYP8B1, GTF2E1, BCL3, SNORA13, SGMS2, RPL37, SRSF11, CNGC1, TTF1, PROX1, STAR57, FBXL5, LY86-AS1, CLMP, PHF23, SNORA62, RAB3P1, LY86, SNORA40, RPL10P19, LM1X2, SYNG1, ERBIN, PKN, TCTC, E1F3B, SFXN5, HP1BP3, SPATA13, ZBTB37, DDT14, CDC123, HM13, ARF6, T1B1, PPP1R3E, ME1, RPL15P21, AMOTL2, PROM1, RRAGA, E2F7, HNRNPA1, POSTN, RPS15A, HTRA1, SNORA32, KDM6B, TPM1, SNORA18, FND1C, RPS18P14, PDCD10, SLCA52A5, MIR1204, SNORA50C, SNORD16, GLUD1, FUT4, GOLGA2, RPTOR, SNX5, HNRNPH1, SNORD77, MIR194-2, N4BP2L2, NFKBIZ, TRIM52, RPL38P4, SLC1A3, EPB41L2, SNRPD3, XPO1, SNORD27, SON, MIR1206, DARS2, TAPT1, SKIL, RDX, MTMR11, MYC, CENPU, TAF1D, RPL27, CLUL1, PTRH2, ANKMY2, ATP6V0A1, KRT86, SF3A2, CCDC134, ARSA, CNTN5, PCID2, TSGA13, SOX7, RPL29, MIR501, H2CB10, MIR1304, DCP1A, RCAN1, RAB1A, C14orf93, PABPN1, RABL3, ATOH8, LINC00473, RPS10P2, RPL41, MACROD2, GLIS2, RBM3, CCNA2, STX6, SNORD47, COA4, DDX5, SLCO2B1, WIIF2, ADGRF3, SNORD80, HSD17B7P2, ARHGAP29, MTHFD1, RIN2, ERGIC1, ID3, SC5D, INO80, RN7SL2, H2C18, TOR1AIP2, FKBP2, NAA50, TSPY1, EMID1, CLIC4, RPL34-DT, KLK3, WDR48
RNAi
EIF1AY, HID1, AGFG2, RASSF1, TRIM32, ZNF516, ATP6V1C1, GTF3A, LIN7C, CNNM1, GCA, SFTPB, RPS6KA2, PSMD4, GPT2, KRTCAP3, MAEA, IMP4, LNX2, ATMIN, TNIP1, XCRC5, SOAT1, NUP155, HNRNPF, SNX4, OXSR1, CCDC74B, EVC2, CTSV, APC2, UBL5, ST6GALNAC6, COPS6, MOGAT1, TRAK1, SIRPA, SLC35A2, MID1P1, FAM76B, FRMD8, T2BC15, DDX50, B4GALT2, FAM178B, ZNF182, CTSB, SCD, XAB2, EPRS1, PTGES3, DNAJB1, RNPS1, ADAMTS5, ELMOD1, MAP2K3, HSPA5, DDX10, SSH3, C9orf131, WFDC9, MTURN, KCNH3, IGKC, TIMM17B, CLK3, ATOX1, FIBCD1, WIF1, LCE3C, CDK4, GTF2A1, CHMP4C, CKLF, GBF1, TNS4, NUP210P1, ZNF154, HYAL4, DOK6, UFD1, EIF3C, TAOK1, ZNF831, CHAF1A, CACTIN, LRRQ1, ATP6V1H, SDC3, ZC3H15, ER12, TPM4, VAPB, PPM1N, CARMIL1, SNRPA, BAZ1B, HMGFB, CYP4F11, NOCA6, ARPC1B, STARD5, RBFXO2, COL2A1, ATP6V1B2, CCDC74A, SNRNP70, TT3C, STK39, RAB1C, CHST12, TMEM37, TOM1, FAM174B, EPB41L4A-DT, PRPF6, CRTC2, NUP54, TLK2, PTGDR, WAC, DUSP12, STX12, POLR2L, ANKR6D, CXCR4, ETHE1, AGTRAP, EGF, SP110, INT56, COMMD3, PNRC1, GM2A, TNFRSF4, PKN2, RNF144B, SPDL1, GMPPA, NGLY1, DOCK10, THOC2, DAPK2, SOX13, NAALAD1, MAP2K12, PSA2, SHCBP1, ILDR1, GRIN2B, USP42, NBN, ADAM17, MAP3K7, PLPPR4, PSMD11, DPM1, ARID1A, SRRM2, NOCT, CD58, CHST5, TAZ, SERBP1, PTPR, VPS28, BPIFC, ZNF536, LDB1, MTHFSD, SLC1C10A, PSMC5, CACNG1, TOMM70, HUWE1, PEMT, KCNJ3, CGREF1, FZD4, PERP, CAMKK2, KCNK3, PRKC1, CALCB, ANKR27, AQP4, ITGB3, CHMP2B, B3GLCT, ANKRS6, OSMR, RAB7, WDR77, HERC6, DUSP27, RPS20, CLEC10A, SLCA48A, ITGA3, LMNT2D, RNF216, GRM2, SERPINB2, NCOR2, TEK1, RNF170, S100A1, MT-ND4L, IDH1, NTSR1, IKBKG, PCDH2A, ERCC5, RTL5, PCCB, CLNS1A, RNF207, PRD10, CDC42, STAC3, MICAL3, UBE2I, FASTKD5, SPDEF, MYRF, SIK1, OPN4, UBE2J1, CHST1, AKTIP, FCGRT, POLR2J2, B2M, QLFLM2B, ABLIM1, FGFR4, ABLIM3, SLU7, CREB3, FBXW11, PABPC1, ORAI1, EPS8L3, H3C12, OR10H4, PSCA, FPGS, NACA2, FAM104B, TRIM21, GAB1, PSORS1C2, RABGEF1, SLCO2A1, CMVC2, VPS33B, NUP43, CTSZ, UPK3A, SAP30P, ST6GAL1, IMPDH2, RAN, TOP1MT, TMTC1, CALCOCO1, ZIM2, TRIM8, NOM1, GPD2, AMMECR1, ZNF608, TNFRSF18, RAB29, DNAL1, KHLN1, TCOF1, LONP2, YEATS4, KPNN1, NOL12, VPS4A, SYNGAP1, TBL1X, SMARCD3, DDX39B, TPSAB1, ATG16L2, EPAS1, LARP1, L1TD1, RPS3A, SF3B2, ZFAND3, DMRT2C, FBXW10, TRHDE, KCTD14, SMPD1, TGFB1, H3C7, TM9SF2, C1orf159, VPS35, LY6E, SOCS1, CCBN2, ZMPSTE24, ROCK1, ENTPD8, SGCA, AP1M1, R3HDM1, GTF2H1, SNRCP, ANKR28, MGAT1, MAP1LC3C, GSK3B, ZCCCH17, PNLIIPR1, ANKR23, LIMK2, MED17, IQUB, HSP1A, MMP9, NR2F1, ATP6V0A4, II9R, ICAM1, ZNF747, CLEC4C, IQSEC1, DGAT1, LRP11, SIAH2, RAB8A, IL411, NOX1, POLA1, CSNK2A2, SNRPF, SRSF8, ATXN7L3, FAM226A, HNRNPA8, PIK3CA, ERCC1, SEC16A, HNRNPU, CNTN3, PPP2R1A, EIF3F, AFM, SRRT, CHUK, CCR2, MRS2, MYOD1, RAB1, CDK10, SLC6A19, INT5, FNTA, BRINP2, PVR, NUP98, AMOTL1, OTUD1, PRSS35, ARNTL, CIT, ZNF587, POLR2A, ZBTB3, EIF2AK4, BTF3, POLR3A, GPN3, RAB43, PILRA, NOL6, HOXC12, MARCO, RNF10, PLAU, C3orf56, ZNRD1, PCP2, TMED10P1, C4orf33, RELA, MND1, NCL, ARGLU1, PPAN, AEBP2, MARK2, PPIR14D, RAPGEF2, RPS4X, GSR, SELENO1, FOXQ1, ZNF292, PIGH, DYNC11, CLIP3, FGFR1, ASXL2, CSPP1, CCDC51, JAK1, SYMPK, TEAD1, RBM20, COX5A, GOLGA1, TNPO2, DVL2, LTb, CXCR6, MRPL10, TARBP1, C2P, MANBA, EGFR, PSIP1, C16orf72, HAMP, STX2, HRK, SLC9A6, CRYAA, EIF3A, UMP5, CCDC28B, SUMO1, CPLX1, ARID1B, STX10, NX2, NUP62, SHD, IRF3, EFTUD2, OSBP6, REEP5, SH2B1, ATG12, RAD18, TLE5, ZDHHC11, HES1, PURA, FRK, ISG15, LXN, KCNJ11, TAS2R1, KPN2A, JAK2, NLGN4X, BCAP31, RPSO3, TCF5, PDCD6P, AKAP13, MAGEA9, NOSTRIN, OR51T1, RUNX1, CYP4A22, AP3S2, TPPP, ATP6V0B, CLEC4A, ARHGEF10, KIDINS220, SLC10A3, PGLYR3, SYVN1, MIR1821B, THRSP, PRSS7, ATP6V1G3, DCAF1, GH2, NPF1, FAM13C, CSNK1A1L, ZNF337, SPG7, SEPTIN5, SNRPA1, RAB5A, RGS2, RTBDN, TOP2A, PDZD7, CFAP43, CBX1, RAPGEF1, CDC42EP3, HSF4, LINC00208, BRCA1, HNRNPH1, SP1, MATN4, PPP2R5E, MED4, CHORDC1, PEPD, SLC52A3, MPHOSPH6, EXOSC5, PKLR, CD48, TCTEX1D2, DLG2, A4GNT, SLC24A1, HSPBP1, SPC51, TRIP11, SLC25A27, EEF1D, SLC6A8, PDSS1, SEPTIN4, THRA, YAP1, DCST2, USP11, CST5, DHCRT7, RPL15, POLE, TUBA8, COPB1, SCGB1C1, AP2A2, PCDH5B, MED7, WBP4, PGK2, RAB3D, FAM209A, ZNF467, TRPC4, ITSN2, TBC1D20, EIF3H, COPZ1, SPC52, NXNL2, GPC3, MYOB, KANSL1, ACACB, ZDHHC20, CFHR5, TRAPP1C, DDX5, STK33, RB1CC1, CYCS, CRYAB, DDOST, CDC6, SUZ12, MPD2, G3BP1, ARFGEF1, KIF3C, GRINA, CYP46A1, GRK5, CHST13, BSG, ATP5PB, RETN, HTR4, FAM13B, NOTUM, PRPS2A, SYNCRI, TGDS, NEK9, PIK3R4, KSR2, DDIAS, FCHO2, UBASH3A, LSM3, TBCD, POLR21, TBK1, KCNK12, CEBPB, SPATA4, TNFRSF14, PSMB6, CDO1, KIF4A, KXD1, CARNS1, UBE2H, MMP13, COG2, POTE, TBX2A2, SIK3, RND1, GEMIN2, TRAF2, SFXN3, ATP6V1G2, CTBP1, TSSK6, HDAC1, STXB1P1, PCDHG4, HUNK, CLTA, UBE2B, ONECUT1, SCNA3, EPHB4, LRIF1, CRAMP1, DDX23, HAVCR2, THAP7, NAB1, PVALB, GORASP2, SCFD1, EPHB2, H3-4, HACD3, ALAD, RIPK2, RANBP2, ACTR2, GLCE, RBM14, HMGR, SPAST, EGR2, TRM29, TWIST1, RAB28, SEC61A2, CDC3A, TFAP2A, OR8K1, LACRT, PCSK6, CHMP4A, MARK1, GSX1, BLK, NR3C1, DDAH1, OR6S1, DDO, KDM7A, EFHC2, PRR12, SP100, CYB5R4, CD300BL, TXNDC11, TIAM2, DMXL1, DERL2, CAPN9, MUC2, SETD7, MDN1, SLC5A12, TSC22D1, SLCO5A1, SEC14L1, CCT6A, LCP2, RPS6KL1, HSF1, FLII, COQ8A, HOPX, HOXB13, PM20D1, STX18, BRDT, STAB1, PLA2G4D, MYOZ1, OTUD3, EPS8, FBFI, KLF12, MRPL24, NPSR1-AS1, VPS11, DYSF, LY6D, FBXO38, SBF2, CXorf21, CSE1L, BICD2, AB1, NF2, MLXIP1, KCNK10, SGK1, UPK3B, TM6SF2, LY6G6C, PGM1, F11R, GALC, PRDM7, PHF3, CLTB, RANBP1, EXOSC3, LSM14B, COG4, CD4, TMEM13L, PFKL, SLC2A13, CD3EAP, KRT4, TIAL1, CST3, GRIN2C, GPR182, CNOT3, NDUF53, PCDH13, AAK1, ATM, TDG, CDK20, LTK, INMT, DERL1, UQCRC2, MRPL42, EIF5B, TFE3, NECAB3, M1CB, TPRX1, SNRPD1, TCF3, ARPC2, PRPF31, SNX6, PBK, MIR122, ZNF12, HCCS, HERC1, BACE2, PSKH1, ZBED5, CFLAR, SUMO4, H2BC12, SLC9A3R2, SSB, CTSW, PSMC3, DENND1B, CCNB3, CD164, ERC2, ENGASE, PRPH2, RFP2, RNF152, PANK4, SHISA2, WDR83, BCL9, TRIM28, SMIM8, ZDHHC16, TRPM3, RAB6B, SELPLG, THBS1, TEAD3, HTATIP2, KCNK6, BCKDHA, MAGEA6, CAPN2, ARHGEF28, EXOSC10, HIPK1, PSEN2, LRRK1, MAP2K2, PLD2, ARAF, CAMK2B, NLGN3, XRC34, PIK3R5, POU3F2, MAP4, MR1, CKN4K, RAB10, CPN2, TRMT61A, 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PCGF6, SNX7, DCBLD1, SAP18, RING1, RTN2, HRC, VEGFB, MRPS12, DIMT1, HDAC7, IL36G, DQX1, PRRT1, LSM4, CDC42BPP, CLEC4M, IPO7, DPY5L, TBC1D10A, CPSF4, SP6, SPPL3, MRPL48, RPS14, NOS1AP, TER2F, ARHgap22, ATP6V1B1, DAB2P, RAB18, BCAS2, KDM4D, PCDH18, SUCLG2, BAG6, ARHGAP9, NBEAP1, RPS5, MYO7B, DT4X, GJA3, MAML1, RPTN, CHMP4B, RACGAP1, HSPA4, ISG20L2, RSPH4A, CAPN1, ZNF2, YTHDC2, KIF17, CBL11, SAP130, CEACAM6, DDX28, UBE3A, ATP6V1E1, KHSRP, PRFNG, CLUAP1, CLK1, NAA10, SUB1, PUS1L, PDLM1, OTUD5, ANPEP, KPN46, PDI43, NDUFAF2, SN9X, ATP6V0D1, NAPA, GDP55, SRMS, PCDHGA1, TARBP2, GAB3, ADRA1D, APOE, LPL, NRG1, UBE2N, NXF1, TUBB3, NTRK2, RBBM42, CDK7, IRF1, EIF3D, GAK, OSBPL3, HMGCS1, RAB11B, DDR1, ELAVL1, EP300, IQGAP1, USP26, ZNF550, CDK9, CHML, WWTR1, NCOA2, RPL5, PLK3, HGS, ACTL6B, MAN1A1, COPA, WFDC13, DPYD, DYNC1H1, TRIM63, ZNF366, GCNA, MOS, PTDS11, HMNC2, SLAMF1, SIIX4, SNX10, SF3A1, COP1, MAML2, EIF5A, H1P1, HSPE1, SMYD3, H2AC7, SPTBN2, YWHAB, VAPB, BAZ1B, H2AC20, SNRPA, H2BC1, HYOU1, 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Co-IP+LC/MS	
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Table S3. Disease-associated genes.

Pan-cancer

ABI1, ABL1, ABL2, ACKR3, ACSL3, ACVR1, ACVR2A, AFDN, AFF1, AFF3, AFF4, AKT1, AKT2, ALK, AMER1, APC, APOBEC3B, AR, ARHGAP26, ARHGEF12, ARID1A, ARID1B, ARID2, ARNT, ASPSCR1, ASXL1, ATF1, ATIC, ATM, ATP1A1, ATP2B3, ATR, ATRX, AXIN1, AXIN2, B2M, BAP1, BARD1, BAX, BCL10, BCL11A, BCL11B, BCL2, BCL3, BCL6, BCL7A, BCL9, BCOR, BCORL1, BCR, BIRC3, BMPR1A, BRAF, BRCA1, BRCA2, BRD3, BRD4, BRIP1, BTG1, BTB, BUB1, CACNA1D, CALR, CAMTA1, CANT1, CARD11, CARSI1, CASP8, CBFA2T3, CBFB, CBL, CBLC, CCDC6, CCNB1P1, CCND1, CCND2, CCNE1, CD274, CD74, CD79A, CD79B, CDC37, CDH1, CDH11, CDK12, CDK4, CDK6, CDKN1B, CDKN2A, CDKN2C, CDKN2D, CDK2, CECPBA, CHCHD7, CHD4, CHEK2, CIC, CIITA, CLIP1, CLTC, CLTCL1, CNBP, CNOT3, CNTRL, COL1A1, COL2A1, CREB1, CREB3L1, CREB3L2, CREBBP, CRLF2, CRTC1, CRTC3, CSF3R, CTCF, CTNNB1, CXU1, CXCR4, CYLD, DAXX, DCTN1, DDB2, DDT3, DDR2, DDX10, DDX3X, DDX5, DDX6, DEK, DICER1, DNAJB1, DNM2, DNMT3A, DROSHA, EBF1, EGFR, EIF3E, EIF4A2, ELF4, ELK4, ELM4, EP300, EPAS1, EPS15, ERBB2, ERBB3, ERBB4, ERC1, ERCC2, ERCC3, ERCC4, ERCC5, ERG, ESR1, ETNK1, ETV1, ETV4, ETV5, EWSR1, EXT1, EXT2, EZH2, EZR, FANCA, FANCC, FANCD2, FANCE, FANCF, FANCG, FAS, FAT1, FAT4, FBXO11, FBXW7, FGFR2B, FGFR4, FES, FEV, FGFR1, CEPR3, FGFR2, FGFR4, FH, FHI1, FIP1L1, FLCN, FLI1, FLT3, FLT4, FOXA1, FOXL2, FOXO1, FOXO3, FOXO4, FOXP1, FSTL3, FUBP1, FUS, GAST, GATA1, GATA2, GATA3, GNA11, GNAQ, GNAS, GOLGA5, GOPC, GPC3, GPHN, GRIN2A, H3-3A, H3-3B, HERPUD1, HEY1, HIP1, H3C2, H4C9, HLA-A, HLF, HMGA1, HMGA2, HNF1A, HRNPAA2B1, HOOK3, HOXA11, HOXA13, HOXA9, HOXC11, HOXD13, HOXD11, HRAS, HSP90AA1, HSP90AB1, IDH1, IDH2, IGH, IGK, IGL, IKBKB, IKZF1, IL2, IL21R, IL6ST, IL7R, IRF4, IRS4, ITK, JAK1, JAK2, JAK3, JUN, KAT6A, KAT6B, KCNJ5, KDM5A, KDM5C, KDM6A, KDR, KDSR, KEAP1, KIF5B, KIT, KLF4, KLF6, KLLK2, KMT2A, KMT2C, KMT2D, KNL1, KRAS, KTN1, LASP1, LATS1, LATS2, LCK, LEF1, LIFR, LMNA, LMO1, LMO2, LPP, LRIG3, LRP1B, LYL1, LZTR1, MAF, MAFB, MALT1, MAML2, MAP2K1, MAP2K2, MAP2K4, MAP3K1, MAP3K13, MAPK1, MAX, MDM2, MDM4, MECOM, MED12, MEN1, MET, MITF, MLF1, MLH1, MLLT1, MLLT11, MLLT11, MLLT13, MLLT6, MN1, MPL, MRTFA, MSH2, MSH6, MS12, MSN, MTCP1, MTOR, MUC1, MUTYH, MYB, MYC, MYCN, MYD88, MYH11, MYH9, MYO5A, MYO1, NAB2, NBN, NCOA1, NCOA2, NCOA4, NCOR1, NCOR2, NDRG1, NF1, NF2, NFATC2, NFE2L2, NFIB, NFKBIE, NIN, NKX2-1, NONO, NOTCH1, NOTCH2, NPM1, NR4A3, NRAS, NRG1, NSD1, NSD2, NSD3, NT5C2, NTRK1, NTRK3, NUMA1, NUP214, NUP98, NUTM1, NUTM2B, NUTM2D, OLIG2, P2RY8, PAFAH1B2, PALB2, PATZ1, PAX3, PAX5, PAX7, PAX8, PBRM1, PBX1, PCMV1, PCDCD1LG2, PDE4DIP, PDGF, PDGFR, PDGFRB, PER1, PHF6, PHOX2B, PICALM, PIK3CA, PIK3CB, PIK3R1, PIM1, PLAG1, PLCG1, PML, PMS2, POLD1, POLE, POLQ, POU2AF1, POU5F1, PPARG, PPFBP1, PPP1MD1, PPP2R1A, PPP6C, PRCC, PRDM1, PRDM16, PREX2, PRPF1, PRKACA, PRKAR1A, PRRX1, PSIP1, PTCH1, PTEN, PTK6, PTPN11, PTPN13, PTPRB, PTPRC, PTPRK, PTPRT, QKI, RABEP1, RAC1, RAD21, RAD51B, RAF1, RANBP2, RAP1GDS1, RARA, RB1, RBM10, RBM15, RECOLQ4, REL, RET, RHOA, RHOM, RM2, RNF213, RNF43, ROS1, RPL10, RPL22, RPL5, RPN1, RSPD2, RSPD3, RUNX1, RUNX1T1, SALL4, SBD5, SDC4, SDHA, SDHAF2, SDHB, SDHC, SDHD, SET, SETBP1, SETD2, SF3B1, SFPQ, SFRP4, SH2B3, SH3GL1, SIX1, SLC34A2, SLC45A3, SMAD2, SMAD3, SMAD4, SMARCA4, SMARCB1, SMARCD1, SMARCE1, SMO, SND1, SOCS1, SOX2, SPEN, SPOP, SRC, SRSF2, SRSF3, SS18, SS18L1, SSX1, SSX2, SSX4, STAG2, STAT3, STATUS5B, STAT6, STL, STK11, STRN, SUFU, SUZ12, SYK, TAFF15, TAL1, TAL2, TBL1XR1, TBX3, TCEA1, TCF12, TCF7L2, TCL1A, TENT5C, TERT, TET1, TET2, TFE3, TFBF, TFGFR2B, TLX1, TLX3, TMEM127, TPMRSS2, TNFAIP3, TNFRSF14, TNFRSF17, TOP1, TP53, TP63, TPM3, TPM4, TPR, TRA, TRAF7, TRB, TRD, TRIM24, TRIM27, TRIM33, TRIP11, TRRAP, TSC1, TSC2, TSHR, U2AF1, UBR5, USP6, USP8, VHL, WAS, WDCP, WIF1, WRN, WT1, WWTR1, XPA, XPC, XPO1, YWHAE, ZBTB16, ZFHX3, ZMYM2, ZNF331, ZNF384, ZNF521, ZRSR2

BCLC

PTPRU, RBM5, ADAM10, CDKN1A, CDKN1B, STAG1, CDKN2A, NDRG1, CARM1, ARFGEF2, PAIP1, TXNIP, CTCF, STAG2, SF3A3, CHD3, CHEK2, CLTC, KLF6, CREBBP, CTNNB1, DDX3X, DDX5, DHX15, ATN1, EGFR, EIF1A1X, ARID2, EIF4A2, EIF4G1, ELF1, MUC20, EP300, ERBB2, ERCC2, AKT1, MECOM, BPTF, DIS3, CCT5, CNOT1, ARHGP26, CLASP2, CIC, ZFCR2, FLT3, TBC1D12, MGA, ACSL6, FN1, DICER1, SF3B1, SUZ12, MTOR, FUS, AFF4, GNAS, C3orf70, GPS2, ANK3, SETD2, HLA-A, FOXA1, APC, HRAS, HSPA8, HSP90AA1, HSP90AB1, IDH1, IREB2, TNPO1, RHOA, RHOB, RPSAP58, SMAD4, MAP3K1, MAP3K4, MET, MLH1, MYH10, MYH11, NALP1, NCF2, NFE2L2, NOTCH1, NRAS, NUP98, PCSK6, LIMA1, CDK2, PIK3CA, PIK3CB, ATR, PCDH18, BCOR, FBXW7, ARFAP1, CCAR1, ERBIN, NUP107, PTEN, ARID1B, TAOK1, RAD21, RASA1, RB1, ACTB, RXRA, CLSPN, BLM, SFPQ, BMPR2, SOS1, SOS2, BRCA1, BRAF, ZFP36L1, ZFP36L2, STK4, TAF1, KLF5, TBX3, TGFBR2B, ACTG1, TP53, TP53BP1, TRIO, TSC1, ZNF814, KDM6A, EZR, ZMYM2, CSDE1, BTG2, CAD, AHNAK, TBL1XR1, CEP290, CHD9, SMC1A, ARID1A, CAST, BAP1, SNX25, PIP5K1A, HORMAD1, CAP8S, PHF6, CUL2, CAT, MAP4K3, IRS2, CCND3, COP5, TAOK2, FOXQ1, EIF2AK3, NCOR2, AQR, BCLAF1, KEAP1, MED24, SETDB1, SEC24D, G3BP2, GOLGA5, THRAP3, MED12, CDH1

BRCAl

TOM1, MICA, PTPRU, AKAP9, RBM5, CDKN1B, STAG1, NDRG1, CARM1, ARFGEF2, AKAP3, CTCF, STAG2, STIP1, CHD4, CHEK2, CLTC, DCAF4L2, RAB40A, CSNK1G3, DGKG, DDX3X, DDX5, DHX15, ATN1, EGFR, EIF1A1X, ARID2, EIF4A2, EIF4G1, ELF1, MUC20, EP300, ERBB2, ERCC2, AKT1, MECOM, BPTF, DIS3, CCT5, SPEN, CLASP2, CIC, FLT3, ADGRL2, MGA, ACSL6, FN1, SIRT4, SF3B1, ATP6V0D2, ASPM, GATA3, FOXP1, GNAS, GOT1, SLC9A9, GRIK3, APC, IDH2, TRIM23, KRAS, ARNTL, SMAD2, SMAD4, MAP3K4, MYO1B, MSR1, MYH10, ATM, NF1, AC01, NRAS, NUP98, NR4A2, PCBP1, CDK12, PIK3CA, PIK3R1, BRWD1, POLR2B, ATRX, BCOR, GPR32, GSP2, ANK3, SETD2, H1-2, HCFC1, HLA-A, HLF, FOXA1, APC, HSPA8, IDH1, TNPO1, KRAS, LCP1, LRP6, ARNTL, SMAD4, MAX, MAP3K1, MLH1, AFDN, FAM47C, MSR1, MYB, MYH9, MYH11, ATF1, ATIC, ATM, NF1, NF2, AC01, CNOT3, NOTCH1, NOTCH2, NRAS, ATP2B2, NUP98, NR4A2, PCSK6, PAX5, ARID4B, CDK12, PIK3CA, PIK3CB, PIK3R1, POLR2B, ATR, PCDH18, BNC2, BCOR, PBRM1, FBXW7, PRKA1, CCAR1, ASH1L, PRKCZ, ERBIN, NUP107, PTEN, PTGS1, SRGAP1, MRTFA, PTPRD, RB1, RBBP7, RFC4, ACTB, RHEB, RPGR, RPL5, RYR2, CLSPN, MAP2K4, SFPQ, NSD1, ITSN1, BMPR2, SOS2, SMARCA4, OS1, SOS2, SPTAN1, BRCA1, RBLR, SPRRA, BRCA2, ZFP36L1, ZFP36L2, STK4, STK11, TAF1, TBX3, TCF7L2, TCF12, TDP1, FBXW7, TLR4, TP53, TRIO, USH2A, WNT7A, CSDE1, CAD, AHNAK, TBL1XR1, MYH14, SVEP1, CEP290, CHD9, PNPLA3, OR2G3, KDM5C, ARID1A, CAST, BAP1, H2BC4, H3C2, PIP5K1A, CASP8, PHF6, CUL4B, CUL1, PIK3R3, OR6A2, RUNX1, CFBL, FUBP1, CCND3, KALRN, ACVR1B, PIWIL1, KCNB2, KLF4, MED23, NCOR1, AQR, KEAP1, MED24, SETDB1, SEC24D, G3BP2, GOLGA5, THRAP3, MED12, CDH1

COAD

PTPRU, GPC6, AKAP9, CDKN1B, SYNCRIP, CTCF, STAG2, TCERG1, CHD4, CREBBP, CTNNB1, MIER3, DMD, DNMT3A, EDNRB, EGFR, ELF3, ERBB3, MECOM, BPTF, DIS3, CNOT1, ADGRL2, MGA, ACSL6, FN1, SIRT4, SF3B1, ATP6V0D2, ASPM, GATA3, FOXP1, GNAS, GOT1, SLC9A9, GRIK3, APC, IDH2, TRIM23, KRAS, ARNTL, SMAD2, SMAD4, MAP3K4, MYO1B, MSR1, MYH10, ATM, NF1, AC01, NRAS, NUP98, NR4A2, PCBP1, CDK12, PIK3CA, PIK3R1, BRWD1, POLR2B, ATRX, BCOR, PPP2R1A, FBXW7, MAP2K1, B2M, NUP107, RTN4, PTEN, PTGS1, PTPN11, PTPN12, RAD21, NTN4, CLSPN, GALNT17, ITSN1, BMPR2, SOS2, SMARCA4, OS1, SOS2, SPTAN1, BRCA1, TCF4, TBX3, TCF7L2, TRF2, NRP1, TGFBR2, TP53BP1, TRIO, TTN, WIF1, WT1, CAD, CDD73, FZD3, CEP290, CHD9, FXR1, BRWD10, TBX3, SMC1A, ARID1A, AXIN2, CASP8, CUL1, RUNX1, MAP7, ACVR1B, MED24, ZC3H11A, SRGAP3, GOLGA5, CDC27, MED12

GBM

ABC99, CDH9, AKAP9, CDH18, ADAM10, TMEM147, CDX4, CARM1, SEMA3C, ARFGEF2, PRPF8, STAG2, CD3EAP, ADAM29, CLTC, NLRP5, COL1A2, FOXR2, MUC17, ODF4, DDX5, AFM, DYNC11I, SLC26A3, DRD5, EGFR, ARID2, LCE4A, EZH2, BPTF, FAT1, LRRK55, CDHR3, RFX6, FGA, DIS3, CNOT1, NEDD4L, FN1, SF3B1, GABRA1, GABRA6, GABRB2, SIN3A, ACAD8, SIGLEC8, SULT1B1, ZNF844, ANK3, GPX5, SETD2, HSP90AB1, KRTAP20-2, DCAF12, IDH1, ANKR36, KDR, KEL, KRAS, RPSAP58, LRP6, LUM, MAX, MAP3K1, MAP3K4, MEN1, MET, MMP13, NCFL2, NF1, NFATC4, PAX5, PDGFR, ABCB1, PIK3CA, PIK3CB, PIK3R1, PCDH18, ATRX, PBRM1, TRPV1, TP53, AZGP1, NUP107, PTEN, CHD8, PTPN11, RB1, RPL5, CN94, SEMG1, SOS1, SOX9, SPTA1, SPTAN1, BRCA1, BRAF, NR2F2, TGFBR2, TCHH, TJP1, TCF4, TBX3, TCF7L2, TRF1, TPDP1, TGFBR2, ACTG1, TP53, TRIO, TTN, WIF1, WT1, CAD, CDD73, FZD3, CEP290, CHD9, FXR1, BRWD10, TBX3, SMC1A, ARID1A, PIK3R1, PARD6B, CARD6, MAP4K3, IL18RAP, KALRN, FRMD7, NUP210L, CD1D, PTPE2, QKI, ARHGEF6, CLOCK, NCOR1, PLCH2, AQR, SEMA3E, HDAC9

HNSC

RASGRP1, ATP6AP2, ADAM10, CDKN1B, CDKN2A, CARM1, IPO7, ARFGEF2, PRPF8, CTCF, STAG2, NCKAP1, STIP1, PSIP1, COL1A1, KLF6, CSNK2A1, CTNNB1, CYLD, OTUD7A, DDX3X, DNMT3A, EEF1A1, EGFR, AHR, ARID2, EPHA2, ELF1, ELF4, MUC20, EP300, AKT1, EZH2, BPTF, FAT1, FAT2, FGFR2, CCT5, CLASP2, FLT3, ADGRL2, MGA, FMR1, NEDD4L, FN1, DICER1, SF3B1, MACF1, MTO1, SIN3A, ACAD8, FOXP1, GNAS, GPSM2, BA2B, HLA-A, HLA-B, APAF1, APC, HRAS, HSPA8, IREB2, IRF6, RHOA, RPSAP58, LAMA2, SMA2, MEF2C, MAP3K1, MEN1, MGMT, CIITA, MSR1, MYH9, NCF2, ATIC, ATM, NF1, NFATC4, NFE2L2, CNOT4, NOTCH1, NFE2L2, AC01, CNOT3, CNOT4, NUP98, PCSK6, PIK3CA, PIK3R1, PCDH18, BCOR, NSD3, PPP2R1A, PBRM1, PPP2R5C, FBXW7, ARFGP1, CCAR1, B2M, NUP107, PTEN, ARID1B, TAOK1, RAC1, RAD21, RASA1, ACTB, RPL22, CLSPN, NSD1, BMPR2, SMARCA4, SOX9, SPTAN1, BRCA1, BRAF, TCF4, TBX3, TCF7L2, TRF1, TPDP1, TGFBR2, ACTG1, TP53, TRIO, U2AF1, KDM6A, NSD2, CAD, TBL1XR1, KDM5C, ARID1A, BAP1, PIP5K1A, SLTRK6, PHF6, CUL1, CAT, CCDC120, CCNB2, COP5, TAOK2, KALRN, ACVR2A, TRIP10, TAOK2, TJP2, MED17, ARHGEF6, NCO1, SEC24D, ZC3H11A, G3BP2, THRAP3, CDH1

KIRC

PSME3, TXNIP, CTCF, BTNL3, CHEK2, CLTC, DDX3X, DDX5, DHX15, EEF1A1, EGFR, AHR, ARID2, EIF4A2, EIF4G1, ELF1, AKT1, EZH2, DIS3, ARHGP26, FLT3, ADGRL2, MGA, FMR1, DICER1, MTO1, SIN3A, PABPC1, SETD2, GUSL, HLF, HSP90AB1, IDH1, LCP1, LRP6, SMAD2, MAX, MET, MPO, MSR1, ATF1, ATM, NFE2L2, AC01, CNOT3, CNOT4, NUP98, PCSK6, PIK3CA, PIK3R1, PCDH18, BCOR, NSD3, PPP2R1A, PBRM1, PPP2R5C, FBXW7, ARFGP1, CCAR1, B2M, NUP107, PTEN, ARID1B, TAOK1, RAC1, RAD21, RASA1, ACTB, RPL22, CLSPN, NSD1, BMPR2, SMARCA4, SOX9, SPTAN1, BRCA1, BRAF, TCF4, TBX3, TCF7L2, TRF1, TPDP1, TGFBR2, ACTG1, TP53, TRIO, TTN, WIF1, WT1, CAD, CDD73, FZD3, CEP290, CHD9, FXR1, BRWD10, TBX3, SMC1A, ARID1A, PIK3R1, PARD6B, CARD6, MAP4K3, IL18RAP, KALRN, ACVR1B, MED24, SEC24D, SRGAP3, G3BP2, CDH1

LAML

CEBPNA, PRPF8, STAG2, CHD8, ASXL1, DNMT3A, EGFR, EZH2, DIS3, PTEN, SUZ12, HNRNPK, BRINP3, IDH1, IDH2, KIT, KRAS, NF1, NPM1, NRAS, TET2, BCOR, PTEN, IDH1, IDH2, PTPE2, LIP2A1, KDM6A, WT1, SMC1A, PHF6, C1, P11, P11X1, CEBPNA, SMC2, THRAP3, MED12

LUAD
TOM1, G3BP1, ATP6AP2, RBM5, ADAM10, CDKN1A, CDKN1B, STAG1, CDKN2A, SYNCRIPI, CARM1, PRPF8, CTCF, NCKAP1, STIP1, MAP4K1, CHEK2, COL1A1, KLF6, CREBBP, CSNK1G3, CTNNB1, CYLD, DACH1, DDX3X, DDX5, DHX15, DNMT3A, EEF1B2, EGFR, EIF4A2, EIF4G1, EP300, EPH4, EPHB2, STX2, ERBB2, ERCC2, AKT1, EZH2, FAT1, FGFR2, CCT5, ARHGAP26, CLASP2, CIC, ADGRL2, MGA, FMR1, NEDD4L, FN1, SF3B1, CAPN7, SIN3A, ACAD8, AFF4, GNA11, SETD2, GPSM2, BAZ2B, HLA-A, HSPA8, HSP90AA1, HSP90AB1, ABCB5, IDH1, IREB2, KDR, TNPO1, KRAS, LCP1, LDHA, SMAD2, SMAD4, MAX, MAP3K1, MAP3K4, MEN1, MET, MLH1, MMP2, MSR1, MYB, MYH10, NCK1, ATIC, ATM, NF1, NF2, NFE2L2, ACO1, CNOT3, CNOT4, NPM1, NRAS, NTRK2, NUP98, PCSK6, PAX5, CRNL1, CDK12, PIK3CA, PIK3R1, PRRX1, BRWD1, POLR2B, GNG2, PPP2R1A, PBRM1, PPP2R5A, FBXW7, ARHGAP1, CCAR1, ERBIN, MAP2K1, RELN, PSM46, NUP107, RTN4, PSMD11, PTEN, PTGS1, TAOK1, MRTFA, PTPN11, SLC45A1, RAD23B, RASA1, RB1, NTN4, RHEB, RT1, CLSPN, BLM, MAP2K4, SFPPQ, SHMT1, UPF3B, BMPR2, SMARCA4, SOX9, SPRR3, BRAF, STK4, STK11, TCF4, TCF7L2, TCF12, TFDP1, TGFB2R, ACTG1, TP53, TP53BP1, ACTG2, ZNF814, U2AF1, KDM6A, ZMYM2, TBL1XR1, ZFH4, SVEP1, FXR1, RBM10, SMC1A, ARID1A, BAP1, PIK3K1A, CASP8, PHF6, CUL3, CUL2, CAT, MAP4K3, PIK3R3, IRS2, FUBP1, ACVR1B, ACVR2A, COPS2, EFTUD2, TAOK2, MED17, EIF2AK3, CHD1L, KEAP1, MED24, SETDB1, G3BP2, CDH1
LUSC
TOM1, ADAM10, CDKN1A, STAG1, CDKN2A, NDRG1, SYNCRIPI, ARFGEF2, PRPF8, SF3A3, CHD3, CHEK2, CTNNB1, DDX3X, DHX9, DHX15, DLG1, EEF1A1, EGFR, EIF4A2, ELF1, MUC20, CTTN, EZH2, FGFR3, CLASP2, CIC, ACSL6, FMR1, FN1, SF3B1, SUZ12, SIN3A, GATA3, ABL2, ACAD8, FOXP1, AFF4, GNA11, SETD2, GPSM2, HLA-A, HLF, HRAS, HSPA8, HSP90AA1, HSP90AB1, IDH1, IREB2, TNPO1, KRAS, ARNTL, SMAD2, SMAD4, MAP3K1, MAP3K4, MEN1, MET, MLH1, MYB, NCF2, NCK1, NF1, NFATC4, NFE2L2, ACO1, CNOT3, CNOT4, NOTCH1, NUP98, NR4A2, PCSK6, PAX5, PIK3CA, PIK3CB, PCDH18, PPP2R5C, FBXW7, CCAR1, ERBIN, MAP2K1, B2M, NUP107, RTN4, PTEN, ARID1B, MRTFA, PTPN11, RAD21, RASA1, RB1, NTN4, RGS3, RPL5, BLM, ITSN1, UPF3B, SPTAN1, ZFP36L2, STK4, STK11, TBX3, TFDP1, TFDP2, TGFB2R, TP53, ACTG2, WIFP1, WT1, CSDE1, CDC73, TBL1XR1, FXR1, RBM10, KDM5C, ARID1A, CAST, PIK3K1A, CASP8, PHF6, CUL1, PIK3R3, IRS2, FUBP1, ACVR1B, COPS2, TAOK2, TJP2, MED17, ARHGEF6, CHD1L, CLOCK, AQR, KEAP1, MED24, SETDB1, SEC24D, ZC3H11A, SRGAP3, G3BP2, GOLGA5, THRAP3, CDH1
OV
TOM1, STAG1, NDRG1, STAG2, NCKAP1, CHD4, CSMD3, FAT3, CTNNB1, DDX5, DLG1, DNMT3A, EIF4A2, MECOM, F8, CCT5, CLASP2, FLT3, ADGRL2, FMR1, GABRA6, ASPM, SIN3A, AFF4, GNAs, GPS2, SETD2, BAZ2B, HGF, HSP90AA1, KRAS, RHOA, MAP3K4, MLH1, MYH10, ATF1, ATIC, NF1, ACO1, NOTCH1, NRAS, YBX1, NR4A2, CDK12, PIK3CA, POLR2B, ATR, ATRX, FBXW7, CCAR1, ASH1L, ERBIN, PTEN, MRTFA, RB1, CLSPN, NSD1, ITSN1, BMPR2, SOS1, BRCA1, BRAF, BRCA2, TBX3, TCF7L2, TFDP1, TGFB2R, TP53, ACTG1, TP53, TP53BP1, TRIO, CSDE1, ARID1A, BAP1, CASP1, CUL2, MAP4K3, HDAC3, EIF2AK3, CHD1L, AQR, BCLAF1, KEAP1, SETDB1, G3BP2, CDC27, THRAP3, MED12
PRAD
AKAP9, CDKN1B, PRPF8, ADCY1, CHD3, CHD4, CHEK2, CTNNB1, EEF1B2, EGFR, EIF4G1, EP300, ERCC2, MECOM, BPTF, FAT1, FGFR2, CNOT1, FN1, FRG1, ARHGAP3, GNAs, SCAl, HGF, APC, HRAS, HSPA8, HSP90AB1, IDH1, RPSAP58, SMAD4, MYH10, ZFH3, NAP1L1, ATIC, ATM, NIXX3-1, CNOT3, NOTCH1, NOTCH2, NUP98, PIK3CB, PLXNA1, PCDH18, ATRX, BNC2, BCOR, NSD3, PTEN, ARID1B, SMARCA1, SMARCB1, BRAF, TBX3, HNF1A, TJP1, TP53, TP53BP1, TRIO, ZNF814, KDM6A, WNT5A, AHNAK, TBL1XR1, SVEP1, CEP290, FIP1L1, CASP1, SPOP, CUL3, CUL2, CAT, CNTNAP1, IRS2, TAOK2, TJP2, EIF2AK3, CHD1L, AQR, BCLAF1, KEAP1, SETDB1, G3BP2, CDC27, THRAP3, MED12
SKCM
LRPPRC, ATP6AP2, CDK4, CDKN1A, STAG1, CDKN2A, NDRG1, SYNCRIPI, ARFGEF2, CTCF, STAG2, NCKAP1, WASF3, SF3A3, CHD3, FAF1, CHEK2, CLTC, COL1A1, KLF6, JMY, CSNK1G3, CTNNB1, CYLD, DDX3X, DDX5, DHX15, DLG1, DNMT3A, AHR, EIF1AX, ARID2, EIF4G1, ELF1, ELF3, EP300, ERBB3, AKT1, MECOM, EZH2, ACSL3, BPTF, FGFR3, DIS3, CCT5, ARHGAP26, CLASP2, CIC, CLCC1, PLCB1, FMR1, FN1, DICER1, SF3B1, SUZ12, AHCTF1, ASPM, GATA3, FOXP1, AFF4, CYTH4, ZNF638, ANK3, BAZ2B, HLA-A, HLA-B, HLF, HRAS, HSPA8, IDH1, IDH2, FAS, IREB2, IRF7, ITGA9, TNPO1, KRAS, RHOA, LCP1, LDHA, LNPEP, LRP6, SMAD2, SMAD4, MAT2A, MCM3, MAP3K1, MAP3K4, MEN1, MFNG, MLH1, MAP3K11, MSR1, ATF1, NCF2, ATIC, NF1, NEFATC4, NFE2L2, ACO1, CNOT3, NOTCH1, NPM1, NRAS, YBX1, NUP98, NR4A2, PAX5, PER1, PIK3C2B, PIK3CA, PIK3CB, PIK3R1, PRRX1, BRWD1, POLR2B, GNG2, XRN1, PCDH18, ATRX, BNC2, PPP2R1A, FANCI, PPP2R5A, PPP2R5C, RHOT1, FBXW7, PPP6C, ARHGAP1, CCAR1, TRERF1, ERBIN, MAP2K1, B2M, PMSA6, NUP107, RTN4, PTEN, PTGS1, ARID1B, TAOK1, MRTFA, RAC1, RAD21, RAD23B, RASA1, RASA2, RB1, NTN4, RBBP7, RGS3, RHEB, RPL5, RPL22, CLSPN, BLM, MAP2K4, SFPPQ, ITSN1, SMURF2, CRTC3, WNK1, BMPR2, SOS1, SOS2, SOX9, BRCA1, BRAF, ZFP36L2, STK11, SYK, TCF4, TBX3, TCF12, NR2F2, TFDP1, TFDP2, TGFB2R, ACTG1, TP53, ACTG2, ZNF814, KDM6A, VHL, VIM, WIFP1, WT1, ZMYM2, AHNAK, CDC73, SVEP1, CEP290, CHD9, FXR1, KDM5C, SMC1A, CAST, BAP1, CASP1, FCRL4, PIK3K1A, SPOP, CASP8, CHD6, PHF6, McM8, CUL3, CUL2, CUL1, CAT, MAP4K3, PIK3R3, RUNX1, CBFN, EIF4G3, HDAC3, FUBP1, USP6, ACVR1B, ARHGEF2, ACVR2A, KLF4, COPS2, ARHGAP29, TJP2, MED17, EIF2AK3, ARHGEF6, CHD1L, CLOCK, NCOR1, AQR, HDAC9, BCLAF1, MED24, MAGI2, SETDB1, SEC24D, ZC3H11A, POM121, G3BP2, GOLGA5, CDH1
THCA
AKAP9, PRPF8, CHD3, CTNNB1, EIF1AX, ARID2, BPTF, ARHGAP26, DICER1, GNAs, HRAS, KRAS, LDHA, NCK1, NRAS, CDK12, PIK3CA, PPP2R1A, PTEN, NSD1, BRAF, AHNAK, PPM1D
UCEC
RBMS5, CDKN1B, NDRG1, CAP2, SYNCRIPI, CARM1, PRPF8, CTCF, NCKAP1, STIP1, CHD3, CHD4, CHEK2, CSMD3, FAT3, CLTC, SLC44A3, COL1A1, CSNK1G3, CTNNB1, CTNND1, TTLL9, DHX15, DIAPH1, DNMT3A, EGFR, AHR, EIF1AX, EIF4A2, EIF4G1, MUC20, EP300, ERBB3, AKT1, ESR1, MECOM, FAT1, RSBN1L, FGFR2, SEC31A, DIS3, TPX2, LIMCH1, FTL3, MGA, NEDD4L, ADNP, DICER1, CAPN7, SUZ12, PLXNB2, ALK, ZNF620, TXNDC8, TCP11L2, SIN3A, GIGYF2, SACS, MLH3, RBLMX, GNA11, AMY2B, CDH19, GPS2, ANK3, GPM5C, BAZ2B, HGF, ACACA, FOXA2, HOXA7, HPD, IDH1, FAS, ING1, INPP4A, INPPL1, IREB2, KRAS, ARNTL, SMAD2, MAX, MAP3K1, MET, MKI67, MLH1, MYB, MYCN, MYH10, ZFH3, ATF1, NCF2, ATIC, ATM, NF2, NFE2L2, CNOT4, NRAS, FAM135B, PGR, PIK3CA, PIK3R1, PLCG1, PRRX1, PNN, POLE, ATR, PCDH18, BCOR, ZNF770, PPP2R1A, PPP2R5A, PPP2R5C, FBXW7, DEPD1C, RTN4, PTEN, KHLH8, ZNF471, MRTFA, METTL14, PTPN11, RAD21, RAD23B, RBBP7, CCND1, ACTB, RHEB, DHX35, ROBO2, RPL5, RPL22, SELP, MAP2K4, SOX17, ARAP3, SGK1, SHMT1, SLCA13, BMPR2, SOS1, SPTA1, BRCA1, BRAF, ZFP36L2, TAF1, TAP1, TBX3, NR2F2, TFDP1, TGFB2R, ACTG1, TNFAIP6, TP53, TP53BP1, ZNF814, U2AF1, USH2A, KDM6A, VHL, WIFP1, ZMYM2, CSDE1, GNPTAB, MORC4, TBL1XR1, CHD9, CCDC6, FXR1, USP9X, SMC1A, ARID1A, CAST, AXIN1, SPOP, ZRANB3, ARID5B, PHF6, CUL1, CAT, PPM1D, MICALCL, ALKBH6, PIK3R3, RUNX1, HDAC3, FUBP1, EIF2S2, DNER, KLF4, MED17, EIF2AK3, ARHGEF6, CLOCK, NCOR1, NUP93, BCLAF1, ZC3H11A, SRGAP3, G3BP2
Type 1 diabetes
CCN2, CTLA4, GLIS3, SIRT1, PTPN22, GH1, CLEC2D, TBX21, IL2RA, IL4R, IL10, INS, KCNJ11, SUMO4, NEUROD1, OAS1, PAX4, FOXP3, SLC29A3, PRF1, XYLT1, IFIH1, BTC, TAP2, HNF1A, TCF7, WFS1, ALMS1, CBLB
Inflammatory bowel disease
CALCOCO2, NOD1, NLRP3, PGLYRP2, PGLYRP3, IL23R, CTLA4, NKX2-3, DEFB4A, DLG1, DMBT1, CARD8, ICOSLG, GLI1, CLEC2D, HNF4A, XIAP, IRGM, IL1R1, IL10, IL10RA, IL10RB, IL12B, IL16, IL17A, IRF5, KRT8, KRT18, IL17REL, EPCAM, SMAD3, MSH2, MST1, MST1R, MUC2, MUC3A, MUC4, MYO9B, NCF2, NCF4, NELL1, NFKB1, NOS2, FOXP3, ABCB1, HEATR3, ATG16L1, MUC13, PGLYRP4, TTC7A, PTGER4, PTPN2, RAC1, IL21, PRDM1, GAL3ST2, NOD2, CARD9, SKIV2L, SLC11A1, SLC15A1, SLC22A4, SLC22A5, BPI, EED, DLG5, TTC37, LRBA, TNFSF15
Multiple sclerosis
CD24, LRRK2, CRYAB, CYP27B1, EDNRB, IKZF3, HLA-DPB1, HLA-DRB1, IFNAR2, IFNG, IL7R, IRF5, METTL1, MGAT1, CIITA, MOG, ACLY, NOS2, NOTCH4, PCK1, POLG, TMEM39A, PRF1, PRKCA, ZC3HAV1, PSMB9, ATXN2, SPP1, TNFRSF1A, TYK2, CASP9, C1orf48, EIF2B5, CD6, H6PD, CD58
Rheumatoid arthritis
MICA, NLRP3, TAGAP, LRRK2, CCR6, PLB1, BTIA, ESR2, RTKN2, FCGR3B, NLRP1, PADI4, PTPN22, HAVER1, NR3C1, HLA-A, HLA-B, HLA-DRB1, HLA-DRB2, HMOX1, AIRE, IL2RA, IL3, KLRC1, LGALS3, LGALS8, SMAD3, MMP1, NFKBIA, NFKBIE, NFKBIL1, CD244, APOM, BTNL2, SLC2A3, NCF1, SLC22A4, TAP2, TYK2, VPREB1, ZFP36, TNFSF11, RUNX1, TNFRSF25, TNFRSF14, CD2
Alopecia areata
DSP, EDNRA, AIRE, IL1R1, AR, JUP, NFKB2, NOTCH4, MBTPS2, PLEC, RIN2, RBM28, HR, HTRA1, TTC7A, ALX4, VDR, FOXN1, CLDN1
Graves' disease
FCRL3, SCGB3A2, CTLA4, GC, HLA-DRB1, ICAM1, IL3, FOXP3, SLC26A4, GPR174, CD40
Myasthenia gravis
CHRNA1, CTLA4, CD55, DPAGT1, AGRN, LRP4, ENOX1, RAPSN
Psoriasis
C1orf68, CDSN, TRAF3IP2, TMC6, ZNF816, AP1S3, CSTA, IL23R, YDJC, ITPRID1, FLG, SYNE2, FUT2, ZNF683, IL36RN, PRSS53, LCE3B, IL12B, C1orf141, LNPEP, MGST2, KPRP, IL22, IL20RA, RNF114, REV3L, STAT2, BSG, TARBP1, TNF, ZNF143, CARD14, ZNF750, LCE3D, SLC9A3R1, AIM2, LPIN2, ZFYVE16
Sepsis
CASP12, ADAM10, IRAK3, S1PR3, IRAK1, LBP, ADAM17, NRXN1
Systemic lupus erythematosus
CDKN1A, TNIP1, IKZF1, CD226, TREX1, SLC15A4, CRP, CSK, CTLA4, DNASE1, DNASE1L3, EGR2, ESR1, ETS1, FCAR, FCGR2B, FCGR3A, FCGR3B, KLRK1, RASGRP3, PTPN22, NR3C1, TBX21, HCLS1, HLA-G, FAS, FASLG, IL6, IL10, IL12B, IL18, IRF5, IRF7, ITGAM, ITPR3, LTK, MIR146A, MFGE8, CIITA, NCF2, NFKBIL1, TLR7, PDCD1, UHRF1BP1, BANK1, PRKCD, PRL, PTEN, MAVS, WDFY4, HRH4, BLK, SPI1, TRIM21, STAT4, TNFAIP3, TNFRSF1A, TNFRSF1B, C4A, C4B, TNFSF4, TYK2, TNFRSF6B, CD40, CD40LG, IKBKE
Vitiligo

NLRP1, FOXD3, IL19, PDGFRA, ZM1Z, MYG1, CAT
Arrhythmia
KCNE3, AKAP9, NKGX2-5, EMD, GPD1L, FLNC, ANK2, HRC, KCNA5, KCND3, KCNJ2, LMNA, TNNI3K, RYR2, SCN5A, SNTA1, CACNA1C, CACNB2, NAA10, KCN17, KCN2
Atherosclerosis
KERA, ABCA1, ALOX5AP, PCSK9, GJA4, APOA1, LMNA, LPL, MMP3, MMP9, PECAM1, INO80D, SELE, SREBF1, TNFSF4, ZNF202, APH1B
Coronary artery disease
CDKN2B-AS1, MIR4513, NAMPT, TRIB1, ADAMTS13, DEGS2, CYBA, CYP2J2, CYP27A1, ABCA1, S1PR1, F13B, FGFR4, ALOX15, GATA2, GPX1, APOA1, APOB, IL5, ITGA2, LIPA, LIPC, LMNA, LPA, LRP6, MEF2A, MTR, MTRR, NOS3, PON2, APOM, MRTFA, JCAD, ACTA2, BHMT, ABCG8, TDG, TERT, THBS1, TNFRSF1B, LRP8, ST6GALNAC5, PLPP3, IL33, IL1RL1, ABCG1
Heart block
HCN4, DES, GJA5, LMNA, TRPM4, NXF5, SCN5A
Congestive heart failure
CLCNKA, ADRB1, ADRB2, DMD, GRK5, PSEN1
Heart valve disease
GATA5, NKX2-5, ELN, FBN1, FLT1, GATA4, GJA5, GLI1, SNAI3, SLC35B2, MSX1, NFATC1, NOS1, NOTCH1, NOTCH2, PAX6, PIgf, WNT4, PPP3CA, MCTP2, TBX20, PTCH1, SOX9, TBX5, UGHD, VEGFA, VEGFB, VEGFC, ZNF236, AXIN1, PTCH2, MATR3
Hypertension
CORIN, CHGA, AZIN2, NLRP3, ADD1, CLCNKB, CLU, COMT, ADM, ADRA1A, CTF1, CTS1, CYBA, CYP1B1, CYP2J2, CYP4A11, CYP11B2, ACE, DRD1, AGT, AGTR1, EDN1, EDN2, EDNRA, FBLN2, FBIN1, FGF1, NEDD4L, ALOX12, FSHR, KLHL3, GH1, STK39, GNAs, GNB3, GRK4, HMOX1, HNRNPU, HSD3B1, HSD11B2, APOE, KCNJ5, KCNMA1, KCNMB1, KLK1, KLKB1, NR3C2, NOS2, NOS3, NPPB, ATP2A2, NPR1, PLD2, PPARG, RNLS, PRSS8, RETN, PTGIS, REN, RGS2, BDKRB2, ACSM3, SCNN1A, SCNN1B, SCNN1G, BLVRA, WNK4, NCF1, SLC7A1, SLC12A3, KLF5, TBX2, TH, TRHR, XDH, SCG2, CUL3, CAT, VNN1, KYNU, GOSR2
Myocardial disease
HCN4, ABCC9, TSFM, CDKN1B, SPEG, NEBL, PROCR, CCT7, TXNRD2, RBCK1, BTN2A1, LDB3, MRPL3, CHRM2, ADCY8, APOA5, CALR3, ADH5, COL4A1, DNAJC19, ADORA1, COX15, ADORA3, CRP, GATA5, CRYAB, NKX2-5, CT1, ADRA2B, DES, DMD, DSC2, DSG2, DSP, ELANE, ZNF627, ELM, EMD, ENO1, EPH4A, EYA4, F7, F12, F13A1, F13B, FKTN, ALDH3A2, FHL1, FHL2, DOLK, FOXD4, PALLD, NCOA6, FLNC, FLT1, VPS13A, FMR1, SYNE1, SIRT1, FXN, MT01, TAS2R50, TOR1AIP1, GATA4, GATA6, ANKR1D1, HSPB7, GLA, GCCL, PDLIM3, GCLM, BMP10, GP1BA, RBM20, RANGRF, SLC25A4, CTNNA3, GUCY1A1, HADHB, ANXA5, TAX1BP3, HLA-DPB2, CAVIN4, IGF1, ILK, ISL1, ITGA2, ITIH3, JUP, NDUF57, MIA3, KCN11, KCNQ1, ARG1, COA6, LAMA2, LAMA4, LAMP2, LDLR, LGALS2, LMNA, LTA, MIR149, MEF2A, NR3C2, MIAT, OR13G1, MYBPC3, MYH6, MYH7, MYL2, MYL3, MYO6, NDUFV2, NPPA, COA5, OLR1, TNN13K, NDUFAT1, GP6, PRKAG2, MYOZ2, SLC25A3, PKD2, PKP2, TM6SF2, PLN, POLG, TMEM70, AGK, PRKCA, MAP2K1, MAP2K2, PSEN1, PSM4, JPH2, TRIM54, AARS2, MIB1, MYH7B, GATA1D, ACTA1, RAF1, ELAC2, ROS1, RYR2, SORT1, SCNA5, SDHA, PRDM16, SELP, SGCA, SGCD, SCGG, MRPL44, SOS1, SRI, BRAF, TAZ, TBX5, TBXAS1, TCF21, ACTC1, TGFB3, THBD, THBS2, THBS4, THPO, KLF10, TMP0, TNNC1, TNNT2, TPM1, TRPC4, INS-IGF2, C5, TTN, TTR, TNFRSF4, VCL, XDH, CACNA1C, CACNA1S, CACNA2D1, ALMS1, CACNG1, TMEM43, FHOD3, CSRP3, CALM3, BRAP, OBSCN, CASQ2, MYPN, TRIM55, TRIM63, GTPBP3, MYLK2, TCAP, CAV3, CADPS, PDE5A, MYOM1, ACTN2, NEXN, CD14, CACNA2D4, NRXN3, BAG3
Stroke
CDKN2B-AS1, BCAP31, COL4A1, COL4A2, FGA, FGL1, DDAH1, ALOX5AP, SAMHD1, GH1, GLA, GOLGB1, GP1BA, ANGPT1, HMOX1, APOB, ITGA2B, KIF5B, LDLLR, LTC4S, NOTCH3, NPPA, SERPINA5, ADA2, PON1, ACTA2, SCNN1A, SELPLG, SOX17, SLC1A2, TBXAS1, C5, VCAM1, VWF, ARHGEF10, CD59, MFN2
Type 2 diabetes
ABCC9, OGA, PPARGC1A, UTS2, CAPN10, MAP4K5, CHRM3, ARAP1, THEM4, CLPS, CPE, ADRB2, ADRB3, DBI, SLC30A8, AGER, AKT2, EXT2, FABP2, FABP3, FABP6, ACSL1, RXF6, ATF6, PP1PK2, LARS2, MACF1, GCK, GFPT1, GLP1R, GDP2, GRK5, KCNIP1, HHEX, HMG1A, HMGA1, HMGA4, ACACB, IAPP, APOE, IGFR2, INS, IRSR, PDX1, IRS1, ISL1, KCN9, KCNJ11, KCN15, KCNQ1, LIPC, LPE, LTA, MTNR1B, MTTP, NEUROD1, NOS2, NOS3, NPY, NPPB, ATP2A3, OGG1, PAM, NEUROG3, PAX4, PCSK2, PIK3C2G, PIK3R1, PLIN1, POMC, PPARG, APOM, RETN, PYY, PTEN, PTGS2, RBP4, ZFAND3, RXRG, THADA, FN3K, PINK1, SLC2A2, SD3, SOS1, SREBF1, STX1A, ABCCC8, BTC, HNF1A, HNF1B, TCF7L2, TGM2, TNF, CDK11A, UCP1, NR1H2, WFS1, CACNA1E, ALMS1, FTO, BBS10, PTGES2, EEA1, KLF11, CAT, KLF7, IRS2, CCND2, ADIPOQ, MAPK8IP1, CD38, LPIN2, ARHGEF11, TBC1D4
DNA repair-deficiency disorder
RAD50, CDKN2A, MSH6, MRE11, PCNA, RAD51, RAD52, XPC
Glucose Metabolism Disorders
AKT3, ABCC9, MIR4513, CDKN1C, IFI30, CEL, SLC19A2, SORBS1, OGA, PPARGC1A, UTS2, CHGA, CAPN10, MAP4K5, CHRM3, ARAP1, THEM4, CLPS, CP, CPE, CCN2, CTLA4, ADRA2A, CYC1, ADRB2, ADRB3, DBI, TRPV3, DCN, SLC30A8, GLIS3, AGER, AGRP, AKT2, EXT2, FABP2, FABP3, FABP6, ACSL1, RFX6, ATF6, ZHX3, AKR1B1, PASK, SULF1, PP1PK2, DMXL2, LARS2, SIRT1, MACF1, G6PC, PT1F1, GPSM1, PTPN22, GATA6, GCGR, GCK, GKRP1, GH1, GIPR, GLP1R, GLUD1, GNAs, PDK2, WDR62, GRK5, CLEC2D, GYS2, TBX21, HADH, HFE, KCNIP1, HHEX, HK2, MNX1, HMG1A, FOXA1, FOXA2, FOXA3, HNF4A, ACACB, IAPP, ZFP57, IGF1, APOE, IGF2, IGF2R, IGFBP1, IL2RA, IL4R, IL10, AQP2, INS, IRSR, PDX1, IRS1, ISL1, KCN9, KCNJ10, KCN15, KCNQ1, SUMO4, KRT17, L1CAM, LIPC, LIPE, LMNA, LTA, MT1A, MTNR1B, MTTP, NEUROD1, NKX2-5, NOS2, NOS3, NPY, NOTCH2, NPPB, ATP2A3, OAS1, OGG1, OPA1, PAM, NEUROG3, PAX4, TAS2R9, PAR6A, PC, PCBD1, FOXP3, IER3IP1, PCSK2, PRKAG2, ENPP1, PIK3C2G, PIK3R1, PLIN1, POMC, PON2, PPARA, PPAR, PPARA, AVP, SLC2A3, AVPR2, PRF1, APOM, DNAJC3, PRPS1, RETN, PYY, PTEN, PTGS2, G6PC2, PTPRD, RBP4, ZFAND3, RREB1, RXRG, RYR3, SCNA2A, SCNA8, THADA, BLK, SEL1L, SELL, FN3K, XYL1T1, IFIH1, NSD1, CSMD1, PINK1, SLC2A1, SLC2A2, SLC2A4, SLC5A1, SLC16A1, SOS3, SOS1, SREBF1, STX1A, ABCC8, BTC, TAP2, HNF1A, HNF1B, TCF7, TCF7L2, TGM2, TLL1, TNF, TRPC5, CDK11A, UCP1, UCP2, UCP3, NR1H2, WFS1, CACNA1E, ALMS1, FTO, BBS10, PTGES2, HKDC1, WNT5B, EEA1, KLF11, CAT, KLF7, IRS2, CBLB, MATN4, CCND2, SOCS3, TRMT10A, ADIPOQ, MAPK8IP1, CD38, LPIN2, ARHGEF11, TBC1D4
Hypercholesterolemia
ZMPSTE24, CEL, CPT2, CYP2D6, CYP7A1, ABCA1, LPIN1, PCSK9, LDLRAP1, STAP1, GCKR, GHR, AMPD1, NPC1L1, APOB, LCAT, LDLR, LIPE, PAX4, INSIG2, PLIN1, SORT1, ABCG5, ABCG8, SREBF2, HNF1B, CH25H, LIPG
Iron metabolism disorder
WDR45, CP, HJV, TMPRSS6, ALAS2, FTH1, SLC40A1, HFE, SLC11A2, HAMP, TF, TFR2, TGFBR2, FA2H, CYBRD1, PANK2, COASY, C19orf12, PLA2G6, GNPAT, MTSS2
Lipid metabolism disorders
MIR4513, NPC2, APOA5, LRRK2, ETFDH, PCSK9, GALC, MTO1, GBA, GLA, C5AR2, ANGPTL3, HEXA, APOA1, APOA4, APOE, LCAT, LIPC, LIPE, PPL, LRP5, ARSA, ASAHI, NPC1, PRKAG2, PLIN1, PPARA, PPARG, PSAP, PNPLA2, RXRG, PCDH15, SMPD1, SREBF1, TNF, USF1, SOAT2
Metabolic syndrome
ADA, ZMPSTE24, CFTR, ADRB2, DNA2, ALDOA, SIRT3, SCG3, HPRT1, MMAB, SLC35D3, LMNA, LRP6, MEF2C, NPC1, WWOX, PYY, RGS2, TFR2, UCP2, XRCC4, FTO, STEAP4, APOL6, DYRK1B, ADIPOQ, CD36
Mitochondrial disease
TSFM, FARS2, POLG2, FDX2, EARS2, NDUFA11, DGUOK, DNA2, TYMP, GARS1, FBXL4, NFU1, SLC25A4, HADHA, HADHB, HMGCS2, COA6, BOLA3, CHCHD10, MPV17, NDUFA1, NDUFA11, NDUFS1, NDUFS2, NDUFS4, NDUFS6, OPA1, ATP5F1A, RRM2B, MRPS16, PCK2, TACO1, ATP5F1E, SLC25A3, POLG, TTC19, TMEM70, PARL, FOXRED1, TRMU, AGK, TWNK, MRPS22, MFF, VARS2, AARS2, SDHD, MRPL44, TK2, UQCRC2, NDUFAF5, TARS2, PUS1, SUCLG1, SUCLA2, NFS1, LYRM7, AIFM1, NDUFAF2, MGME1, MFN2, SCO2
Alzheimer's disease
DNA2, NAMPT, ADAM10, SIGMAR1, APBB3, ABCA7, TOMM40, CYP46A1, CHAT, CLU, SERPINA3, CCR1, CR1, CREB1, CRMP1, CST3, CTSD, CYP19A1, DAPK1, ACAN, ECE1, ABCA1, A2M, C9orf72, EPHA5, ESR2, EWSR1, FGF1, SETX, NCSTN, FPR2, BACE1, PLD3, MS4A6E, CALHM1, GAK, CHMP2B, GBA, BIN1, LAMA1, EPHA6, GRN, GRIN2B, CTNNA3, GSK3B, NRG1, APBB1, HSPA1B, HTR2C, IDE, APOE, APP, I6R, AR, KLK1, ARMS2, LR1, LRP2, LRP6, RLPAP1, MAPT, MEOX2, MME, MPO, NEDD9, NOS1, PNP, OGG1, OLR1, OTC, APHA1, PIN1, PLAU, PLCD1, ATP7B, TREM2, P2PPR2R2B, PSENEN, PSEN1, PSEN2, BDNF, BLHM, MS4A6A, TRAK2, R19orf18, ZNF420, T11orf127, FAM71A, CTNNB1, CTNND1, CTNND2, ARL6IP1, RNF38, CNTN4, FAM81B, ABCA13, GIMAP8, VPS13B, FAM91A1, ADSL, LINGO2, FAAH2, USP54, DAB2, DAG1, PGBD4, SLFN5, ZNF780B, DMLX1, PRICKLE2, FREM3, TXLNB, GALNT5, DDX53, ARX, HTR3C, FAM9C, DLG2, DLG3, DLG4, DLX6, DMD, DNAH5, DNAH9, DNM73A, DXO, DPP4, DPP6, DPYD, DRP2, ECM2, DUSP3, DYRK1A, ABCA1, NRB01, HIGD2A, K2T24, DHAN10, ZNF778, EIF4E, FYB2, A2M, ABCA2, SPAG17, ELK1, VWA3R, SI_C39A1, FN1, F2, FPA51, SLC25A43, FPRB11, A1, ANO5, EPHB2, FRRB2, FARPB2, OR8H1, ORK3, FAT1, CRY2, IMID1C, SPAT13, FOXK1, THSD7A, SI_C29A4
Autism
GAGE8, LRRK69, JMJD7, TROAP, CDH5, SAE1, CDH8, DPP3, HUWE1, CDH11, AKAP9, TENM1, TOPORS, GPHN, BCKDK, SNAPC5, LAMC3, CCL26, ABCA7, IRF9, S73GAL6, CDX2, VAV3, SEC23A, CREB3, LRRC41, UNC13B, MYBPP1A, C1B2, PRDX4, MTHFS, TBR1, NFAF5, RA1, ZMYND11, WDR4, SLC17A3, NCXAP1, ARID5A, NPFFR2, UGT2A1, CHAT, CHD1, CHD2, RAPGEF4, CHD3, ADCY5, CAPN10, IL1R1APL1, CORO1A, NISCH, SUPT16H, AKAP13, NXP3, PNPK, LYST, AHNAK2, GOLM2, CHRNA2, CHRNA7, CRHNB3, CHRNLD22, A9LMT3, MBD6, TUBGCP5, SORCS1, PWV2P2A, WDR31, TM4SF19, RAB39B, CLCN6, CLCNK2, FAT3, IKBIP1, NIP1A, NTAN1, GPR139, ANKS3, SPATA32, EFCAB13, ZNF813, B3GALT6, CNR1, IQGAP3, CST9, DUSP15, BP1FA3, COL7A1, CNTNAP5, COL11A1, UBR3, PABPC4L, STXBPF5, LRGUK, CPT1B, CREBBP, MAGEC3, BEND2, ADGRG4, PTCHD1, RNF32, UB2E2, P2PPR2B, PSENEN, PSEN1, PSEN2, BDNF, BLHM, MS4A6A, TRAK2, R19orf18, ZNF420, T11orf127, FAM71A, CTNNB1, CTNND1, CTNND2, ARL6IP1, RNF38, CNTN4, FAM81B, ABCA13, GIMAP8, VPS13B, FAM91A1, ADSL, LINGO2, FAAH2, USP54, DAB2, DAG1, PGBD4, SLFN5, ZNF780B, DMLX1, PRICKLE2, FREM3, TXLNB, GALNT5, DDX53, ARX, HTR3C, FAM9C, DLG2, DLG3, DLG4, DLX6, DMD, DNAH5, DNAH9, DNM73A, DXO, DPP4, DPP6, DPYD, DRP2, ECM2, DUSP3, DYRK1A, ABCA1, NRB01, HIGD2A, K2T24, DHAN10, ZNF778, EIF4E, FYB2, A2M, ABCA2, SPAG17, ELK1, VWA3R, SI_C39A1, FN1, F2, FPA51, SLC25A43, FPRB11, A1, ANO5, EPHB2, FRRB2, FARPB2, OR8H1, ORK3, FAT1, CRY2, IMID1C, SPAT13, FOXK1, THSD7A, SI_C29A4

FGD1, ALDOA, XRN2, NLGN4Y, NTNG1, NLGN1, SHANK2, DIP2C, RIMS1, WDFY3, ZNF292, PDZD2, MYT1L, MYCBP2, NFASC, FLG, POGZ, PHF8, KDM6B, EFR3A, RTF1, LPN1, DIP2A, KANK1, CYFIP1, MDN1, FAM120A, GSE1, ATP11B, ZFR2, ASTN2, DENND5A, CSTF2T, IQCE, ANKS1A, SATB2, TBC1D30, AFF2, SYNE1, SMCHD1, FN1, OBSL1, MED13L, ADNP, DICER1, NCS1, GRIP1, ATP1B4, SLC35A3, PHF3, MACF1, ZFYVE26, SCRIB, KAT6B, ARHGPAP45, TSPAN12, PIGN, ZKSCAN5, CADM1, BRD1, DEFB124, HEPACAM2, CERS6, KCTD13, UBN2, MCM9, GABRB3, GABRG3, ZNF683, CFAP45, GAK, NIPBL, MOB4, MXRA5, DCAF13, AB13BP, POT1, LY6G6F, FAM205A, SH2B1, AOC1, C2CD3, L3MBTL1, ATRLN1, ZNF451, SIPA1L1, SETBP1, CNTNAP2, AUTS2, RAB11FIP5, DCAF4, PYGO1, ZBTB20, ABCA12, GARS1, AMD1, LRRK29, FBXL6, TSPAN17, FBXO10, SEZ6L2, MYOF, GCNT2, AGO1, B4GALT1, RANBP6, NBEA, AMPD1, FGFR2, TPK1, DAPP1, FOXP1, SNX5, DISC1, HCAR1, TUBGCP4, SRPX2, ZNF638, SGSM3, GLO1, AMT, GNAS, GOLGA3, SLC01B3, ZNF311, OTOG, CD163L1, SLC39A5, KSR2, CEP170B, PRTG, NUDT7, HID1, ENDOV, DYNAP, DLL1, UNC80, SLC9A9, SUMF1, GPRIN3, PNPLA1, GPR37, ANK2, GPS1, ANK3, GRIA3, GRID1, GRIN2B, SETD2, UBE2T, GRM1, CTNNNA3, ANKRD11, GRMT, GRM8, GRPR, GTF3C2, NME7, OSGIN1, GYPE, ANXA1, H2AC8, HDLBP, CFHR2, EHD2, MR1, CCDC85C, HOXA1, ACACB, APBA2, HTR3A, HTR5A, ZFP69, ABCB5, ZNF517, NEXMIF, VSI1, ZC3H12B, SATL1, RTL4, MS4A10, TMCS1, ZNF774, FMN1, CCDC18, FCR6L, NCKAP5, AACADL2, ATP13A5, APOC3, MACC1, OR1J1, RNF81, ITIH6, OR13H1, DGAT2L6, ARSH, ZNF713, ZBTB41, IMPDH2, AR, ITGA4, ITGA5, ITK, ITPK1, PTCHD3, GALNT18, FAM11B, MAP11, LAPTMB4, PRCP, CDC7A1, BMP2K, MTMR8, ZNF407, CHD7, CNDP2, AGK, TBC1D23, MBD5, METTL2B, CACNA2D3, UTP6, WWC3, PRKD1, KMT2E, ERBIN, MAPK3, MAP2K2, MAP2K3, PCDH8, PCDHA13, TEX13B, DNAH7, KIAA1217, PRODH, RELN, PSEN1, SDR39U1, RGMA, WDR93, RARS2, DDX44, ATP10D, PTCH1, PTEN, SLC44A10, BIRC6, PTH2R, TEC1D24, KIAA1210, AHRR, ARID1B, MRTFB, NLGN4X, XPO5, PCDH19, M1B1, PTK7, MICAL3, LRRCT, UNC79, RIC1, JCAD, DPP10, KIAA1549, RNF213, CHD8, CACHD1, SEMA4G, PCDHB16, METTL14, SCUBE2, CCAR2, PTPRK, ZNF77, KMT2C, RAB2A, RABGGTA, RAD21, PGAP6, TRPV4, REST, RFX2, RG57, EXOC4, CCDC90B, CELF6, ROBO2, ROS1, RPL10, RPS6KA3, RRM1, BDNF, BCORL1, SBF1, SERPINB4, SCNA1, SCNA2, SCNA3, SCNA9, SCP2, SLC17A9, ZNF735, ANO3, LRRRC4, LIN7B, RAD21L1, SRSF7, NSD1, COP1, TRA2B, SFTP7, CSMD1, SMYD3, CCDC14, USP46, AGXT2, SLC30A5, SLC1A1, UPF3B, SLC6A1, SLC6A3, SLC6A4, FAM86B2, ACTR3C, SLC6A13, SLC9A1, SLIT3, SMARCC1, SMARCC2, MTMR9, SNAP25, SNRPN, SOS1, SOX5, SPP2, SPTAN1, SRPK2, RO60, BRCA2, SSX1, STAT2, CDKL5, STXBP1, STXBP3, SUOX, SVL, SYN1, SYN2, TAFL, TBX6, HNF1B, TCF3, TCF20, BT1N1, BUB1, TDO2, TECTA, NR2F1, THRA, TOP1, C3, TRIO, TSC2, TWIST1, TYK2, RFX8, UBA7, UBE3A, UGT2B10, USH2A, DMD6A, VCP, VIP, ZAN, WNT1, XPO1, YWHAE, ZFPL1, ZNF45, ZNF75D, ZNF79, ZNF157, CACNA1B, CACNA1C, ZMYM2, CACNA1D, ZNF213, CACNA1E, CSDE1, TUBA1A, USP7, SPATA5L1, FA2H, RNF128, MCPH1, PARP8, NLRX1, TBL1XR1, NSUN7, ZNF668, MYH14, MMRN2, EHMT1, RBF1, DCAKD, ZC3H14, TUSC3, CNTNAP3, LRRMT4, DBF4B, MLL10, TET1, ADAM33, C11, CUL5, THSD7B, CMIP, KMT2D, ALX1, OR5AC2, AP3B2, ST8SIA2, CAMK4, POLR2M, DIAPH3, CLTCL1, ESS2, KDM5C, TRRAP, TCF7L1, KATNAL2, ARHGEF24, MFRP, SOX7, SESN2, SETDB2, RAB34, KRTAP9-3, IMMP2L, CTTNBP2, ADGRV1, ANTRX1, MINDY4, TRAFF, ATP13A4, MEGF11, DOC2A, FAM120B, CUL3, ZNF559, TTF2, KIRREL3, HDGF2L, USP30, PLCD4, AGBL4, FBH1, PPP1R15B, PPM1D, MICALCL, CPZ, CBX4, SNS3, PIR, CNTNAP4, PIAS1, DENR, MADD, CASK, RUVBL1, TNKS, EIF3G, JMJD7-PLA2G4B, DNAH11, RIPK2, MPDZ, SUCLA2, NR2P2, SYNGAP1, PER2, MTMR2, YGV2, CACNA1H, HERC2, MBD4, NAV1, NAV2, FGD3, PLOD3, KLHL6, UBE3B, TNFSF18, HAP1, TAF1C, BRSK2, TBX18, SLC16A3, SMC3, KCNQ4, CBA2T2, PLXNA4, EBAG9, MFSD4B, SLC16A7, TPGS1, LARGE1, DLGAP2, CENPBD1, TAAR2, NT5C1B, PKHD1L1, NAPRT, COPS2, TRIP12, CADPS2, NRXN3, NRXN1, NRXN2, CIAO1, FOXP2, ARHGEF6, SCARB2, STXBP5L, CD38, NPEPPS, ATP5MPL, CEP41, GTF2IRD1, CDC42BP2, PDIA4, UBE3C, KIAA0100, RUBCN, NOS1AP, SLK, HDAC4, CD151, BCLAF1, KIAA0232, RIMS3, SETDB1, AREL1, NUAK1, SV2B, SRGAP3, NCAPD2, CRYZL1, USP15, SLC23A2
Bipolar disorder
PDLIM5, AKR1C4, TPH2, CNR2, COMT, UBE2F, ABCA13, GRK3, DDC, DLG2, DP6, DSCAM, C9orf72, EPHA5, ERBB4, FAPB7, MLC1, GABRA6, TEENM4, DISC1, CNTN6, PCL0, GRM1, CTNNNA3, GRM3, GRM7, GSK3B, GSTZ1, HSPA5, HTR2A, HTR2C, HTR3A, PLCXD3, IMPA2, ITGA9, ITIH3, MIR137, MAOA, ASMT, NFIA, NR4A2, OTX2, PRKN, PIK3C3, RBFQX1, NDE1, BCL9, BCR, BDNF, S100B, PCDH15, SLC6A3, SLC18A1, SSTR5, VAMP7, HSP90B1, TSHR, XBP1, CACNA1C, IMMP2L, SHANK3,
Depression
CHRMB2, CR1, ABCA13, NR5A1, APAF1, HTR1A, HTR1B, MIR182, NFIA, P2RX7, POLG, TPH1
Encephalitis
TBK1, CFI, MX1, PDCD1, SCN1A, SCN2A, TLR93B1
Epilepsy
AKT3, HCN4, ATP6AP2, TNK2, GPHN, BCKDK, SLC9A6, ARFGEF2, FARS2, CHL1, AFG3L2, LIAs, CHD2, PRRT2, TUBA3E, STX1B, ACOT7, CHRNA2, CHRNA4, CHRNA7, CHRN2B, CHRN3B, EFHC1, TSEN15, CLCN2, ABCC2, DMBX1, COL4A1, COL6A2, ACMSD, CP, CRH, MPP7, PRICKLE1, RBFQX3, CSTB, SIK1, ADRA2B, TRMT44, KCTD7, PRICKLE2, KCNV2, ARX, DLG2, DMD, DYRK1A, AGTR2, EEF1A2, CLN8, FOXG1, ARHGEF9, EXOC6B, FMR1, NEDD4L, ATP13A2, GRIP1, SLC35A3, PIGN, KIF4A, BRWD3, GABBR1, GABRA1, GABRA6, GABRB2, GABRB3, GABRD, GABRG2, PTPN23, CNTNAP2, DMN3, AUTS2, SACS, AMPD2, SRPX2, SLC13A5, WDR62, GRIK1, GRK2, GRIN2A, GRIN2B, GMPPB, HSID7B10, HIP1, HNRNPU, NCKAP5, HCN1, APP, RBPJ, KCNA1, KCNA2, KCN2D, KCNH2, KCNJ2, KCNJ10, KCNA1, KCNN3, KCNQ2, KCNQ3, NHLRC1, L1CAM, KPNA7, MAOA, MECP2, MEF2C, ASAHI, MLLT3, NDP, NEB, NEU1, NF1, ATP1A2, ATP1A3, NID1, OCA2, OPA1, OPN1, OPRM1, ALDH7A1, PRKN, SHANK1, GAL, IER3IP1, UBR5, SUCO, ZNF44, PDYN, WWOX, SERPIN1, CSNK1G1, PODXL, POLG, INO80, RBFQX1, NDE1, CLN6, PPP1R3C, VP535, NGLY1, MBD5, PCDH8, PSEN1, FSTL5, CP6, PTEN, SLC4A10, GJD2, TBC1D24, SLC12A5, PCDH19, KCNT1, RXF3, HCN2, SCN1A, SCN1B, SCN2A, SCN3A, SCN4A, SCN5A, SCN8A, SKI, SLC1A1, RTN4R, SLC4A3, SLC2A1, SLC6A1, BMP5, SLC6A3, SLC6A8, SNAP25, SPTAN1, CDKL5, STXB1P1, ABCB8, SYN1, SYN2, CNTN2, TSPAN7, C3, TSC2, TUBB2A, KDM6A, YWHAE, CACNA1A, CACNA2D1, CACNB4, EPMA2, CAR52, SLC25A22, SNIP1, ST8SIA2, CLPB, NIPA2, FAR1, MR1, CASR, PIGO, KCNA2B, SHANK3, CASK, JRK, CBL, MATN4, SYNGAP1, SYNJ1, ST3GAL5, EIF2B5, CACNA1H, CACNA1G, LGI1, STRADA, TBC1, NRXN1, SCARB2, GOSR2, DEPDC5, DNAJC6, ZEB2, MAGI2, SEC24D, FIG4
Parkinson's disease
ABCAT7, ATG7, PARK7, CHRN3B, LRRK2, ADH1C, ACMSD, PACRG, CR1, CYP2D6, DBH, DCTN1, DRD4, EEF1D, EIF4G1, C9orf72, PTK2B, SETX, DNAJC13, FMR1, USP24, ATP13A2, SIRT1, ZFYVE26, FTH1, FUS, SLC41A1, FBXO7, GAK, GIGYF2, FGF20, GBA, GCH1, GLA, HTRA2, GLUD2, ANG, GRN, GSK3B, HLA-DRA, HMOX2, HSPA1A, HSPA9, APP, IL1B, LAMP2A, MAOB, MAPT, ASCL1, MTX1, NDUFV2, NEDD9, NEFM, NQO2, NPC1, NR4A2, PRKN, CHCHD2, NME8, ABCB1, PITX3, TREM2, POLG, PARL, VPS35, PRNP, PSEN2, ALS2, BDNF, ATXN2, PINK1, SLC6A3, SMPD1, SNCA, SORL1, TBP, TRPM2, UCHL1, LRRK1, SPG11, PLA2G6, RAB29, PLXNA4, ATG5, SNCA1P
Attention-deficit hyperactivity disorder
PTPRT, CHRN4, SLTRK1, TPH2, MACROD2, UBE2F, DBH, DOCK3, DRD4, EPHA5, FGD1, NEGR1, PCDH11X, SLC9A9, ANK3, GIT1, GRM1, CTNNNA3, GRM5, GRM7, GRM8, STS, MAOA, MTNR1A, PRKN, RBFQX1, C12orf4, SLC22A23, CSMD1, SLC6A2, SLC6A3, SNAP25, TAF1, TPH1, TUSC3, CHAF1B, SHANK3, NOG, NRXN1, SLC23A2
Encephalopathy
FARS2, SLC26A1, CHAT, CHD2, WDR45, STX1B, PNKP, CHRN4, CLCN2, CLCN4, ISCA2, MTFMT, EARS2, SYT2, COL4A1, COL4A2, CPT2, CSF1R, SIK1, AARS1, ARX, DNMT1, TPY, EIF2B1A, IB57, ERB4, FASN, HEPACAM2, ARHGEF15, MLC1, ARHGEF9, PLCB1, SZT2, SYNE1, SRGPAP2, ETHE1, GABA1, NECAP1, CNTNAP2, FBXL4, GCH1, GJB1, KCNH5, NFU1, GLDC, GLS, AMT, GNAO1, SLC13A5, GRIN2A, HNRNPU, HCN1, KCNA2, KCNQ2, LMBN1, MECP2, MEF2C, ASNS, NDUFV2, NOTCH3, ATP5F1A, RRM2B, RYR3, ATXN2, SCNA1, SCNA2, SCNA8, SC01, SDHA1, SLC7A2, SLC16A2, BRAF, CDKL5, STXBP1, SURF1, TLR3, UBE3A, SLC35A2, KDM6A, CACNA2D1, SLC25A22, PIGAP1, TAR2, SLC19A3, CLPB, USP9X, COA8, GTPBP3, SERAC1, DOCK7, RNASET2, SYNGAP1, EIF2B4, EIF2B3, EIF2B5, LYRM7, CACNA2D2, MARS2, NRXN1, GABBR2
Huntington's disease
ATG7, CNR1, GRIN2B, HTT, JPH3, ATXN8OS, TBP, HAP1
Migraine
PRRT2, HRH3, CSNK1D, EDNRA, KCN18, ATP1A2, NOTCH4, SCN1A, SLC2A1, SLC20A2, CACNA1A, SLC4A4
Tourette syndrome
OLFM1, SLTRK1, AADAC, DRD4, CNTNAP2, ZBTB20, CTNNNA3, HCRTR2, HDC, HTR1A, IMMP2L, FSCB, NRXN1
Asthma
NAT2, TLR6, CCL26, NOD1, CFTR, CYSLTR1, SPINK5, CHI3L1, IRAK3, PTGDR2, IL17F, GLCCI1, SCGB3A2, FRMD6, PPARGC1B, CSF1R, CTLA4, ADRB2, GRASP, S1PR1, MS4A2, CDHR3, FLG, CEP68, ALOX5, HAVCR1, CHIA, PDCD4, GSDMA, TBX21, HLX, TNC, IL4, IL4R, IL12B, IL13, IL18, INPP4A, ITK, KCNMB1, LTA, LTC4S, MAP3K1, MMP9, MUC7, MYLK, NFKB1A, NOS1, SERPIN1A, PLA2G4A, IL17RB, GSDMB, PTGDR, PTGER2, IL21, CCL7, SLC6A12, STAT6, STK10, TBXA2R, TLR2, TUFM, SCGB1A1, TRPV1, PLA2G2B, CAT, TSLP, SOCS1, ORMDL3, CD86, ATG5, CD38
Chronic obstructive pulmonary disease
COL4A3, CSF2, DEFB1, DEFB4A, A2M, ELN, PLA2G2D, MSR1, SERPIN1A, SNA1, TERT, TGFB1, ADAM33
Cystic fibrosis

CFTR, CHI3L1, CLCA1, EDNRA, IFRD1, FAS, IL1B, NOS1, DCTN4, SCNN1A, SCNN1B, HNF1B
Lung injury
IRAK3, GADD45A, MYLK, NFE2L2, SLC44A2
Pneumonia
CYP2E1, DKC1, ABCA3, CFH, RTE1, THBD, CCRL2
Pulmonary fibrosis
CR1, ABCA3, FAM111B, SFTPC, SFTPA1, TERC, TERT, MUC5B, SFTPA2
Pulmonary hypertension
DVL1, ENG, ABCA3, NFU1, GUCY1A1, HTR2B, KCNA5, SARS2, BMPR2, THBS1, ACVRL1
Respiratory distress syndrome
CCR3, XKR3, S1PR3, ABCA3, IGHMBP2, PI3, SFTPB, SFTPC, NKX2-1, FLAD1, LAS1L, NRXN1
Respiratory failure
ABCA3, MAPT, MTHFR, SFTPC, NKX2-1, TTN

Table S4. COVID-19 clinical studies used in the meta-analysis.

Study	Study period	Location	Patients	Non-severe	Severe	Male	Age	PubMed ID / DOI
Kim, ES	Jan.19 - Feb.17, 2020	Korea	28			15	42.6 ± 13.4	32242348
Qiu, CF	Jan.22 - Feb.12, 2020	Hunan, China	104		49	43 ± 7.5	10.1101/2020.03.04.20026005	
Xu, YH	Jan. - Feb., 2020	Hebei, China	50		29	43.9 ± 16.8	32109443	
Zhao, W	Dec. 2019 - Feb., 2020	Hunan, China	101		56	44.4 ± 12.3	32125873	
Yang, W	Jan.17 - Feb.10, 2020	Zhejiang, China	149		81	45.1 ± 13.4	32112884	
Li, K	Jan. - Feb., 2020	Chongqing, China	83	58	25	44	45.5 ± 12.3	32118615
Wu, J	Jan.22 - Feb.14, 2020	Jiangsu, China	80		39	46.1 ± 15.4	32109279	
Liu, J	Jan.5 - Jan.24, 2020	Wuhan, China	40	27	13	15	48.7 ± 13.9	10.1101/2020.02.16.20023671
Ai, JW	Dec. 2019 - Feb.10, 2020	Hubei, China	102			52	50.4 ± 16.9	10.1101/2020.02.19.20025023
Mao, L	Jan.16 - Jan.19, 2020	Wuhan, China	214	126	88	87	52.7 ± 15.5	10.1101/2020.02.22.20026500
Leung	Jan.26 - Feb.28, 2020	Hong Kong, China	50			23	55.2 ± 19.5	10.1101/2020.03.30.20045740
Huang, Y	Dec.2019 - Jan., 2020	Wuhan, China	34			14	56.2 ± 17.1	32114074
Zhang, JJ	Jan.16 - Feb.3, 2020	Wuhan, China	140	82	58		25 - 57 - 87	32077115
Mo, P	Jan.1 - Feb.5, 2020	Wuhan, China	155	70	85	86	42 - 54 - 66	32173725
Wang, Z	Jan.16 - Jan.29, 2020	Wuhan, China	69	55	14	32	35 - 42 - 62	32176772
Xu, X	Jan.23 - Feb.4, 2020	Guangdong, China	90			39	18 - 50 - 86	32107577
Tian, S	Jan.10 - Feb.10, 2020	Beijing, China	262			127	1 - 47.5 - 94	32112886
Chen, J	Jan.20 - Feb.6, 2020	Shanghai, China	249			126	36 - 51 - 64	32171869
Wang, D	Jan.1 - Jan.28, 2020	Wuhan, China	138	102	36	75	42 - 56 - 68	32031570
Wan, S	Jan.23 - Feb.8, 2020	Chongqing, China	135	95	40	72	36 - 47 - 55	32198776
Zhou, F	Dec.29, 2019 - Jan.31, 2020	Wuhan, China	191			119	46 - 56 - 67	32171076
Lu, HZ	Jan.1 - Feb.9, 2020	Shanghai, China	265	243	22			10.1101/2020.02.19.20025031
Lu, JT	Jan.21 - Feb.5, 2020	Wuhan, China	75			37	48 - 62 - 71	10.1101/2020.02.20.20025510
Lei, L	Jan.20 - Feb.3, 2020	Chongqing, China	51	44	7	32	34 - 45 - 51	10.1101/2020.02.20.20025536
Guan, WJ	Dec. 2019 - Jan.29, 2020	Whole China	1099	926	173	640	35 - 47 - 58	32109013
Yan, SJ	Jan.22 - Mar.13, 2020	Hainan, China	168	132	36	81	36 - 51 - 62	10.1101/2020.03.19.20038539
Wang, YF	Jan.1 - Feb.10, 2020	Wuhan, China	110	72	38	48		10.1101/2020.03.02.20029306
Liu, YL	Jan.2 - Feb.1, 2020	Wuhan, China	109	56	53	59	43 - 55 - 66	10.1101/2020.02.17.20024166
Cai, QX	Jan.11 - Feb.6, 2020	Shenzhen, China	298			149	33 - 47 - 61	10.1101/2020.02.17.20024018
Feng, ZC	Jan.17 - Feb.1, 2020	Changsha, China	141	126	15	72	34 - 44 - 55	10.1101/2020.02.19.20025296
Liu, JY	Jan.13 - Jan.31, 2020	Beijing, China	61	44	17	31	1 - 40 - 86	10.1101/2020.02.10.20021584
Ai, JW	Jan.22 - Feb.9, 2020	Eastern China cities	20			10	33.75 - 37 - 50.5	10.1101/2020.02.13.20022673
Qian, GQ	Jan.20 - Feb.11, 2020	Zhejiang, China	91			37	36.5 - 50 - 57	32181807
Chen, G	Dec. 2019 - Jan.27, 2020	Wuhan, China	21	10	11	17	50 - 56 - 65	32217835

Ages are in the format of “mean ± standard deviation” and “lower quartile – median – upper quartile”.

Table S5. Proposed repurposable drugs and their antiviral profiles.

Name	Proximity HCoV-PPI		Proximity SARS2-DEG		Proximity SARS2-DEP		Proximity SARS2-PPI		GSEA					Antiviral profiles	
	Z	P	Z	P	Z	P	Z	P	SARS2-DEG	SARS2-DEP	MERS	SARSA	SARSb	PubMed ID	Virus
Azithromycin	-0.68	0.21	-0.11	0.47	-3.03	0.00	-3.57	0.00	-	-	-	-	-	20150207, 28839081	RV, ZIKV
Tetracycline	0.05	0.58	-0.69	0.24	-3.31	0.00	-2.71	0.00	0.00	0.30	0.38	0.00	0.77	17872917, 15855434	WNV, HIV
Cefdinir	-1.96	0.03	-1.61	0.04	-1.71	0.03	-1.29	0.05	-	-	-	-	-		
Cefaclor	0.57	0.70	-0.89	0.16	-2.02	0.00	-2.07	0.00	0.00	0.29	0.48	0.47	0.60		
Dexibuprofen	2.00	0.02	-3.23	0.00	-2.60	0.00	-0.81	0.19	0.00	0.00	0.37	0.39	0.58	26167272	EBOV
Lifitegrast	-2.08	0.00	-0.27	0.40	-1.55	0.00	-0.99	0.01	-	-	-	-	-		
Hydrocortisone	2.03	0.01	-0.81	0.15	-2.00	0.00	-1.52	0.00	-	-	-	-	-		
Toremifene	-2.95	0.01	-2.36	0.01	-3.17	0.01	-2.03	0.02	-	-	-	-	-	27362232, 29566060, 24841273, 24841269	EBOV, MERS-CoV, SARS-CoV
Dacarbazine	-1.41	0.07	-1.85	0.02	-2.70	0.00	-4.14	0.00	0.54	0.26	0.00	0.00	0.00		
Melatonin	-1.57	0.05	-0.86	0.09	-1.42	0.05	-0.04	0.32	0.00	0.39	0.53	0.00	0.57	25262626, 20070490	EBOV, RSV
Megestrol acetate	0.66	0.23	-0.49	0.33	-2.02	0.01	-1.90	0.01	0.00	0.37	0.00	0.49	0.62		
Temsirolimus	-1.90	0.02	-0.69	0.26	-3.08	0.00	-1.77	0.03	-	-	-	-	-	23135723, 26276683	ANDV, HCV
Cyclosporine	-0.79	0.20	-1.05	0.15	-3.53	0.00	-3.00	0.00	0.00	0.00	0.50	0.46	0.67	21752960, 27890789, 16382464	SARS-CoV, HCoV-229E, MHV, HBV, HCV
Thalidomide	-1.43	0.05	-2.00	0.03	-0.72	0.12	-0.07	0.27	0.38	0.00	0.00	0.00	0.40	11598844, 12660941	HIV, CMV
Pimecrolimus	-1.78	0.03	-0.23	0.43	-2.41	0.00	-1.24	0.08	-	-	-	-	-		
Procaterol	-1.61	0.04	-0.41	0.38	-3.66	0.00	-2.74	0.00	-	-	-	-	-	20940011	RV
Terbutaline	-0.92	0.15	0.79	0.80	-3.81	0.00	-2.04	0.01	0.00	0.26	0.39	0.00	0.52		
Salbutamol	-1.03	0.14	0.54	0.72	-3.64	0.00	-2.55	0.00	0.00	0.58	0.44	0.00	0.68		
Carvediolol	-1.98	0.02	-0.45	0.18	-2.91	0.01	-1.74	0.03	-	-	-	-	-	12535832	EMCV
Timolol	-0.76	0.18	0.10	0.61	-3.15	0.00	-2.46	0.00	0.00	0.00	0.41	0.67	0.81		
Sotalol	-1.08	0.11	0.37	0.68	-3.46	0.00	-1.95	0.00	0.30	0.41	0.64	0.00	0.66		
Bisoprolol	-0.91	0.15	-0.17	0.51	-2.83	0.00	-1.87	0.00	0.41	0.38	0.00	0.53	0.68		
Penbutolol	-0.87	0.17	-0.25	0.43	-3.23	0.00	-2.41	0.00	0.00	0.34	0.40	0.00	0.73		
Bretylium	-0.96	0.14	-0.54	0.29	-4.19	0.00	-3.10	0.00	0.00	0.27	0.55	0.58	0.65		
Irbesartan	4.96	0.01	-2.08	0.02	-3.53	0.01	-3.12	0.01	-	-	-	-	-	25929767, 26086883, 24717262	HBV, HDV
Amitriptyline	-2.63	0.01	0.35	0.62	-3.12	0.01	-3.04	0.01	0.00	0.54	0.62	0.00	0.88	15888438, 19834551	RV, MV
Chloroquine	0.71	0.72	-1.50	0.07	-2.90	0.00	-2.82	0.00	0.00	0.00	0.00	0.00	0.00	32020029, 14592603, 24841269, 11166661, 2821967, 3752892, 19760134, 16729896, 6842189, 18620511, 2154882, 27916837, 26459826	SARS-CoV-2, SARS-CoV, MERS-CoV, HIV, HAV, HBV, HCV, IAV, IBV, CHIKV, DENV, ZIKV, EBOV
Iloprost	1.44	0.91	-0.30	0.41	-1.60	0.05	-2.63	0.01	0.45	0.34	0.56	0.60	0.59		
Brexipiprazole	-1.58	0.04	1.00	0.84	-3.11	0.00	-1.37	0.07	-	-	-	-	-		
Deferoxamine	-1.40	0.07	-1.69	0.03	-2.66	0.01	-2.27	0.04	0.00	0.28	0.48	0.00	0.52	10669330, 28583206	HIV, WNV
Gallamine Triethiodide	1.97	0.98	0.37	0.69	-1.70	0.04	-1.66	0.03	0.00	0.00	0.44	0.59	0.54		
Pegademase	-1.71	0.04	-0.97	0.07	-1.54	0.03	-0.33	0.20	-	-	-	-	-		
Lansoprazole	-0.47	0.29	-0.42	0.36	-1.61	0.05	-2.86	0.00	0.00	0.39	0.48	0.00	0.63	15733557	RV
Palmitic Acid	-2.19	0.02	-0.77	0.24	-2.86	0.00	-1.94	0.01	-	-	-	-	-	31676430, 20001317	SVCV, HIV

HIV, human immunodeficiency virus. EBOV, Zaire ebolavirus. RV, rhinovirus. HAV, hepatitis A virus. HBV, hepatitis B virus. HCV, hepatitis C virus. HDV, hepatitis D virus. SARS-CoV-2, severe acute respiratory syndrome coronavirus 2. SARS-CoV, severe acute respiratory syndrome coronavirus. MERS-CoV, Middle East respiratory syndrome coronavirus. HCoV-229E, human coronavirus 229E. MHV, mouse hepatitis virus. IAV, influenza A virus. IBV, influenza B virus. WNV, West Nile virus. ZIKV, Zika virus. ANDV, Andes virus. CHIKV, chikungunya virus. CMV, cytomegalovirus. DENV, dengue virus. EMCV, encephalomyocarditis virus. MV, measles virus. RSV, respiratory syncytial virus. SVCV, spring viremia of carp virus.

Figure S1

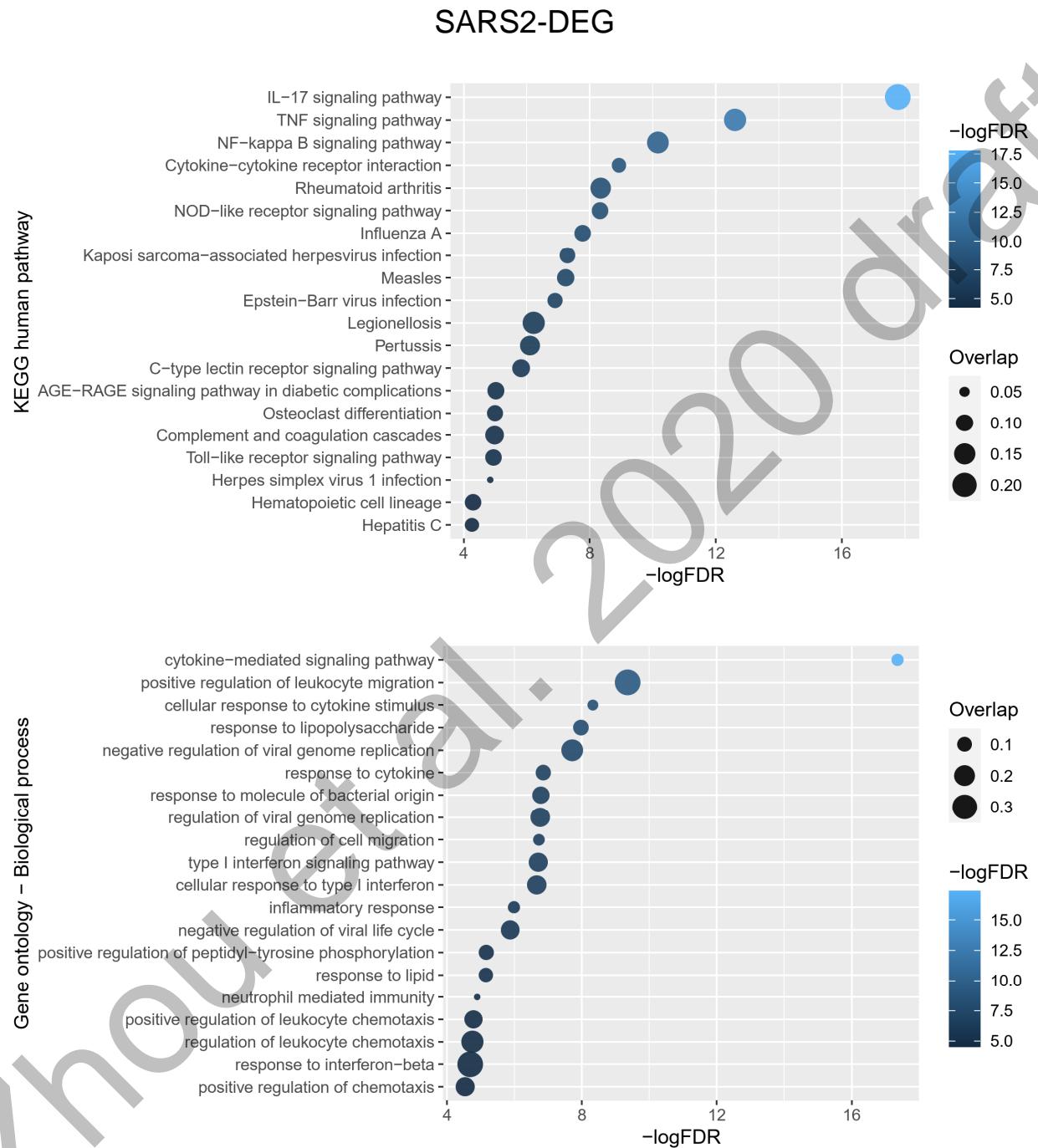


Figure S1. Functional enrichment analysis for SARS2-DEG. 246 differentially expressed genes (DEGs) in human bronchial epithelial cells infected with SARS-CoV-2 were obtained from the NCBI GEO database with the accession number GSE147507, denoted as SARS2-DEG.

Figure S2

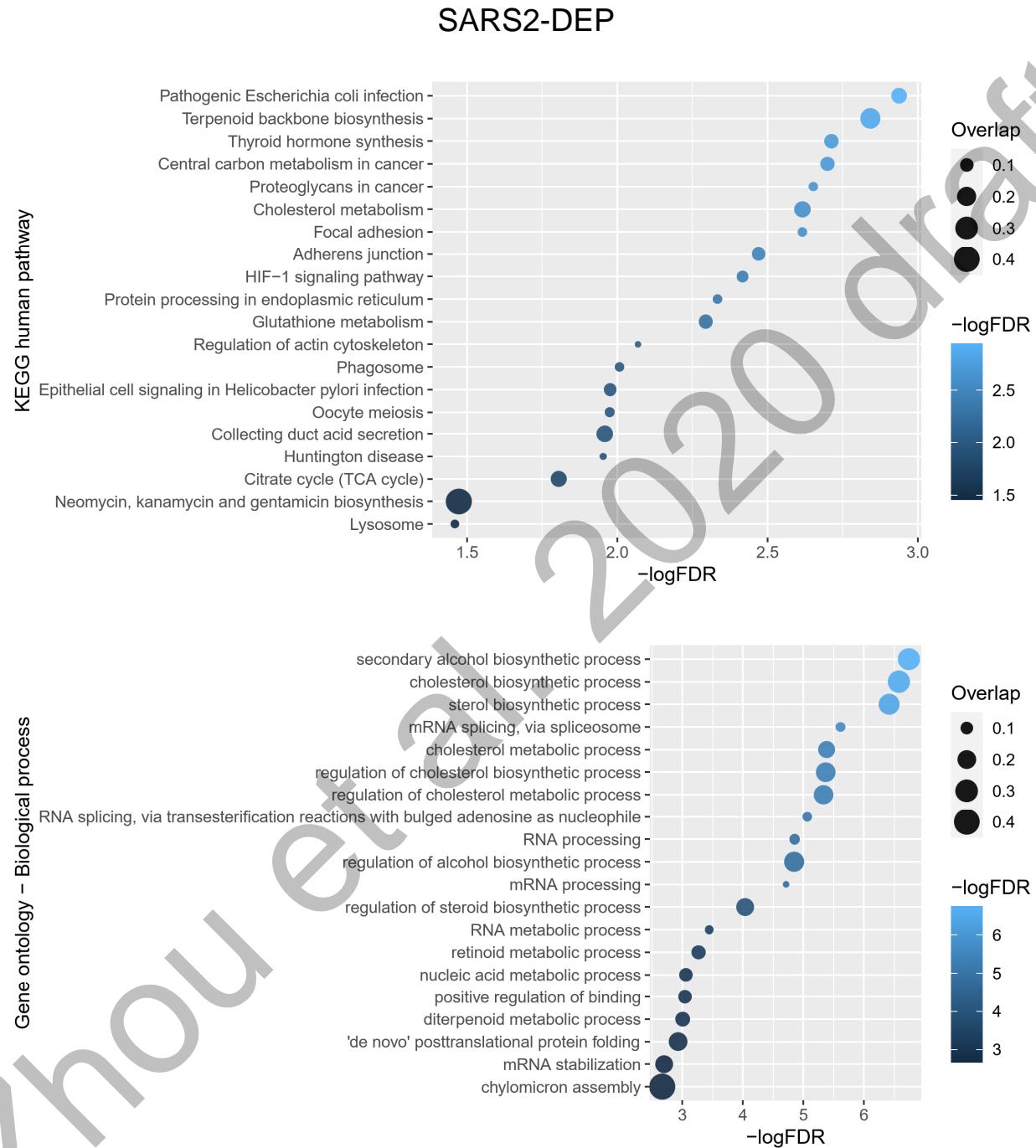


Figure S2. Functional enrichment analysis for SARS2-DEP. 293 differentially expressed proteins (DEPs) in human Caco-2 cells infected with SARS-CoV-2 were obtained from Bojkova, D. et al. (doi:10.1038/s41586-020-2332-7), denoted as SARS2-DEP.

Figure S3

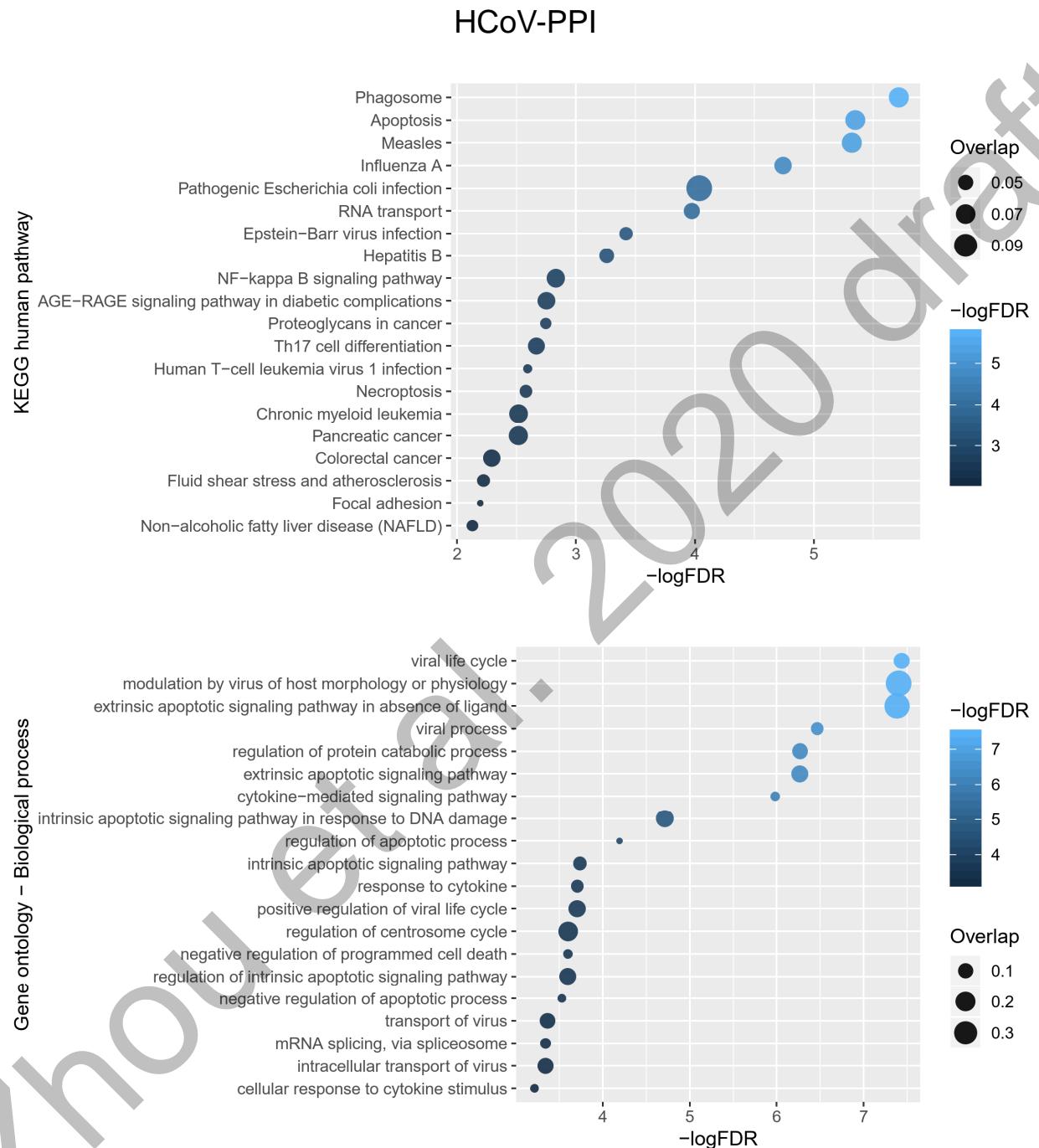


Figure S3. Functional enrichment analysis for HCoV-PPI. This data set contains 134 strong literature evidence-based pan-human coronavirus target host proteins from Zhou, Y. et al. (doi:10.1038/s41421-020-0153-3) with 15 newly curated proteins, denoted as HCoV-PPI.

Figure S4

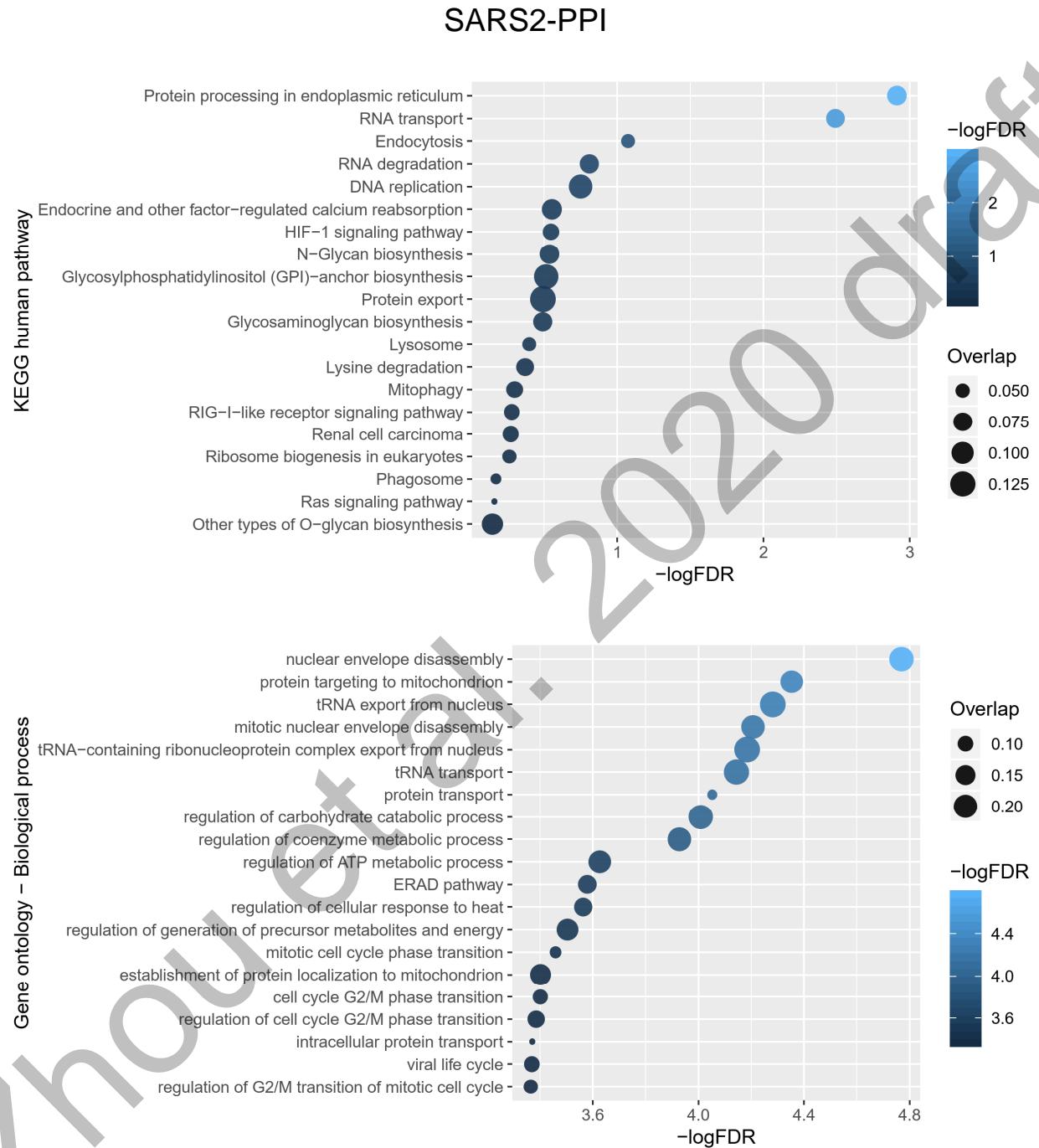


Figure S4. Functional enrichment analysis for SARS2-PPI. This data set contains 332 proteins involved in the protein-protein interactions with 26 SARS-CoV-2 viral proteins identified by affinity purification-mass spectrometry from Gordon, D. E. et al. (doi:10.1038/s41586-020-2286-9), denoted as SARS2-PPI.

Figure S5

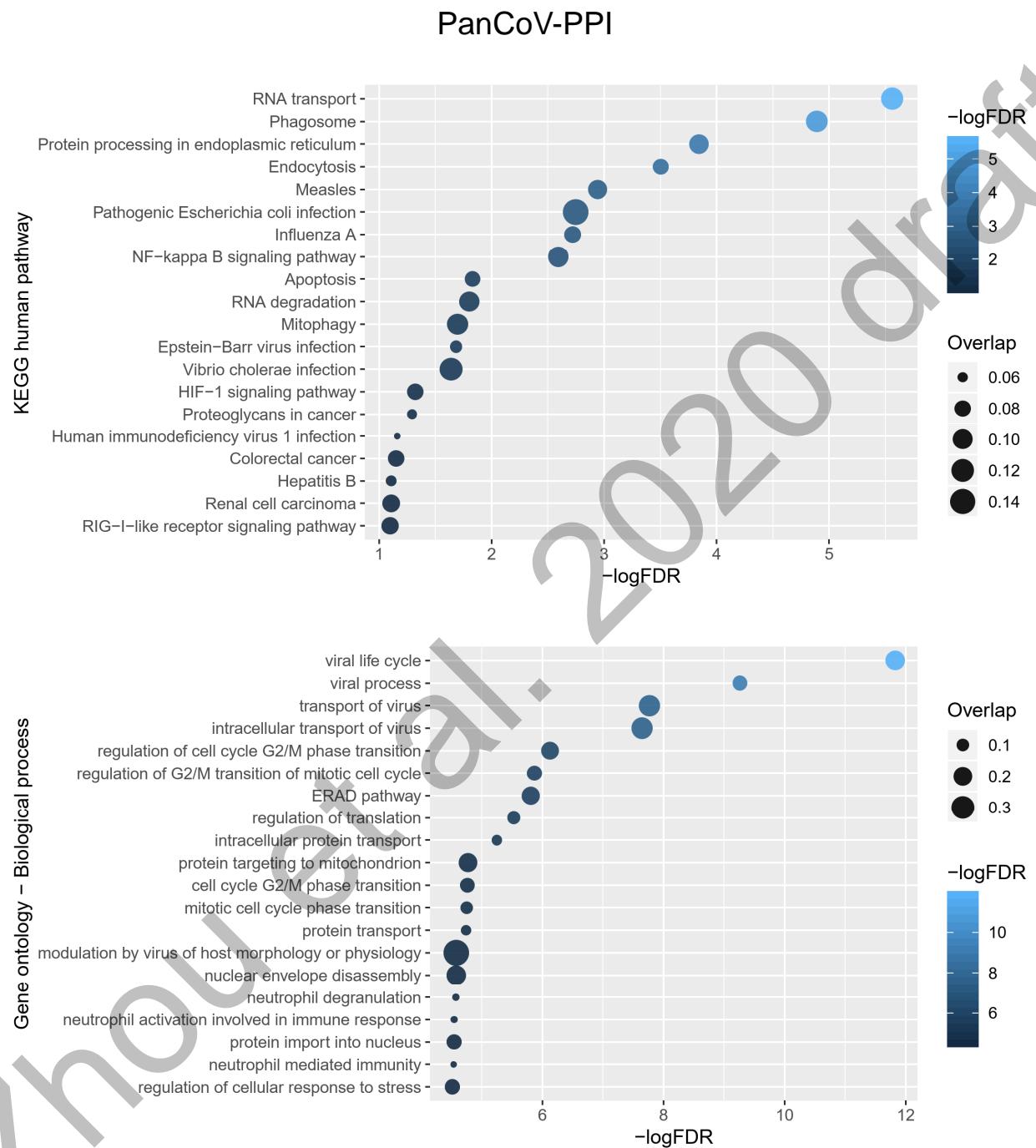
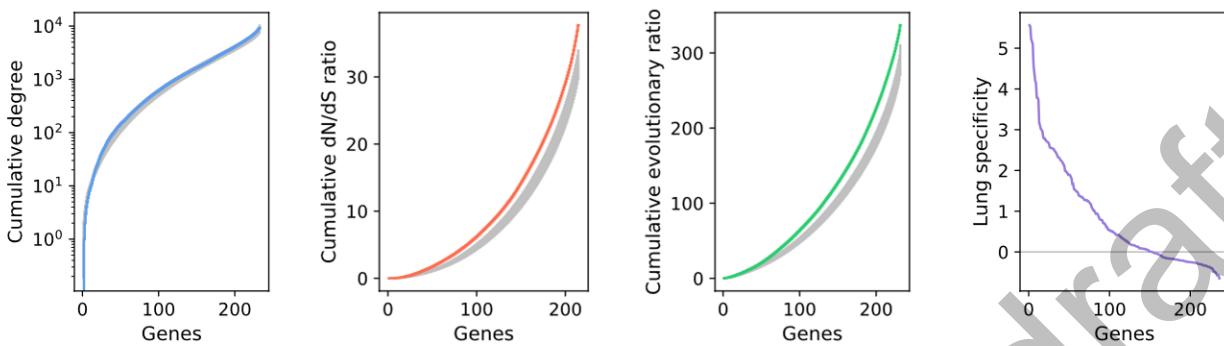


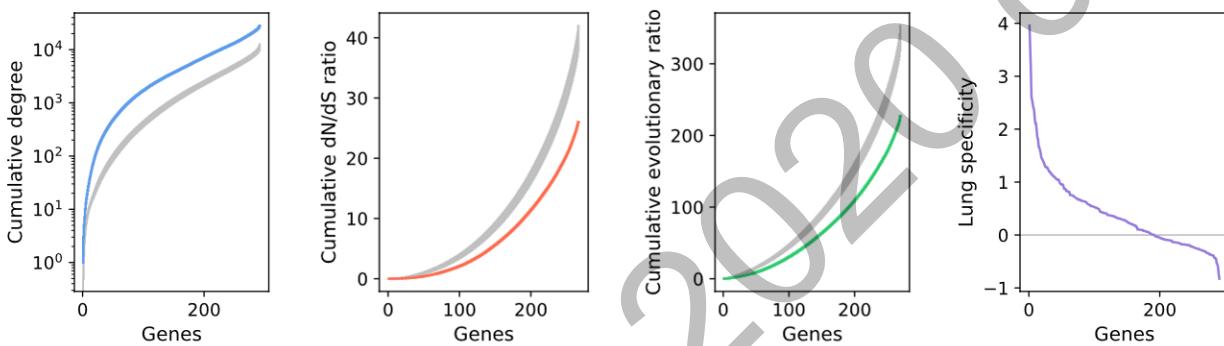
Figure S5. Functional enrichment analysis for PanCoV-PPI. Due to the interactome nature of HCoV-PPI and SARS2-PPI, we combined these data sets as the fifth SARS-CoV-2 data set, which has 460 proteins and is denoted as PanCoV-PPI.

Figure S6

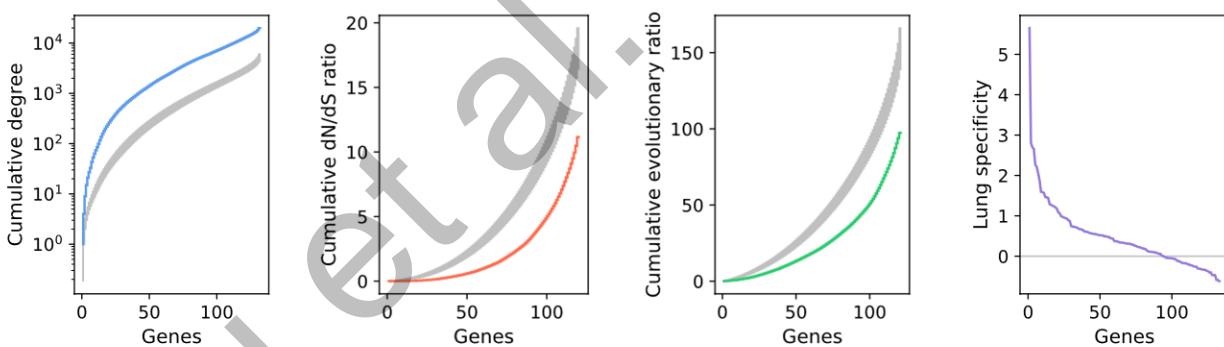
SARS2-DEG



SARS2-DEP



HCoV-PPI



SARS2-PPI

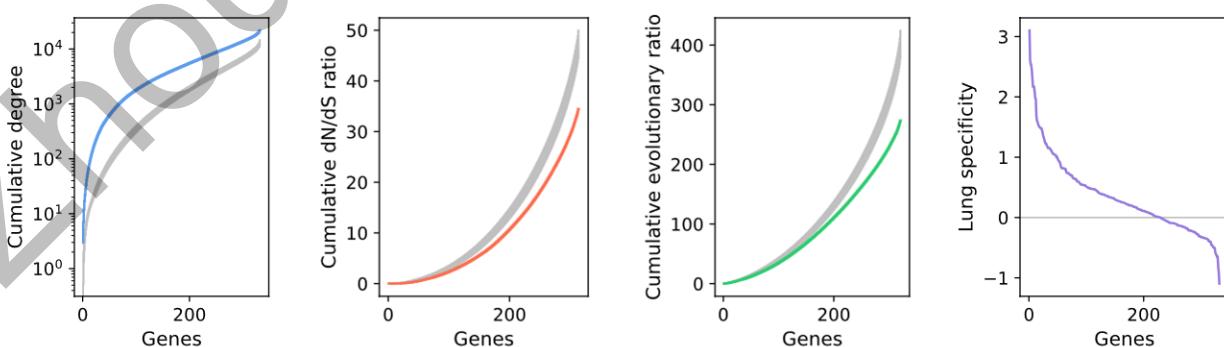
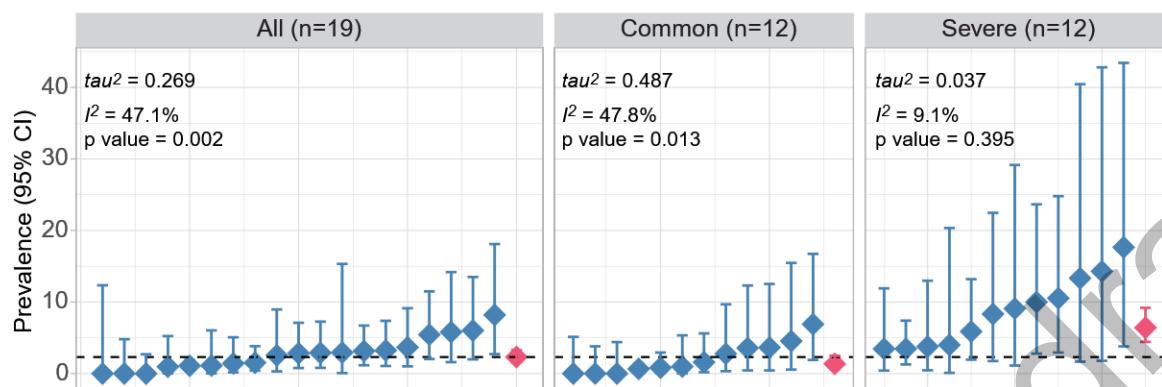


Figure S6. Characteristics of the four SARS-CoV-2 target data sets. Node degree (blue), dN/dS ratio (orange), evolutionary ratio (green), and lung expression specificity (purple) are shown for each data sets. Grey areas indicate mean \pm standard deviation of 100 repeats using randomly selected genes.

Figure S7

A COPD studies Pooled effects (Random model)



B

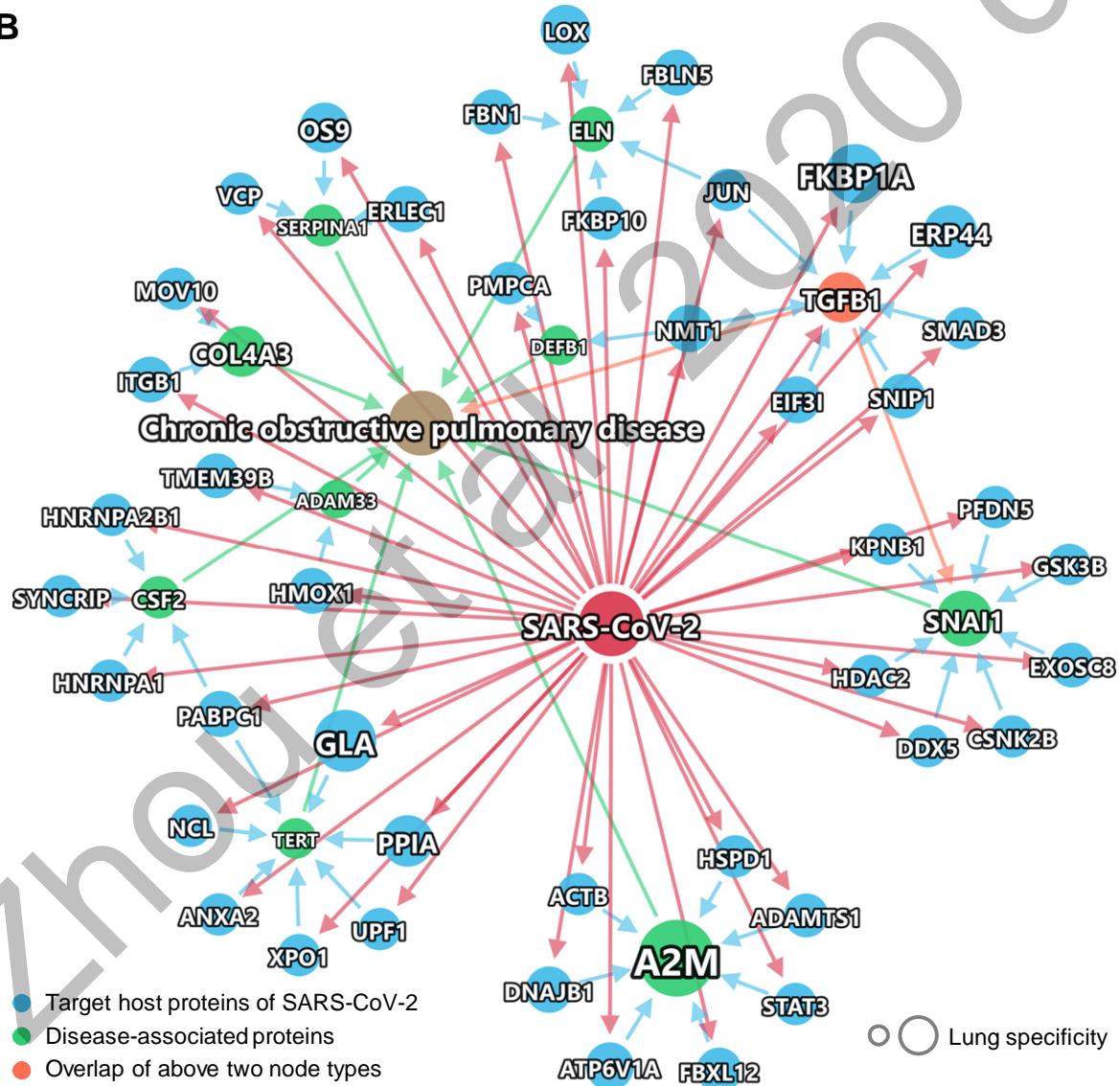


Figure S7. Chronic obstructive pulmonary disease and COVID-19. (A) The risk of chronic obstructive pulmonary disease (COPD) is increased in severe COVID-19 patients. (B) Subnetwork shows the proteins potentially involved in the interaction between COPD and COVID-19. See Table S4 for the clinical studies used in the meta-analysis.

Figure S8

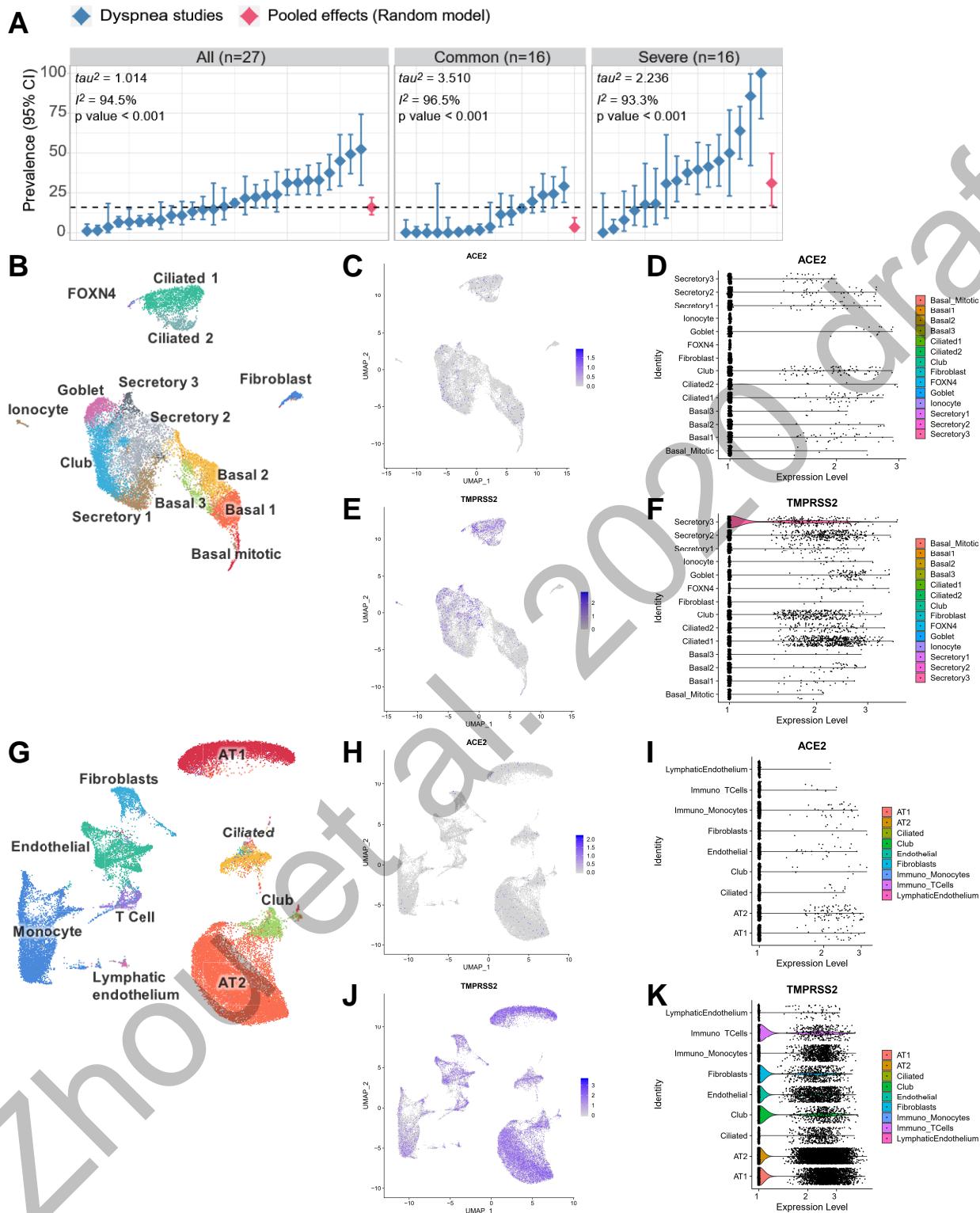
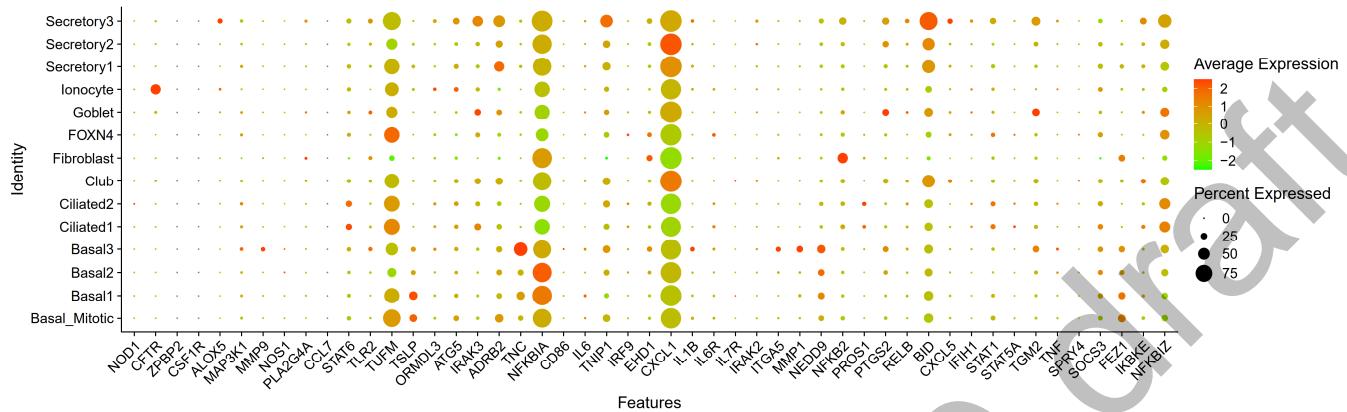


Figure S8. Asthma and COVID-19. (A) The risk of dyspnea is increased in severe COVID-19 patients. (B) UMAP visualization for human bronchial epithelial cells. (C, D) Expression levels of ACE2 across 14 cell types. (E, F) Expression levels of TMPRSS2 across 14 cell types. (G) UMAP visualization for lung cells. (H, I) Expression levels of ACE2 across 9 cell types. (J, K) Expression levels of TMPRSS2 across 9 cell types. The single cell data were retrieved from Lukassen, S. et al. (doi:10.15252/embj.20105114), which contains 39,778 lung cells and 17,451 bronchial epithelial cells.

Figure S9

A



B

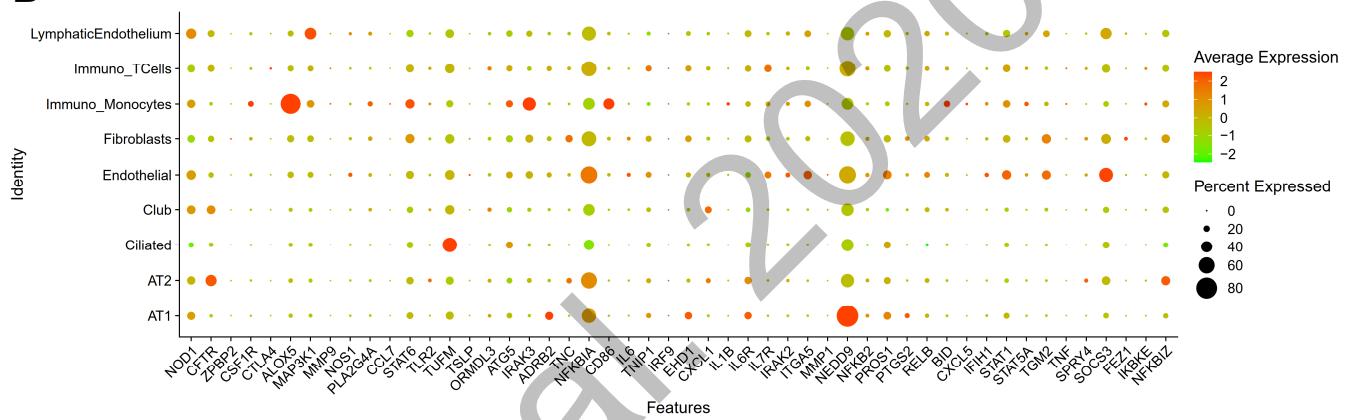


Figure S9. The expression of asthma genes and SARS-CoV-2 targets. The expression levels of the genes from the asthma-COVID-19 subnetwork in bronchial epithelial cells (A) and lung cells (B) are shown.

Figure S10

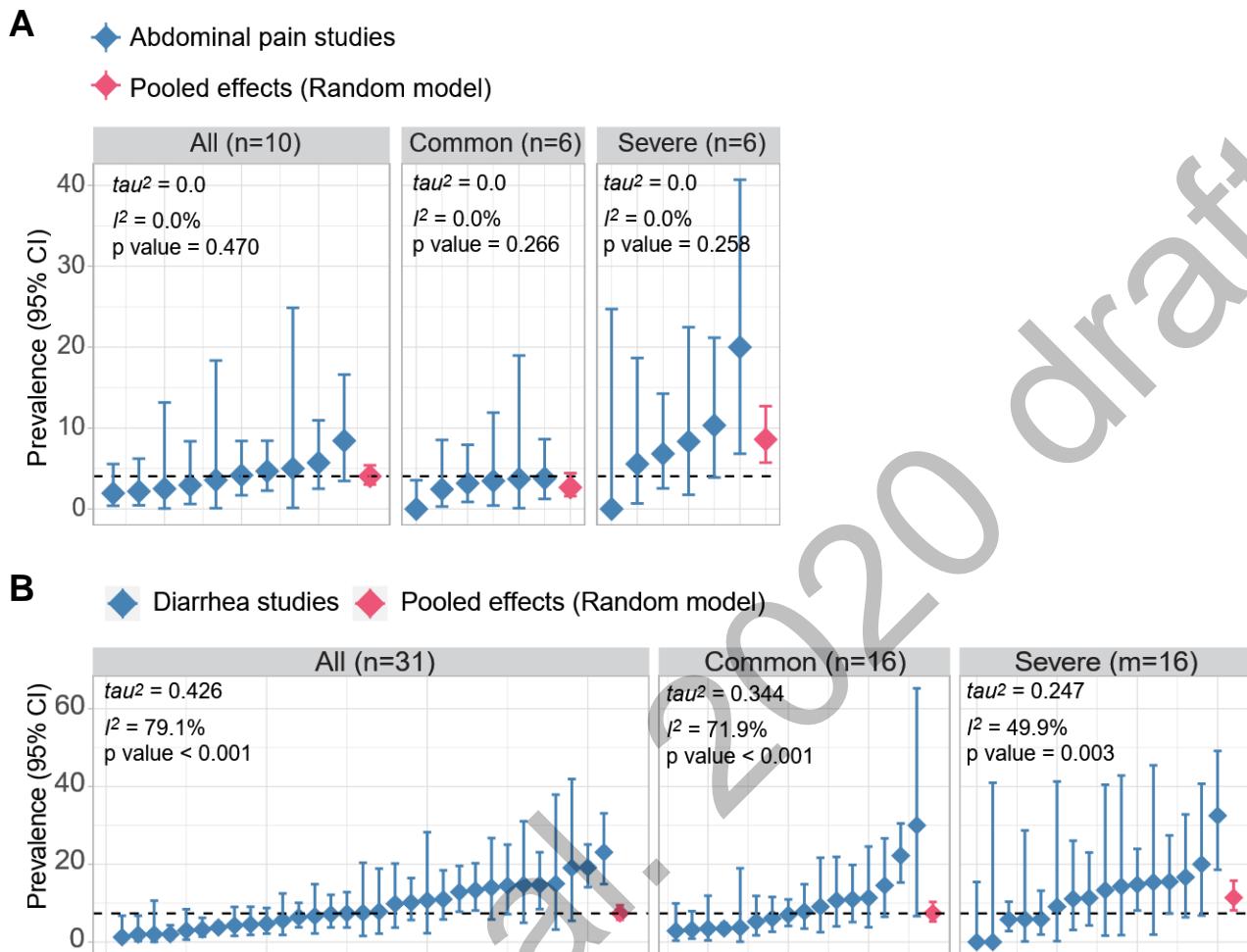


Figure S10. Risk ratios for abdominal pain and diarrhea in COVID-19 patients. Abdominal pain (A) and diarrhea (B) have increased risks in severe COVID-19 patients.

Figure S11

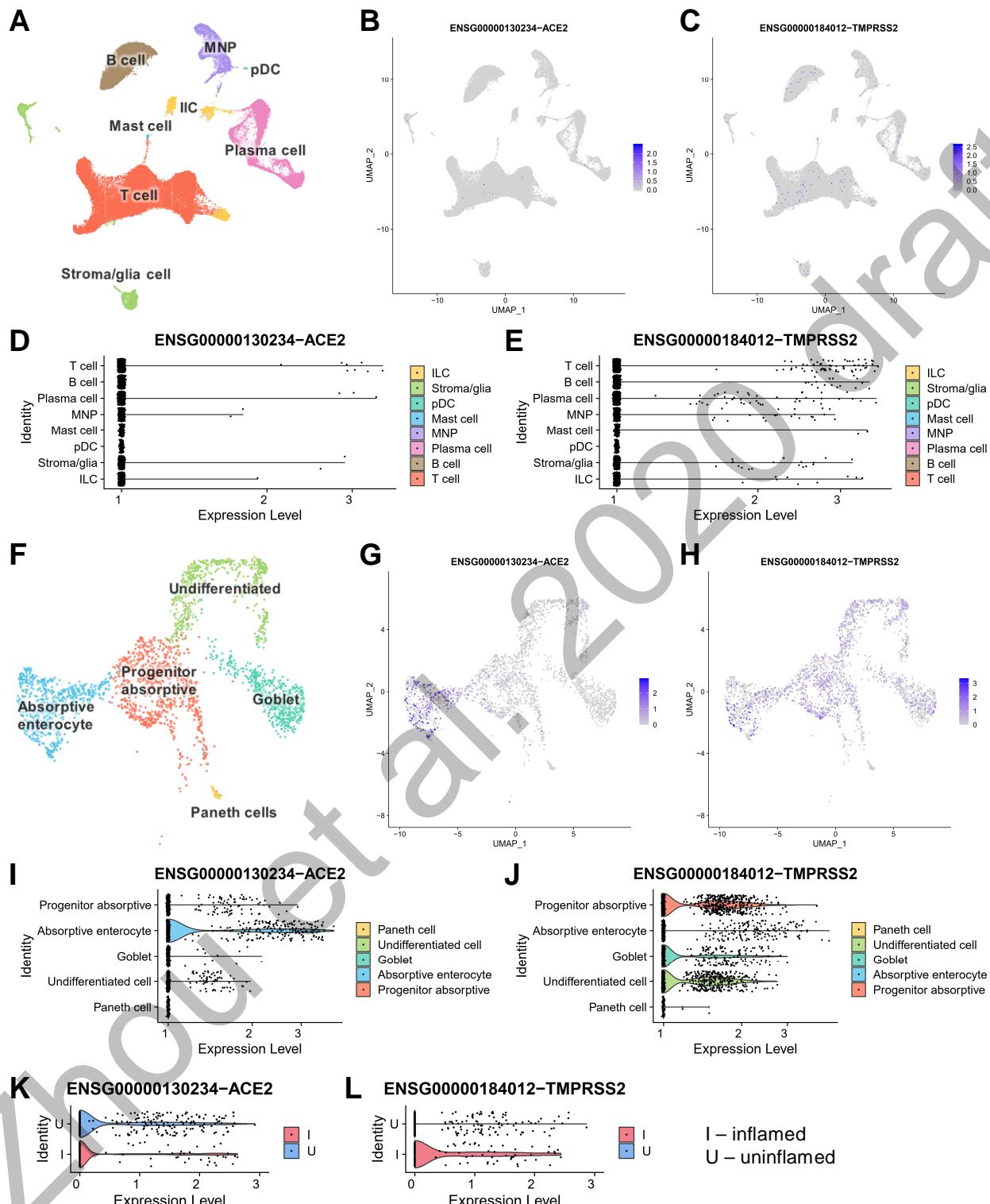


Figure S11. Inflammatory bowel disease and COVID-19. (A) UMAP visualization of non-epithelial cells from the ileal tissues of patients with Crohn's disease. (B, D) The expression of ACE2 in non-epithelial cells in A. (C, E) The expression of TMPRSS2 in non-epithelial cells in A. (F) UMAP visualization of epithelial cells from the ileal tissues of patients with Crohn's disease. (G, I) The expression of ACE2 in epithelial cells in F. (H, J) The expression of TMPRSS2 in epithelial cells in F. (K, L) The expression levels of ACE2 and TMPRSS2 in the inflamed versus uninflamed ileal absorptive enterocytes in Crohn's disease patients. The single cell data were retrieved from Martin, J. C. et al. (doi:10.1016/j.cell.2019.08.008), which contains 67,050 inflamed and uninflamed cells from the ileal samples of 8 patients with Crohn's disease.

Figure S12

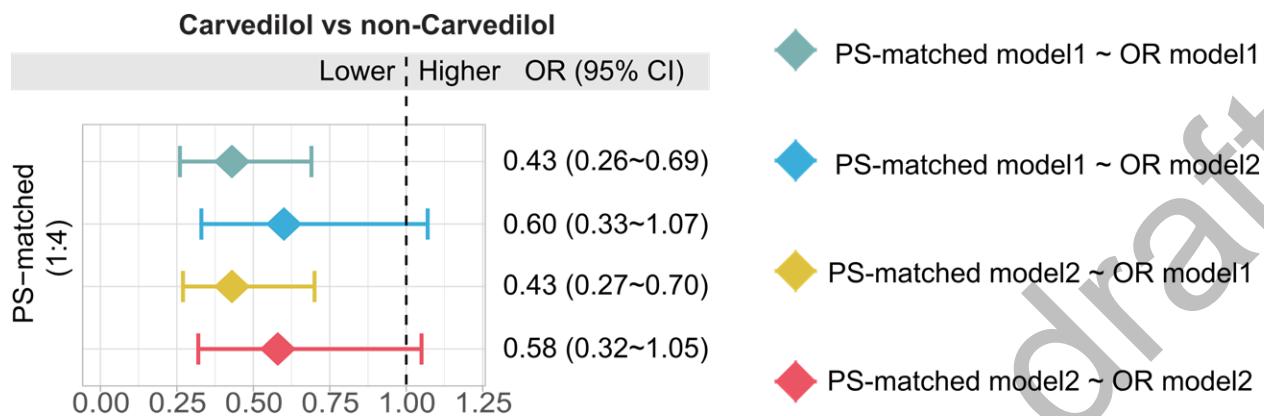


Figure S12. Patients data validation for carvedilol. PS, propensity score. OR, odds ratio. PS-matched model1 was matched using age, gender, race, and smoking; PS-matched model2 was matched using age, gender, race, smoking, coronary artery disease, diabetes, hypertension, and COPD. OR model1, the odds ratios of COVID-19 in melatonin exposure; OR model2, the odds ratios of COVID-19 in melatonin exposure adjusted by age, gender, race, smoking, coronary artery disease, diabetes, hypertension, and COPD.

Figure S13

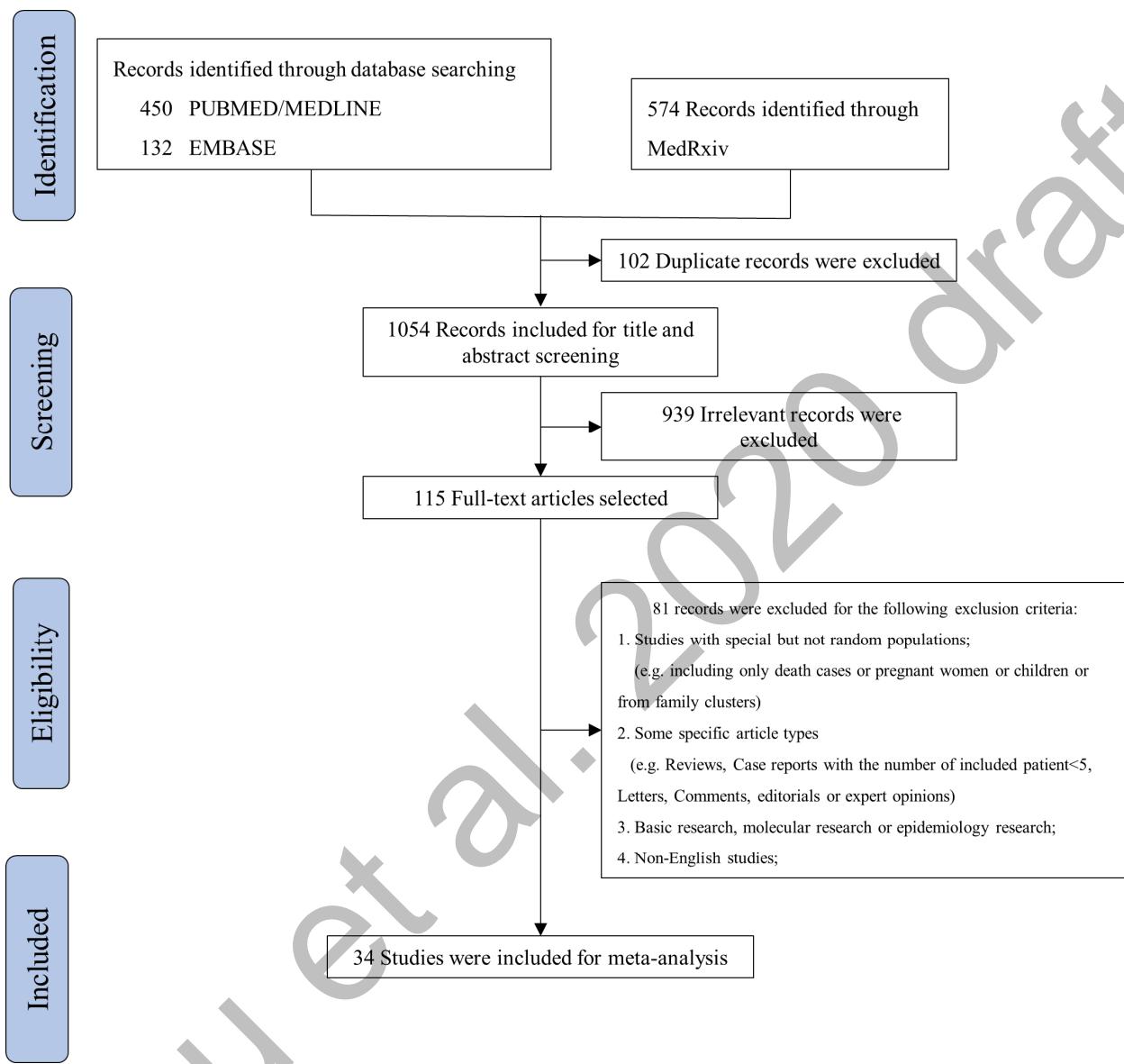


Figure S13. Workflow of clinical study search. We searched PubMed, Embase and Medrxiv databases for publications as of April 25th, 2020 using the search term (“SARS-COV-2” OR “COVID-19” OR “nCoV 19” OR “2019 novel coronavirus” OR “coronavirus disease 2019”) AND (“clinical characteristics” OR “clinical outcome” OR “comorbidities”). Only research articles were included. Several criteria were used to filter the initial 1,054 articles to a final of 34 studies for meta-analyses.