

SUPPLEMENTARY TABLE S1. Polymorphic Loci Associated with Susceptibility, Hospitalization, Severity, and Death of COVID-19.

Susceptibility to COVID-19	Hospitalization	Severity of COVID-19	Death due COVID-19
<i>ABLM2</i>	<i>ACTN4</i>	<i>ACSF3</i>	<i>ADAM33</i>
<i>ABO</i>	<i>ADAMTSL1</i>	<i>ADGRE1</i>	<i>AGTR1</i>
<i>ABTB2</i>	<i>AP1S3</i>	<i>ADGRL4</i>	<i>APOC1</i>
<i>ACE2</i>	<i>ATP13A3</i>	<i>AGAP1</i>	<i>CADM2</i>
<i>ADAMTS6</i>	<i>C10orf143</i>	<i>AK5</i>	<i>CERKL</i>
<i>ADGRE1</i>	<i>CELF2</i>	<i>ALDH1A2</i>	<i>CNTNAP5</i>
<i>AHI1</i>	<i>CPNE4</i>	<i>APOC1</i>	<i>CTNNA3</i>
<i>ANK2</i>	<i>CSGALNACT1</i>	<i>APOE</i>	<i>CTRC</i>
<i>ANKLE2</i>	<i>DMD</i>	<i>ASTN2</i>	<i>FYC01</i>
<i>ANKRD60</i>	<i>EGFR</i>	<i>BEND7</i>	<i>GALNT16</i>
<i>ARFGEF3</i>	<i>FBN3</i>	<i>BPIFC</i>	<i>GRIN2D</i>
<i>ARID3A</i>	<i>FER</i>	<i>CADM2</i>	<i>IQSEC1</i>
<i>ARSJ</i>	<i>FXYD5</i>	<i>CCR3</i>	<i>KIAA0513</i>
<i>ASRGL1</i>	<i>HIVEP2</i>	<i>CDH8</i>	<i>LRRC4C</i>
<i>ATCAY</i>	<i>HPSE2</i>	<i>CERKL</i>	<i>LZTFL1</i>
<i>ATF7IP2</i>	<i>HSF2BP</i>	<i>CHIT1</i>	<i>NCAM1</i>
<i>BCL2L14</i>	<i>KALRN</i>	<i>CNTNAP5</i>	<i>PRKCE</i>
<i>BSG</i>	<i>KCNAB2</i>	<i>CRMP1</i>	<i>RASGEF1B</i>
<i>C12orf75</i>	<i>KCNH5</i>	<i>CTRC</i>	<i>RGS17</i>
<i>CA10</i>	<i>KIF13A</i>	<i>DDX46</i>	<i>SCFD2</i>
<i>CACNA1D</i>	<i>KLHL4</i>	<i>DKK2</i>	<i>SNTG2</i>
<i>CASS4</i>	<i>LDLRAD4</i>	<i>DKK3</i>	<i>TRIOBP</i>
<i>CCDC148</i>	<i>LGALS3BP</i>	<i>DLG5</i>	
<i>CCHCR1</i>	<i>MALRD1</i>	<i>DNAH17</i>	
<i>CDH11</i>	<i>MT2A</i>	<i>DOP1B</i>	
<i>CDH22</i>	<i>MTMR7</i>	<i>EMCN</i>	
<i>CDH4</i>	<i>NFASC</i>	<i>GABPB2</i>	
<i>CEP44</i>	<i>PATJ</i>	<i>GALNTL6</i>	
<i>CEP97</i>	<i>PIEZO1</i>	<i>GRIN2D</i>	
<i>CHRNA7</i>	<i>PIP4P1</i>	<i>GUCY1A2</i>	
<i>CLNS1A</i>	<i>PLGRKT</i>	<i>KIR2DL3</i>	
<i>CNTNAP5</i>	<i>RAPGEF4</i>	<i>LRRC1</i>	
<i>COL24A1</i>	<i>ROBO2</i>	<i>LRRC4C</i>	
<i>COLGALT2</i>	<i>ROR2</i>	<i>LZTFL1</i>	
<i>CRACD</i>	<i>SART1</i>	<i>MAPT</i>	
<i>CSMD1</i>	<i>SEC16A</i>	<i>MBOAT1</i>	
<i>DACH1</i>	<i>SERPINF1</i>	<i>MUC22</i>	
<i>DCDC2C</i>	<i>SFTPD</i>	<i>NAALADL2</i>	
<i>DDX60L</i>	<i>SGCZ</i>	<i>NCAM1</i>	
<i>DLC1</i>	<i>SLC30A9</i>	<i>NFIA</i>	
<i>DLEU1</i>	<i>SSPN</i>	<i>NSG1</i>	
<i>DMD</i>	<i>STK3</i>	<i>PLEKHG4B</i>	
<i>DPP10</i>	<i>TENM3</i>	<i>PLXNB2</i>	
<i>DPP9</i>	<i>TIAM2</i>	<i>PML</i>	
<i>DTX1</i>	<i>TLN2</i>	<i>PPFIA2</i>	
<i>EGF</i>	<i>VDR</i>	<i>PRKG1</i>	
<i>EGF</i>	<i>WDR7</i>	<i>PTCHD4</i>	
<i>EHMT1</i>	<i>WWC2</i>	<i>RAP1GAP2</i>	
<i>ELM01</i>	<i>ZBTB80S</i>	<i>RARB</i>	
<i>EPB41</i>	<i>ADAM33</i>	<i>RFLNA</i>	
<i>ERG</i>	<i>ADGRB3</i>	<i>RORA</i>	
<i>EXTL3</i>	<i>ANKS1B</i>	<i>SEMA4D</i>	
<i>FAM171A1</i>	<i>ANPEP</i>	<i>SLC16A9</i>	
<i>FHIT</i>	<i>ARFGEF1</i>	<i>SLC37A3</i>	
<i>FLNB</i>	<i>ARHGAP5</i>	<i>SLC4A2</i>	
<i>FRY</i>	<i>ASIC2</i>	<i>SNTG2</i>	
<i>GALNT13</i>	<i>CADPS2</i>	<i>SPATA7</i>	
<i>GALNT18</i>	<i>CAMTA1</i>	<i>SPOCK1</i>	
<i>GAS7</i>	<i>CCND3</i>	<i>STK39</i>	
<i>GLRA3</i>	<i>CERS6</i>	<i>SYDE2</i>	
<i>GNB5</i>	<i>CFAP299</i>	<i>TBX22</i>	
<i>GSDMC</i>	<i>CPN2</i>	<i>TERLR1</i>	
<i>GSE1</i>	<i>DCAF5</i>	<i>TRIOBP</i>	
<i>GTF2E2</i>	<i>DHX15</i>	<i>USP47</i>	
<i>HAFML</i>	<i>DNM3</i>	<i>ZFPM2</i>	
<i>HBP1</i>	<i>DPP9</i>	<i>ZNF45</i>	
<i>HELLS</i>	<i>EIF3K</i>	<i>ZNF516</i>	
<i>HERC1</i>	<i>ERBB4</i>		
<i>HLA-DQB1</i>	<i>FAM107B</i>		
<i>HOPX</i>	<i>FHOD3</i>		
<i>HSD17B4</i>	<i>FN1</i>		
<i>HSPA4L</i>	<i>GPR158</i>		
<i>IGLV5-45</i>	<i>KCNG3</i>		
<i>IL32</i>	<i>KCNMA1</i>		
<i>JMY</i>	<i>MACC1</i>		
<i>KANSL1</i>	<i>MLLT3</i>		
<i>KBTBD11</i>	<i>PON1</i>		
<i>KCNQ3</i>	<i>PRSS23</i>		
<i>KIRREL3</i>	<i>PRTFDC1</i>		
<i>KLF12</i>	<i>RAB3GAP1</i>		
<i>KSR2</i>	<i>RBFOX1</i>		
<i>LRMDA</i>	<i>RYR1</i>		
<i>LRRFIP2</i>	<i>SEL1L3</i>		
<i>LSAMP</i>	<i>SMPD3</i>		
<i>LZTFL1</i>	<i>SNX13</i>		
<i>MACROD2</i>	<i>SORCS1</i>		
<i>MAGI1</i>	<i>TAF45</i>		
<i>MAGI2</i>	<i>TMEM132C</i>		
<i>MAP3K14</i>	<i>ULK4</i>		
<i>MCTP1</i>	<i>WWOX</i>		
<i>MKLN1</i>	<i>XCR1</i>		

SUPPLEMENTARY TABLE S1. Continued

Susceptibility to COVID-19	Hospitalization	Severity of COVID-19	Death due COVID-19
MLPH			
MPP7			
MRPL23			
MSH2			
MUC4			
MYH14			
NCALD			
NEGR1			
NEIL3			
NPHS2			
NR1I3			
NTN4			
NTNG1			
NUBPL			
NUMB			
NXPE3			
OAS1			
OLFM1			
OSBPL1A			
OTOG			
OTUD7A			
PAK4			
PALM			
PCSK6			
PDE10A			
PDLIM2			
PKNOX2			
PLEKHA4			
POC1A			
POLR2A			
PPHLN1			
PPM1H			
PPP2R2B			
PRKCA			
PRKD1			
PRKG1			
PRKN			
PTPRD			
PTPRS			
PUDP			
PUDP			
RAD51B			
RAG1			
RBFox1			
RFLNA			
RGS6			
RRAGD			
RYR2			
SCFD2			
SCRT2			
SDK2			
SEC14L1			
SETD2			
SFTPD			
SH3BGR			
SH3PXD2A			
SLC30A10			
SLC35F1			
SLC6A20			
SLIT1			
SOC6			
SOX2-OT			
SSPN			
ST3GAL1			
STK10			
STPG2			
STX17			
SUB1			
SYNJ1			
SYNRG			
SYT1			
SZT2			
TAS2R1			
TMEM260			
TMT1A			
TRAF3			
TRAPPC9			
TRIP12			
TTC39B			
TYSND1			
XCR1			
YAF2			
YES1			
ZBTB11			
ZC3HAV1			
ZDHHC14			
ZFP69B			
ZNF385D			

SUPPLEMENTARY TABLE S2. Results of Enrichment Analysis of Polymorphic Genes for Susceptibility to, Hospitalization for, Severity of, and Death from COVID-19.

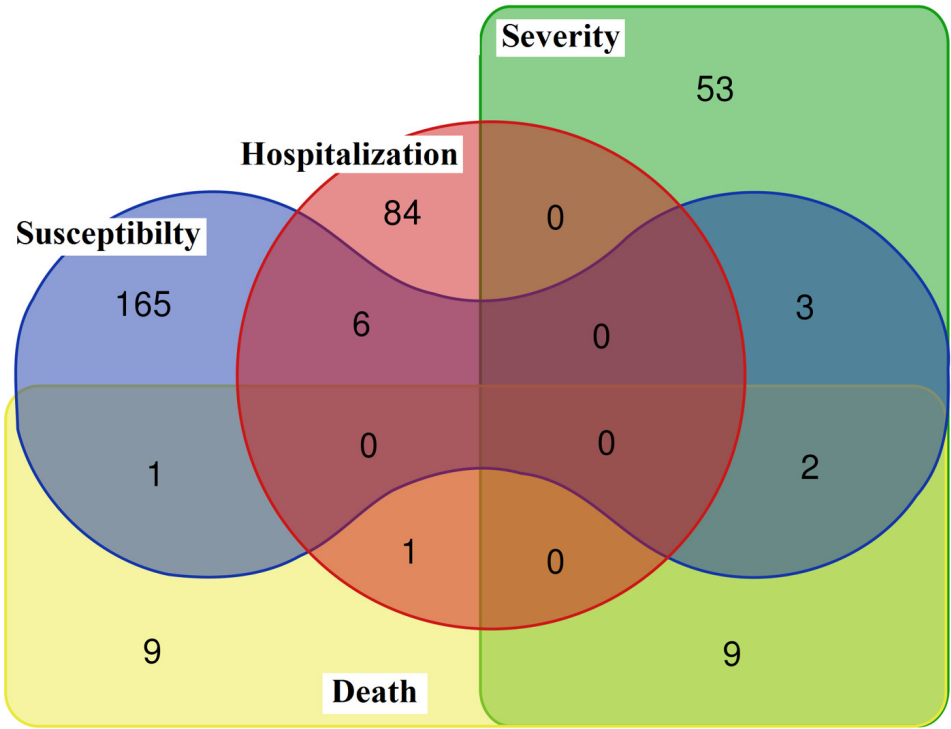
Index	Name	Adjusted <i>p</i> value	OR	Combined score
Susceptibility to COVID-19				
KEGG	Circadian entrainment	0.2578	6.23	39.70
Reactome	Regulation of KIT Signaling R-HSA-1433559	0.2009	26.27	209.03
GO biological process	Synaptic Membrane Adhesion (GO:0099560)	0.09598	37.96	336.46
GO cellular component	Adherens Junction (GO:0005912)	0.05837	5.67	44.57
GO molecular function	Alpha-Actinin Binding (GO:0051393)	0.2701	17.07	116.94
Hospitalization of patients				
KEGG	Focal adhesion	0.03418	7.14	57.57
Reactome	Voltage Gated Potassium Channels R-HSA-1296072	0.09765	16.93	117.22
GO biological process	Regulation of Intracellular Signal Transduction (GO:1902531)	0.04442	6.54	63.30
GO cellular component	Sarcolemma (GO:0042383)	0.01084	19.02	176.83
GO molecular function	Transmembrane Receptor Protein Kinase Activity (GO:0019199)	0.05470	19.93	146.77
Severity of COVID-19				
KEGG	Salivary secretion	0.1502	10.33	57.70
Reactome	Plasma Lipoprotein Assembly R-HSA-8963898	0.1248	43.78	291.36
GO biological process	Regulation of Neuron Projection Development (GO:0010975)	0.001315	13.81	182.11
GO cellular component	Chylomicron (GO:0042627)	0.02444	102.19	827.06
GO molecular function	Phosphatidylcholine-Sterol O-acyltransferase Activator Activity (GO:0060228)	0.01483	204.41	1863.51
Death due to COVID-19				
KEGG	Aldosterone synthesis and secretion	0.1163	20.71	109.12
Reactome	G Alpha (Z) Signaling Events R-HSA-418597	0.05766	44.30	297.48
GO biological process	Positive Regulation of Cellular Metabolic Process (GO:0031325)	0.07280	36.90	234.95
GO cellular component	NMDA Selective Glutamate Receptor Complex (GO:0017146)	0.1147	158.51	771.89
GO molecular function	Phosphatidylcholine-Sterol O-acyltransferase Activator Activity (GO:0060228)	0.08520	237.79	1237.70

COVID-19, coronavirus disease-2019; OR, odds ratio.

SUPPLEMENTARY TABLE S3. Shared Polymorphic Loci Between Any Two Traits Under Study (Susceptibility to, Hospitalization for, Severity of, and Death from COVID-19).

Traits	Number of shared loci	Symbols of genes
Susceptibility-hospitalization	6	<i>SSPN</i> ; <i>DMD</i> ; <i>SFTPD</i> ; <i>RBFOX1</i> ; <i>DPP9</i> ; <i>XCR1</i>
Susceptibility-severity	5	<i>CNTNAP5</i> ; <i>LZTFL1</i> ; <i>RFLNA</i> ; <i>PRKG1</i> ; <i>ADGRE1</i>
Susceptibility-death	3	<i>CNTNAP5</i> ; <i>LZTFL1</i> ; <i>SCFD2</i>
Hospitalization-severity	0	-
Hospitalization-death	1	<i>ADAM33</i>
Severity-death	11	<i>CNTNAP5</i> ; <i>LZTFL1</i> ; <i>SNTG2</i> ; <i>CERKL</i> ; <i>CTRC</i> ; <i>GRIN2D</i> ; <i>LRRC4C</i> ; <i>CADM2</i> ; <i>NCAM1</i> ; <i>TRIOBP</i> ; <i>APOC1</i>

COVID-19, coronavirus disease-2019.



SUPPLEMENTARY FIG. S1. Venn diagram showing the distribution of polymorphic loci in four sets of genes associated with susceptibility to, hospitalization for, severity of, and death from COVID-19.
COVID-19, coronavirus disease-2019.