Supplementary Data

Differentially Expressed Genes (DEGs) common between COVID-19 and AD

BIRC5: Baculoviral IAP Repeat Containing 5
C1QB: Complement C1q B Chain
CPM: Carboxypeptidase M
CYBB: Cytochrome B-245 Beta Chain
DLEU2: Deleted In Lymphocytic Leukemia 2
DSE: Dermatan Sulfate Epimerase
EBLN2: Endogenous Bornavirus Like Nucleoprotein 2
EHD4: EH Domain Containing 4
ELL2: Elongation Factor For RNA Polymerase II 2
ENO1: Enolase 1
F5: Coagulation Factor V
HGF: Hepatocyte Growth Factor
IGLV1-44: Immunoglobulin Lambda Variable 1-44
IRAK3: Interleukin 1 Receptor Associated Kinase 3
JAK2: Janus Kinase 2
MAP3K6: Mitogen-Activated Protein Kinase Kinase Kinase 6
PAQR4: Progestin And AdipoQ Receptor Family Member 4
SIGLEC16: Sialic Acid Binding Ig Like Lectin 16
TYMS: Thymidylate Synthetase
VIM: Vimentin
AMPH: Amphiphysin
AP2S1: Adaptor Related Protein Complex 2 Subunit Sigma 1
ARHGAP23: Rho GTPase Activating Protein 23
COPA: COPI Coat Complex Subunit Alpha
COX5A: Cytochrome C Oxidase Subunit 5A
DBI: Diazepam Binding Inhibitor, Acyl-CoA Binding Protein
PSEN2: Presenilin 2
ANK1: Ankyrin 1
GCAT: Glycine C-Acetyltransferase
SRD5A1: Steroid 5 Alpha-Reductase 1
SYN2: Synapsin II
ATP6V0A1: ATPase H+ Transporting V0 Subunit A1
CDC42BPA: CDC42 Binding Protein Kinase Alpha
FXYD6: FXYD Domain Containing Ion Transport Regulator 6
PAPSS1: 3'-Phosphoadenosine 5'-Phosphosulfate Synthase 1
PKM: Pyruvate Kinase M1/2
PLD3: Phospholipase D Family Member 3
SIRPA: Signal Regulatory Protein Alpha
ENO2: Enolase 2
FGFR1OP: Centrosomal Protein 43
MYH11: Myosin Heavy Chain 11
ZNF91: Zinc Finger Protein 91
CHI3L1: Chitinase 3 Like 1
PHLDB2: Pleckstrin Homology Like Domain Family B Member 2
SLPI: Secretory Leukocyte Peptidase Inhibitor
CXCL5: C-X-C Motif Chemokine Ligand 5
GATA3: GATA Binding Protein 3

KANK3: KN Motif And Ankyrin Repeat Domains 3
KLRB1: Killer Cell Lectin Like Receptor B1
LILRA4: Leukocyte Immunoglobulin Like Receptor A4
LTF: Lactotransferrin
RUNX3: RUNX Family Transcription Factor 3

Differentially Expressed Genes (DEGs) common between COVID-19 and ALS

BAK1: BCL2 Antagonist/Killer 1
C2: Complement C2
CAPG: Capping Actin Protein, Gelsolin Like
CHKA: Choline Kinase Alpha
CPM: Carboxypeptidase M
GPNMB: Glycoprotein Nmb
ITGB2: Integrin Subunit Beta 2
LGALS3: Galectin 3
LHFPL2: LHFPL Tetraspan Subfamily Member 2
MT1E: Metallothionein 1E
PLSCR1: Phospholipid Scramblase 1
SIRPA: Signal Regulatory Protein Alpha
TSPO: Translocator Protein
MSR1: Macrophage Scavenger Receptor 1
C1QB: Complement C1q B Chain
C1QC: Complement C1q C Chain
CCR1: C-C Motif Chemokine Receptor 1
CD163L1: CD163 Molecule Like 1
CTSH: Cathepsin H
DYRK3: Dual Specificity Tyrosine Phosphorylation Regulated Kinase 3
FN1: Fibronectin 1
FTL: Ferritin Light Chain
GM2A: GM2 Ganglioside Activator
KIF14: Kinesin Family Member 14
LAMC1: Laminin Subunit Gamma 1
LGALS3: Galectin 3
MARVELD1: MARVEL Domain Containing 1
METTL7A: Methyltransferase Like 7A
MSR1: Macrophage Scavenger Receptor 1
OAS2: 2'-5'-Oligoadenylate Synthetase 2
RAB13: RAB13, Member RAS Oncogene Family
RIN2: Ras And Rab Interactor 2
SAMSN1: SAM Domain, SH3 Domain And Nuclear Localization Signals 1
SASH1: SAM And SH3 Domain Containing 1
SH3PXD2B: SH3 And PX Domains 2B
SLC1A3: Solute Carrier Family 1 Member 3
SLC2A5: Solute Carrier Family 2 Member 5
SLC35D2: Solute Carrier Family 35 Member D2
SLCO4A1: Solute Carrier Organic Anion Transporter Family Member 4A1
TIMP1: TIMP Metallopeptidase Inhibitor 1
VIM: Vimentin
S100A8: S100 Calcium Binding Protein A8

ACP5: Acid Phosphatase 5, Tartrate Resistant
ASPM: Assembly Factor For Spindle Microtubules
ENO1: Enolase 1
FOXM1: Forkhead Box M1
HGF: Hepatocyte Growth Factor
KNL1: Kinetochore Scaffold 1
MCEMP1: Mast Cell Expressed Membrane Protein 1
METTL7A: Methyltransferase Like 7A
NT5DC2: 5'-Nucleotidase Domain Containing 2
RAPGEF5: Rap Guanine Nucleotide Exchange Factor 5
RHEB: Ras Homolog, MTORC1 Binding
SDHD: Succinate Dehydrogenase Complex Subunit D
SRGAP2: SLIT-ROBO Rho GTPase Activating Protein 2
ANK3: Ankyrin 3
CAMP: Cathelicidin Antimicrobial Peptide
CHIC1: Cysteine Rich Hydrophobic Domain 1
C8G: Complement C8 Gamma Chain
CD247: CD247 Molecule
GZMB: Granzyme B
KIR2DL3: Killer Cell Immunoglobulin Like Receptor, Two Ig Domains And Long Cytoplasmic Tail 3
KIR2DS4: Killer Cell Immunoglobulin Like Receptor, Two Ig Domains And Short Cytoplasmic Tail 4
KIR3DL1: Killer Cell Immunoglobulin Like Receptor, Three Ig Domains And Long Cytoplasmic Tail 1
KY: Kyphoscoliosis Peptidase
PODN: Podocan
RNF144A: Ring Finger Protein 144A
SLC30A4: Solute Carrier Family 30 Member 4
ZNF91: Zinc Finger Protein 91
ENO2: Enolase 2
APBB1: Amyloid Beta Precursor Protein Binding Family B Member 1
DOK4: Docking Protein 4
LTBP4: Latent Transforming Growth Factor Beta Binding Protein 4
MYO6: Myosin VI
SIGIRR: Single Ig And TIR Domain Containing
SYNE1: Spectrin Repeat Containing Nuclear Envelope Protein 1

Differentially Expressed Genes (DEGs) common between COVID-19 and ED

ANKRD50: Ankyrin Repeat Domain 50
CAMK1: Calcium/Calmodulin Dependent Protein Kinase I
CLCN4: Chloride Voltage-Gated Channel 4
C1orf115: Chromosome 1 Open Reading Frame 115
A2M-AS1: A2M Antisense RNA 1
CFH: Complement Factor H
ETS1: ETS Proto-Oncogene 1, Transcription Factor
TRBC1: T Cell Receptor Beta Constant 1

Differentially Expressed Genes (DEGs) common between COVID-19 and HD

ADAMTS2: ADAM Metallopeptidase With Thrombospondin Type 1 Motif 2
ALOX15B: Arachidonate 15-Lipoxygenase Type B

ANXA2: Annexin A2
CD302: CD302 Molecule
CLEC12A: C-Type Lectin Domain Family 12 Member A
CLEC4D: C-Type Lectin Domain Family 4 Member D
CLIC1: Chloride Intracellular Channel 1
CYP1B1: Cytochrome P450 Family 1 Subfamily B Member 1
DDIT4: DNA Damage Inducible Transcript 4
FAM20A: FAM20A Golgi Associated Secretory Pathway Pseudokinase
IL18: Interleukin 18
IL1R2: Interleukin 1 Receptor Type 2
IRAK3: Interleukin 1 Receptor Associated Kinase 3
JCHAIN: Joining Chain Of Multimeric IgA And IgM
LYZ: Lysozyme
MARCO: Macrophage Receptor With Collagenous Structure
MRC1: Mannose Receptor C-Type 1
MT1E: Metallothionein 1E
MT1F: Metallothionein 1F
OLFML2A: Olfactomedin Like 2A
PLBD1: Phospholipase B Domain Containing 1
PTGER2: Prostaglandin E Receptor 2
RNASE6: Ribonuclease A Family Member K6
S100A10: S100 Calcium Binding Protein A10
S100A8: S100 Calcium Binding Protein A8
S100A9: S100 Calcium Binding Protein A9
SLCO4A1: Solute Carrier Organic Anion Transporter Family Member 4A1
TFEC: Transcription Factor EC
ANXA2: Annexin A2
BST2: Bone Marrow Stromal Cell Antigen 2
CAT: Catalase
CORO2B: Coronin 2B
CYBRD1: Cytochrome B Reductase 1
DAAM2: Dishevelled Associated Activator Of Morphogenesis 2
GPNMB: Glycoprotein Nmb
LGALS1: Galectin 1
MAOA: Monoamine Oxidase A
ME1: Malic Enzyme 1
METTL7A: Methyltransferase Like 7A
MT1E: Metallothionein 1E
MT1F: Metallothionein 1F
MT1X: Metallothionein 1X
MX1: MX Dynamin Like GTPase 1
MYOF: Myoferlin
NFIA: Nuclear Factor I A
OLFML2A: Olfactomedin Like 2A
S100A6: S100 Calcium Binding Protein A6
VAMP5: Vesicle Associated Membrane Protein 5
ST6GALNAC3: ST6 N-Acetylgalactosaminide Alpha-2,6-Sialyltransferase 3
CARNS1: Carnosine Synthase 1
MIR3648-1: MicroRNA 3648-1
MIR3648-2: MicroRNA 3648-2
COL18A1: Collagen Type XVIII Alpha 1 Chain

GRIN3B: Glutamate Ionotropic Receptor NMDA Type Subunit 3B
PRDM8: PR/SET Domain 8
CROCC2: Ciliary Rootlet Coiled-Coil, Rootletin Family Member 2
FGFBP2: Fibroblast Growth Factor Binding Protein 2
PRF1: Perforin 1
SKAP1: Src Kinase Associated Phosphoprotein 1
AKR1C3: Aldo-Keto Reductase Family 1 Member C3
AKT3: AKT Serine/Threonine Kinase 3
BTG2: BTG Anti-Proliferation Factor 2
CDKN1C: Cyclin Dependent Kinase Inhibitor 1C
CLDND2: Claudin Domain Containing 2
FRMPD3: FERM And PDZ Domain Containing 3
IGIP: IgA Inducing Protein
KLRF1: Killer Cell Lectin Like Receptor F1
KRTAP5-AS1: KRTAP5-1/KRTAP5-2 Antisense RNA 1
MUC16: Mucin 16, Cell Surface Associated
OR2A7: Olfactory Receptor Family 2 Subfamily A Member 7
PLCL1: Phospholipase C Like 1 (Inactive)
RN7SL1: RNA Component Of Signal Recognition Particle 7SL1
WNT7A: Wnt Family Member 7A

Differentially Expressed Genes (DEGs) common between COVID-19 and MS

ANK1: Ankyrin 1
ANO5: Anoctamin 5
ARL4A: ADP Ribosylation Factor Like GTPase 4A
ARNTL2: Aryl Hydrocarbon Receptor Nuclear Translocator Like 2
C1orf115: Chromosome 1 Open Reading Frame 115
CCNB1: Cyclin B1
CCT8: Chaperonin Containing TCP1 Subunit 8
CERS6: Ceramide Synthase 6
CPNE8: Copine 8
DENND5B: DENN Domain Containing 5B
EXT1: Exostosin Glycosyltransferase 1
HGF: Hepatocyte Growth Factor
ITSN1: Intersectin 1
KCNMA1: Potassium Calcium-Activated Channel Subfamily M Alpha 1
KLHL8: Kelch Like Family Member 8
NCEH1: Neutral Cholesterol Ester Hydrolase 1
NRG1: Neuregulin 1
NRIP1: Nuclear Receptor Interacting Protein 1
PTGFRN: Prostaglandin F2 Receptor Inhibitor
RAPH1: Ras Association (RalGDS/AF-6
RHOT1: Ras Homolog Family Member T1
SEC24D: SEC24 Homolog D, COPII Coat Complex Component
SLITRK4: SLIT And NTRK Like Family Member 4
SPATS2: Spermatogenesis Associated Serine Rich 2
TMTC1: Transmembrane O-Mannosyltransferase Targeting Cadherins 1
TRIQK: Triple QxxK/R Motif Containing
ARNTL2: Aryl Hydrocarbon Receptor Nuclear Translocator Like 2

DERA: Deoxyribose-Phosphate Aldolase
FGD6: FYVE, RhoGEF And PH Domain Containing 6
H2AFY: MacroH2A.1 Histone
NECTIN2: Nectin Cell Adhesion Molecule 2
NHSL1: NHS Like 1
RAD23B: RAD23 Homolog B, Nucleotide Excision Repair Protein
TMEM39A: Transmembrane Protein 39A
YWHAH: Tyrosine 3-Monooxygenase/Tryptophan 5-Monooxygenase Activation Protein Eta
ANKRD18A: Ankyrin Repeat Domain 18A
CARNS1: Carnosine Synthase 1
CDKN1C: Cyclin Dependent Kinase Inhibitor 1C
COLGALT2: Collagen Beta(1-O)Galactosyltransferase 2
DRAXIN: Dorsal Inhibitory Axon Guidance Protein
MUC6: Mucin 6, Oligomeric Mucus/Gel-Forming
NEO1: Neogenin 1
PCBP4: Poly(RC) Binding Protein 4
PLEKHG3: Pleckstrin Homology And RhoGEF Domain Containing G3
PLLP: Plasmolipin
PRR5L: Proline Rich 5 Like
S1PR5: Sphingosine-1-Phosphate Receptor 5
SLC30A4: Solute Carrier Family 30 Member 4
SLC45A3: Solute Carrier Family 45 Member 3
SOX13: SRY-Box Transcription Factor 13
SOX8: SRY-Box Transcription Factor 8
TNRC6C: Trinucleotide Repeat Containing Adaptor 6C
TPPP: Tubulin Polymerization Promoting Protein
AGBL3: AGBL Carboxypeptidase 3
EPB41L4A: Erythrocyte Membrane Protein Band 4.1 Like 4A
GCSAML: Germinal Center Associated Signaling And Motility Like
IKZF2: IKAROS Family Zinc Finger 2
PHLDB2: Pleckstrin Homology Like Domain Family B Member 2
PKD2L2: Polycystin 2 Like 2, Transient Receptor Potential Cation Channel
PTPRS: Protein Tyrosine Phosphatase Receptor Type S

Differentially Expressed Genes (DEGs) common between COVID-19 and PD

GYPE: Glycophorin E (MNS Blood Group)
HIST1H2BO: H2B Clustered Histone 17
JCHAIN: Joining Chain Of Multimeric IgA And IgM
LILRB4: Leukocyte Immunoglobulin Like Receptor B4
MAN2B1: Mannosidase Alpha Class 2B Member 1
MITF: Melanocyte Inducing Transcription Factor
PKP4: Plakophilin 4
CLDN7: Claudin 7
DDIT4: DNA Damage Inducible Transcript 4
FAM20A: FAM20A Golgi Associated Secretory Pathway Pseudokinase
MT1F: Metallothionein 1F
SH3TC1: SH3 Domain And Tetratricopeptide Repeats 1
SLCO4A1: Solute Carrier Organic Anion Transporter Family Member 4A1
SMTN: Smoothelin

SPR: Sepiapterin Reductase
TLR5: Toll Like Receptor 5
ARHGAP29: Rho GTPase Activating Protein 29
CCNA2: Cyclin A2
NLRC4: NLR Family CARD Domain Containing 4
P2RX7: Purinergic Receptor P2X 7
PSMB2: Proteasome 20S Subunit Beta 2
RHEB: Ras Homolog, MTORC1 Binding
SLCO4A1: Solute Carrier Organic Anion Transporter Family Member 4A1
ASGR2: Asialoglycoprotein Receptor 2
BUB1: BUB1 Mitotic Checkpoint Serine/Threonine Kinase
IGF2BP3: Insulin Like Growth Factor 2 MRNA Binding Protein 3
KIF14: Kinesin Family Member 14
MSR1: Macrophage Scavenger Receptor 1
NCAPG: Non-SMC Condensin I Complex Subunit G
NEK2: NIMA Related Kinase 2
NLRP3: NLR Family Pyrin Domain Containing 3
NRG1: Neuregulin 1
SYK: Spleen Associated Tyrosine Kinase
ADAMTS2: ADAM Metallopeptidase With Thrombospondin Type 1 Motif 2
AGPAT2: 1-Acylglycerol-3-Phosphate O-Acyltransferase 2
ALAD: Aminolevulinate Dehydratase
ALOX15B: Arachidonate 15-Lipoxygenase Type B
ANKLE1: Ankyrin Repeat And LEM Domain Containing 1
BRCA1: BRCA1 DNA Repair Associated
CASP1: Caspase 1
CYP19A1: Cytochrome P450 Family 19 Subfamily A Member 1
EHD4: EH Domain Containing 4
EPHB2: EPH Receptor B2
FAM20A: FAM20A Golgi Associated Secretory Pathway Pseudokinase
FGD2: FYVE, RhoGEF And PH Domain Containing 2
GAS2L3: Growth Arrest Specific 2 Like 3
H2AFY: MacroH2A.1 Histone
HFE: Homeostatic Iron Regulator
HIST1H4H: H4 Clustered Histone 8
IGHG1: Immunoglobulin Heavy Constant Gamma 1 (G1m Marker)
IGHM: Immunoglobulin Heavy Constant Mu
IGLJ3: Immunoglobulin Lambda Joining 3
IGLV1-44: Immunoglobulin Lambda Variable 1-44
KIFC1: Kinesin Family Member C1
MAP3K6: Mitogen-Activated Protein Kinase Kinase Kinase 6
METTL7A: Methyltransferase Like 7A
MKI67: Marker Of Proliferation Ki-67
MMP17: Matrix Metallopeptidase 17
MSR1: Macrophage Scavenger Receptor 1
MYO10: Myosin X
PDSS1: Decaprenyl Diphosphate Synthase Subunit 1
PLEKHN1: Pleckstrin Homology Domain Containing N1
RIN2: Ras And Rab Interactor 2
RNASE2: Ribonuclease A Family Member 2
RNASE3: Ribonuclease A Family Member 3

RXFP2: Relaxin Family Peptide Receptor 2
SEC24D: SEC24 Homolog D, COPII Coat Complex Component
SIGLEC11: Sialic Acid Binding Ig Like Lectin 11
STAB1: Stabilin 1
TFEC: Transcription Factor EC
TMEM106A: Transmembrane Protein 106A
ICAM5: Intercellular Adhesion Molecule 5
AKT3: AKT Serine/Threonine Kinase 3
CROCC2: Ciliary Rootlet Coiled-Coil, Rootletin Family Member 2
DGKK: Diacylglycerol Kinase Kappa
DPY19L2P2: DPY19L2 Pseudogene 2
DTHD1: Death Domain Containing 1
FAM160A1: FHF Complex Subunit HOOK Interacting Protein 1A
HDC: Histidine Decarboxylase
KRTAP5-AS1: KRTAP5-1/KRTAP5-2 Antisense RNA 1
LGR6: Leucine Rich Repeat Containing G Protein-Coupled Receptor 6
MME: Membrane Metalloendopeptidase
PTPRS: Protein Tyrosine Phosphatase Receptor Type S
BFSP1: Beaded Filament Structural Protein 1
DOK4: Docking Protein 4
ENPP3: Ectonucleotide Pyrophosphatase/Phosphodiesterase 3
CA11: Carbonic Anhydrase 11
JUND: JunD Proto-Oncogene, AP-1 Transcription Factor Subunit
PURA: Purine Rich Element Binding Protein A
DEFA1B: Defensin Alpha 1B
SYNE1: Spectrin Repeat Containing Nuclear Envelope Protein 1

Hub Proteins

Hub Proteins between COVID-19 and AD

COPB1: COPI Coat Complex Subunit Beta 1
AP2S1: Adaptor Related Protein Complex 2 Subunit Sigma 1
COPE: COPI Coat Complex Subunit Epsilon
CYBB: Cytochrome B-245 Beta Chain
JAK2: Janus Kinase 2
GATA3: GATA Binding Protein 3
COPA: COPI Coat Complex Subunit Alpha
COX5A: Cytochrome C Oxidase Subunit 5A
SIRPA: Signal Regulatory Protein Alpha
ANK1: Ankyrin 1
HGF: Hepatocyte Growth Factor

Hub Proteins between COVID-19 and ALS

FN1: Fibronectin 1
ITGB2: Integrin Subunit Beta 2
C1QB: Complement C1q B Chain
GZMB: Granzyme B
TIMP1: TIMP Metallopeptidase Inhibitor 1

LGALS3: Galectin 3
HGF: Hepatocyte Growth Factor
LAMC1: Laminin Subunit Gamma 1
C1QC: Complement C1q C Chain
SLC2A5: Solute Carrier Family 2 Member 5
MCEMP1: Mast Cell Expressed Membrane Protein 1
CAMP: Cathelicidin Antimicrobial Peptide

Hub Proteins between COVID-19 and ED

JUN: Jun Proto-Oncogene, AP-1 Transcription Factor Subunit
MAPK1: Mitogen-Activated Protein Kinase 1
C3: Complement C3
ETS1: ETS Proto-Oncogene 1, Transcription Factor
PAX5: Paired Box 5
CFH: Complement Factor H

Hub Proteins between COVID-19 and HD

ANXA2: Annexin A2
LYZ: Lysozyme
LGALS1: Galectin 1
CLEC4D: C-Type Lectin Domain Family 4 Member D
CLEC12A: C-Type Lectin Domain Family 12 Member A
IL18: Interleukin 18
FRMPD3: FERM and PDZ Domain Containing 3
IL1R2: Interleukin 1 Receptor Type 2
MARCO: Macrophage Receptor With Collagenous Structure

Hub Proteins between COVID-19 and MS

CDK2: Cyclin Dependent Kinase 2
CCT7 : Chaperonin Containing TCP1 Subunit 7
CCNB1: Cyclin B1
CCT8: Chaperonin Containing TCP1 Subunit 8
CCT5: Chaperonin Containing TCP1 Subunit 5
CCT6A: Chaperonin Containing TCP1 Subunit 6A
FGD6: FYVE, RhoGEF And PH Domain Containing 6

Hub Proteins between COVID-19 and PD

BRCA1: BRCA1 DNA Repair Associated
CCNA2: Cyclin A2
NCAPG: Non-SMC Condensin I Complex Subunit G
BUB1: BUB1 Mitotic Checkpoint Serine/Threonine Kinase
MKI67: Marker Of Proliferation Ki-67
KIFC1: Kinesin Family Member C1
NEK2: NIMA Related Kinase 2
HIST1H2BO: H2B Clustered Histone 17
KIF14: Kinesin Family Member 14
H2AFY: MacroH2A.1 Histone

HFE: Homeostatic Iron Regulator
HIST1H4H: H4 Clustered Histone 8

Transcription Factors
Transcription Factors between COVID-19 and AD

FOXC1: Forkhead Box C1
NFIC: Nuclear Factor I C
E2F1: E2F Transcription Factor 1
YY1: YY1 Transcription Factor
NFKB1: Nuclear Factor Kappa B Subunit 1

Transcription Factors between COVID-19 and ALS

JUN: Jun Proto-Oncogene, AP-1 Transcription Factor Subunit
GATA2: GATA Binding Protein 2
CREB1: CAMP Responsive Element Binding Protein 1
ANK3: Ankyrin 3
FOXC1: Forkhead Box C1
FOXL1: Forkhead Box L1

Transcription Factors between COVID-19 and ED

HINFP: Histone H4 Transcription Factor
GATA2: GATA Binding Protein 2
STAT3: Signal Transducer And Activator Of Transcription 3
FOXC1: Forkhead Box C1

Transcription Factors between COVID-19 and HD

FOXC1: Forkhead Box C1
GATA2: GATA Binding Protein 2
YY1: YY1 Transcription Factor
SRF: Serum Response Factor

Transcription Factors between COVID-19 and MS
GATA2: GATA Binding Protein 2
E2F1: E2F Transcription Factor 1
FOXC1: Forkhead Box C1
FOXL1: Forkhead Box L1
TFAP2A: Transcription Factor AP-2 Alpha

Transcription Factors between COVID-19 and PD
NFYA: Nuclear Transcription Factor Y Subunit Alpha
FOXC1: Forkhead Box C1
FOXL1: Forkhead Box L1
GATA2: GATA Binding Protein 2
YY1: YY1 Transcription Factor

Cell Signaling Pathways that are linked between COVID-19 and Neurological diseases (NDs)

A. Pathways that are linked between COVID-19 and Alzheimer's disease (AD)

SL	Term	P-value	Genes	Database
1	Phagosome	8.46E-03	CYBB;HLA-F;ATP6V0A1	KEGG
2	Leishmaniasis	1.77E-02	CYBB;JAK2	KEGG
3	Epstein-Barr virus infection	1.79E-02	CXCL10;VIM;HLA-F	KEGG
4	Synaptic vesicle cycle	1.95E-02	AP2S1;ATP6V0A1	KEGG
5	Complement and coagulation cascades	2.00E-02	C1QB;F5	KEGG
6	Sulfur metabolism	2.45E-02	PAPSS1	KEGG
7	AGE-RAGE signaling pathway in diabetic complications	3.10E-02	CYBB;JAK2	KEGG
8	Neurotrophin signaling pathway	4.25E-02	PSEN2;IRAK3	KEGG
9	Selenocompound metabolism	4.58E-02	PAPSS1	KEGG
10	Purine metabolism	4.91E-02	PKM;PAPSS1	KEGG
11	Spinal Cord Injury	3.11E-04	C1QB;CXCL10;VIM;LTB4R	Wiki
12	Pathways in clear cell renal cell carcinoma	1.66E-03	PKM;PGK1;ENO1	Wiki
13	Allograft Rejection	1.89E-03	C1QB;VIM;HLA-F	Wiki
14	Microglia Pathogen Phagocytosis Pathway	5.42E-03	C1QB;CYBB	Wiki
15	Interleukin-11 Signaling Pathway	6.52E-03	BIRC5;JAK2	Wiki
16	Synaptic Vesicle Pathway	8.68E-03	AP2S1;SYN2	Wiki
17	Apoptosis-related network due to altered Notch3 in ovarian cancer	9.35E-03	BIRC5;VIM	Wiki
18	IL-4 Signaling Pathway	9.70E-03	BIRC5;JAK2	Wiki
19	Complement and Coagulation Cascades	1.11E-02	C1QB;F5	Wiki
20	Notch Signaling Pathway	1.22E-02	PSEN2;JAK2	Wiki
21	Sterol Regulatory Element-Binding Proteins (SREBP) signalling	1.55E-02	DBI;MBTPS2	Wiki
22	Prolactin Signaling Pathway	1.86E-02	SIRPA;JAK2	Wiki
23	Arachidonate Epoxygenase / Epoxide Hydrolase	1.91E-02	COX5A	Wiki
24	Retinoblastoma Gene in Cancer	2.39E-02	CCNB2;TYMS	Wiki
25	Pyrimidine metabolism and related diseases	2.45E-02	TYMS	Wiki
26	Nucleotide GPCRs	2.98E-02	LTB4R	Wiki
27	Disorders of Folate Metabolism and Transport	3.52E-02	TYMS	Wiki
28	ncRNAs involved in STAT3 signaling in hepatocellular carcinoma	3.52E-02	JAK2	Wiki
29	Mammary gland development pathway - Puberty (Stage 2 of 4)	3.52E-02	VIM	Wiki
30	Cori Cycle	4.31E-02	PGK1	Wiki
31	Sulfation Biotransformation Reaction	4.58E-02	PAPSS1	Wiki
32	Leptin Insulin Overlap	4.58E-02	JAK2	Wiki
33	TGF-B Signaling in Thyroid Cells for Epithelial-Mesenchymal Transition	4.84E-02	VIM	Wiki
34	NO2-dependent IL 12 Pathway in NK cells	2.45E-02	JAK2	Biocarta
35	EPO Signaling Pathway	2.98E-02	JAK2	Biocarta
36	IL 3 signaling pathway	3.25E-02	JAK2	Biocarta

37	B Cell Survival Pathway	3.52E-02	BIRC5	Biocarta
38	Extrinsic Prothrombin Activation Pathway	3.52E-02	F5	Biocarta
39	IL 6 signaling pathway	3.52E-02	JAK2	Biocarta
40	Erythropoietin mediated neuroprotection through NF-kB	3.52E-02	JAK2	Biocarta
41	Classical Complement Pathway	4.05E-02	C1QB	Biocarta
42	IL12 and Stat4 Dependent Signaling Pathway in Th1 Development	4.05E-02	JAK2	Biocarta
43	Estrogen-responsive protein Efp controls cell cycle and breast tumors growth	4.05E-02	CCNB2	Biocarta
44	Chaperones modulate interferon Signaling Pathway	4.84E-02	JAK2	Biocarta
45	Eicosanoid ligand-binding receptors	7.62E-04	PTGER2;LTB4R	Reactome
46	Immune System	8.47E-04	NUP93;C1QB;SIGLEC16;HGF;IGLV1-44;AP2S1;CYBB;IRAK3;JAK2;HLA-F;PLD3;ATP6V0A1	Reactome
47	Gluconeogenesis	3.49E-03	PGK1;ENO1	Reactome
48	ROS, RNS production in response to bacteria	3.94E-03	CYBB;ATP6V0A1	Reactome
49	Nuclear Pore Complex (NPC) Disassembly	3.94E-03	NUP93;CCNB2	Reactome
50	Nuclear signaling by ERBB4	5.15E-03	PSEN2;JAK2	Reactome
51	ER to Golgi Anterograde Transport	5.62E-03	COPA;ANK1;F5	Reactome
52	Classical antibody-mediated complement activation	6.24E-03	C1QB;IGLV1-44	Reactome
53	SUMOylation of DNA replication proteins	6.52E-03	NUP93;BIRC5	Reactome
54	EPH-ephrin mediated repulsion of cells	7.72E-03	PSEN2;AP2S1	Reactome
55	Creation of C4 and C2 activators	8.04E-03	C1QB;IGLV1-44	Reactome
56	Nuclear Envelope Breakdown	8.68E-03	NUP93;CCNB2	Reactome

B. Pathways that are linked between COVID-19 and Amyotrophic Lateral Sclerosis (ALS)

SL	Term	P-value	Genes	Database
1	Pertussis	1.72E-04	C1QB;ITGB2;C2;C1QC	KEGG
2	Amoebiasis	4.21E-04	C8G;ITGB2;FN1;LAMC1	KEGG
3	Graft-versus-host disease	4.50E-04	GZMB;KIR3DL1;KIR2DL3	KEGG
4	Systemic lupus erythematosus	1.43E-03	C1QB;C8G;C2;C1QC	KEGG
5	Antigen processing and presentation	2.81E-03	KIR2DS4;KIR3DL1;KIR2DL3	KEGG
6	Small cell lung cancer	4.79E-03	FN1;LAMC1;BAK1	KEGG
7	HIF-1 signaling pathway	5.86E-03	ENO1;TIMP1;ENO2	KEGG

8	Epstein-Barr virus infection	6.28E-03	OAS2;BAK1;VIM;CD247	KEGG
9	Chagas disease (American trypanosomiasis)	6.35E-03	C1QB;CD247;C1QC	KEGG
10	Allograft Rejection	1.84E-05	C1QB;GZMB;VIM;C2;C1QC	Wiki
11	Complement and Coagulation Cascades	5.97E-05	C1QB;C8G;C2;C1QC	Wiki
12	Pathways in clear cell renal cell carcinoma	2.65E-04	RHEB;ENO1;ENO2;RAPGEF5	Wiki
13	Microglia Pathogen Phagocytosis Pathway	4.18E-04	C1QB;ITGB2;C1QC	Wiki
14	Glycolysis and Gluconeogenesis	5.93E-04	ENO1;SLC2A5;ENO2	Wiki
15	TGF-B Signaling in Thyroid Cells for Epithelial-Mesenchymal Transition	1.94E-03	FN1;VIM	Wiki
16	miRNA targets in ECM and membrane receptors	2.90E-03	FN1;LAMC1	Wiki
17	Focal Adhesion-PI3K-Akt-mTOR-signaling pathway	5.01E-03	RHEB;HGF;ITGB2;FN1;LAMC1	Wiki
18	Inflammatory Response Pathway	5.35E-03	FN1;LAMC1	Wiki
19	Human Complement System	5.38E-03	ITGB2;LAMC1;C2	Wiki
20	Zinc homeostasis	7.64E-03	SLC30A4;MT1E	Wiki
21	Spinal Cord Injury	9.23E-03	C1QB;LGALS3;VIM	Wiki
22	Apoptotic DNA fragmentation and tissue homeostasis	3.94E-02	GZMB	Biocarta
23	Granzyme A mediated Apoptosis Pathway	4.29E-02	GZMB	Biocarta
24	Lck and Fyn tyrosine kinases in initiation of TCR Activation	4.64E-02	CD247	Biocarta
25	Role of Mitochondria in Apoptotic Signaling	4.64E-02	BAK1	Biocarta
26	Immune System	1.17E-04	C1QB;HGF;ITGB2;KIR2DS4;FN1;KIR3DL1;KIR2DL3;C2;SIGIRR;LGALS3;C8G;OAS2;CTSH;CD247;CAMP;C1QC	Reactome
27	Complement cascade	2.09E-04	C1QB;C8G;C2;C1QC	Reactome
28	Extracellular matrix organization	3.76E-03	ITGB2;LTBP4;FN1;LAMC	Reactome

			1;TIMP1	
29	Regulation of Complement cascade	4.04E-03	C8G;C2	Reactome
30	Cell surface interactions at the vascular wall	6.02E-03	ITGB2;FN1;SIRPA	Reactome
31	Gluconeogenesis	6.07E-03	ENO1;ENO2	Reactome
32	Glycolysis	6.07E-03	ENO1;ENO2	Reactome
33	Platelet degranulation	6.70E-03	HGF;FN1;TIMP1	Reactome
34	Response to elevated platelet cytosolic Ca2+	7.62E-03	HGF;FN1;TIMP1	Reactome
35	Transport of vitamins, nucleosides, and related molecules	8.49E-03	SLCO4A1;SLC35D2	Reactome

C. Pathways that are linked between COVID-19 and Epilepsy disease (ED)

SL	Term	P-value	Genes	Database
1	Aldosterone synthesis and secretion	3.85E-02	CAMK1	KEGG
2	Non-genomic actions of 1,25 dihydroxyvitamin D3	2.81E-02	ETS1	Wiki
3	Pathways in clear cell renal cell carcinoma	3.35E-02	CAMK1	Wiki
4	B Cell Receptor Signaling Pathway	3.82E-02	ETS1	Wiki
5	Human Complement System	3.82E-02	CFH	Wiki
6	Neural Crest Differentiation	3.97E-02	ETS1	Wiki
7	Oncogene Induced Senescence	1.27E-02	ETS1	Reactome
8	Generation of second messenger molecules	1.39E-02	TRBC1	Reactome
9	Costimulation by the CD28 family	2.84E-02	TRBC1	Reactome
10	Complement cascade	3.16E-02	CFH	Reactome
11	Downstream TCR signaling	3.89E-02	TRBC1	Reactome
12	Stimuli-sensing channels	3.93E-02	CLCN4	Reactome
13	TCR signaling	4.62E-02	TRBC1	Reactome

D. Pathways that are linked between COVID-19 and Huntington's disease (HD)

SL	Term	P-value	Genes	Database
1	Cocaine addiction	1.24E-02	GRIN3B;MAOA	KEGG
2	Ovarian steroidogenesis	1.24E-02	AKR1C3;CYP1B1	KEGG
3	mTOR signaling pathway	1.56E-02	AKT3;DDIT4;WNT7A	KEGG
4	Steroid hormone biosynthesis	1.83E-02	AKR1C3;CYP1B1	KEGG
5	Arachidonic acid metabolism	2.00E-02	AKR1C3;ALOX15B	KEGG
6	Influenza A	2.13E-02	AKT3;MX1;IL18	KEGG
7	Amphetamine addiction	2.31E-02	GRIN3B;MAOA	KEGG
8	Tuberculosis	2.40E-02	MRC1;AKT3;IL18	KEGG
9	cAMP signaling pathway	3.69E-02	GRIN3B;PTGER2;AKT3	KEGG
10	IL-17 signaling pathway	4.10E-02	S100A9;S100A8	KEGG
11	Prostate cancer	4.43E-02	IL1R2;AKT3	KEGG
12	Longevity regulating pathway	4.84E-02	AKT3;CAT	KEGG
13	Copper homeostasis	7.69E-04	MT1F;MT1X;MT1E	Wiki
14	IL1 and megakaryocytes in obesity	3.08E-03	IL18;S100A9	Wiki
15	DNA Damage Response (only ATM dependent)	6.52E-03	AKT3;CAT;WNT7A	Wiki
16	Melatonin metabolism and effects	7.23E-03	MAOA;CYP1B1	Wiki
17	Aryl Hydrocarbon Receptor Pathway	1.10E-02	MYOF;CYP1B1	Wiki
18	Tryptophan metabolism	1.10E-02	CAT;CYP1B1	Wiki
19	Synaptic signaling pathways associated with autism spectrum disorder	1.29E-02	GRIN3B;AKT3	Wiki
20	Sulindac Metabolic Pathway	1.71E-02	CYP1B1	Wiki
21	TYROBP Causal Network	1.88E-02	IL18;RNASE6	Wiki
22	Nuclear Receptors Meta-Pathway	2.44E-02	CDKN1C;MYOF;ME1;CYP1B1	Wiki
23	Vitamin D Receptor Pathway	2.51E-02	S100A6;S100A9;S100A8	Wiki
24	Macrophage markers	3.06E-02	LYZ	Wiki
25	Metabolism of Spingolipids in ER and Golgi apparatus	3.06E-02	ST6GALNAC3	Wiki

26	Selenium Micronutrient Network	3.56E-02	CAT;ALOX15B	Wiki
27	Serotonin Transporter Activity	3.73E-02	MAOA	Wiki
28	Dopamine metabolism	4.39E-02	MAOA	Wiki
29	Estrogen Receptor Pathway	4.39E-02	CYP1B1	Wiki
30	Termination of O-glycan biosynthesis	3.61E-03	MUC16;ST6GALNAC3	Reactome
31	O-linked glycosylation	6.52E-03	ADAMTS2;MUC16;ST6GALNAC3	Reactome

E. Pathways that are linked between COVID-19 and Multiple Sclerosis (MS)

SL	Term	P-value	Genes	Database
1	G1 to S cell cycle control	1.53E-02	CDKN1C;CCNB1	Wiki
2	Gastric acid production	2.05E-02	MUC6	Wiki
3	Glial Cell Differentiation	2.05E-02	TPPP	Wiki
4	Circadian rhythm related genes	2.15E-02	KCNMA1;NRIP1;ARNTL2	Wiki
5	Mammary gland development pathway - Puberty (Stage 2 of 4)	3.77E-02	NRIP1	Wiki
6	H19 action Rb-E2F1 signaling and CDK-Beta-catenin activity	4.05E-02	H2AFY	Wiki
7	Signal Dependent Regulation of Myogenesis by Corepressor MITR	2.34E-02	YWHAH	Biocarta
8	Sonic Hedgehog Receptor Ptc1 Regulates cell cycle	2.62E-02	CCNB1	Biocarta
9	Multiple antiapoptotic pathways from IGF-1R signaling lead to BAD phosphorylation	3.77E-02	YWHAH	Biocarta
10	RB Tumor Suppressor/Checkpoint Signaling in response to DNA damage	3.77E-02	YWHAH	Biocarta
11	AKAP95 role in mitosis and chromosome dynamics	4.05E-02	CCNB1	Biocarta
12	Estrogen-responsive protein Efp controls cell cycle and breast tumors growth	4.34E-02	CCNB1	Biocarta

13	Role of nicotinic acetylcholine receptors in the regulation of apoptosis	4.90E-02	YWHAH	Biocarta
14	G2/M DNA replication checkpoint	1.47E-02	CCNB1	Reactome
15	Circadian Clock	1.49E-02	NRIP1;ARNTL2	Reactome
16	Cell Cycle Checkpoints	1.66E-02	CCNB1;PCBP4;YWHAH	Reactome
17	Phosphorylation of Emi1	1.76E-02	CCNB1	Reactome
18	Transcriptional Regulation by TP53	1.94E-02	TNRC6C;CCNB1;PCBP4;YWHAH	Reactome

F. Pathways that are linked between COVID-19 and Parkinson's disease (PD)

SL	Term	P-value	Genes	Database
1	Legionellosis	1.83E-03	CASP1;NLRC4;TLR5	KEGG
2	Salmonella infection	6.48E-03	CASP1;NLRC4;TLR5	KEGG
3	Fc gamma R-mediated phagocytosis	7.57E-03	SYK;MYO10;AKT3	KEGG
4	Choline metabolism in cancer	9.53E-03	RHEB;AKT3;DGKK	KEGG
5	Progesterone-mediated oocyte maturation	9.53E-03	CCNA2;AKT3;BUB1	KEGG
6	IL-3 Signaling Pathway	1.97E-02	SYK;ENPP3	Wiki
7	Synaptic signaling pathways associated with autism spectrum disorder	2.05E-02	RHEB;AKT3	Wiki
8	Apoptosis-related network due to altered Notch3 in ovarian cancer	2.28E-02	JUND;NRG1	Wiki
9	Regulation of toll-like receptor signaling pathway	2.35E-02	SYK;AKT3;TLR5	Wiki
10	RANKL/RANK (Receptor activator of NFKB (ligand)) Signaling Pathway	2.44E-02	SYK;MITF	Wiki
11	Integrated Breast Cancer Pathway	2.90E-02	RHEB;BRCA1;CYP19A1	Wiki
12	Hfe effect on hepcidin production	3.04E-02	HFE	Wiki

13	Hypothetical Craniofacial Development Pathway	3.04E-02	ARHGAP29	Wiki
14	NLR Proteins	3.89E-02	EPHB2	Wiki
15	Heme Biosynthesis	3.89E-02	ALAD	Wiki
16	Primary Focal Segmental Glomerulosclerosis FSGS	4.01E-02	MME;MKI67	Wiki
17	Immune System	3.65E-04	IGHM;SYK;MYO10;SIGLEC11;NRG1;ICAM5;NLRC4;LILRB4;P2RX7;IGHG1;PSMB2;AKT3;IGLV1-44;CASP1;NLRP3;TLR5;SEC24D	Reactome
18	Transcriptional Regulation by TP53	8.63E-04	CCNA2;RHEB;AKT3;DDIT4;CASP1;BRCA1;NLRC4	Reactome
19	Regulation of actin dynamics for phagocytic cup formation	8.88E-04	IGHG1;SYK;MYO10;IGLV1-44	Reactome
20	TP53 Regulates Transcription of Caspase Activators and Caspases	1.23E-03	CASP1;NLRC4	Reactome
21	FCGR activation	1.31E-03	IGHG1;SYK;IGLV1-44	Reactome
22	Downregulation of ERBB2:ERBB3 signaling	1.45E-03	AKT3;NRG1	Reactome
23	Adaptive Immune System	1.88E-03	IGHM;SYK;PSMB2;SIGLEC11;AKT3;IGLV1-44;NRG1;ICAM5;SEC24D;LILRB4	Reactome
24	Fcgamma receptor (FCGR) dependent phagocytosis	1.95E-03	IGHG1;SYK;MYO10;IGLV1-44	Reactome
25	Meiotic synapsis	2.03E-03	HIST1H2BO;BRCA1;SYNE1	Reactome
26	Role of phospholipids in phagocytosis	2.35E-03	IGHG1;SYK;IGLV1-44	Reactome
27	Cell Cycle	3.46E-03	CCNA2;HIST1H2BO;PSMB2;NCAPG;NEK2;BRCA1	Reactome

			;BUB1;SYNE1	
28	Signaling by the B Cell Receptor (BCR)	3.68E-03	IGHM;SYK;PSMB2;AKT3;NRG1	Reactome
29	APC:Cdc20 mediated degradation of cell cycle proteins prior to satisfation of the cell cycle checkpoint	3.94E-03	CCNA2;PSMB2;NEK2	Reactome
30	Binding and Uptake of Ligands by Scavenger Receptors	4.26E-03	MSR1;STAB1;IGLV1-44	Reactome
31	APC/C:Cdc20 mediated degradation of mitotic proteins	4.26E-03	CCNA2;PSMB2;NEK2	Reactome
32	Activation of APC/C and APC/C:Cdc20 mediated degradation of mitotic proteins	4.42E-03	CCNA2;PSMB2;NEK2	Reactome
33	Immunoregulatory interactions between a Lymphoid and a non-Lymphoid cell	5.11E-03	SIGLEC11;IGLV1-44;ICAM5;LILRB4	Reactome
34	Processing of DNA double-strand break ends	5.48E-03	CCNA2;HIST1H2BO;BRCA1	Reactome
35	Role of LAT2/NTAL/LAB on calcium mobilization	5.71E-03	SYK;AKT3;IGLV1-44;NRG1	Reactome
36	TP53 Regulates Metabolic Genes	6.07E-03	RHEB;AKT3;DDIT4	Reactome
37	Meiosis	6.27E-03	HIST1H2BO;BRCA1;SYNE1	Reactome
38	APC/C-mediated degradation of cell cycle proteins	6.27E-03	CCNA2;PSMB2;NEK2	Reactome
39	Regulation of mitotic cell cycle	6.27E-03	CCNA2;PSMB2;NEK2	Reactome
40	Cell Cycle Checkpoints	8.55E-03	CCNA2;HIST1H2BO;PSMB2;BRCA1	Reactome