**Supplementary Information**

**Effect of SARS-CoV-2 proteins on vascular permeability**

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**Supplementary File 1A. Documented change by SARS-Cov-2.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cell type** | **Function** | **Gene** | **Entrez Gene** | **Identified significant SARS-Cov-19 proteins** | **Distance** |
| Dendritic cells (T cell proliferation) | Impaired dendritic cells, induces T-cell proliferation and cytokine production and signal for activation of the T-cell | CD801 | 941 | [e; m; spike; nsp10; nsp11; nsp15; nsp7; orf3a; orf6; orf7a; orf8; orf9b; orf9c] | 2 |
|  | CD861 | 942 | [nsp10; nsp7] | 2 |
|  | INFα1 | 3439 |  | 2 |
|  | INF β1 | 3456 |  | 2 |
| T cell | Impaired T cell maturation and activation, reduced proliferation | INF λ1-4 | 3458 |  | 2 |
|  | TNFα1,3,4 | 7124 | [nsp12; orf8] | 1 |
| Production of pro-inflammatory cytokines | IL-22,3,4 | 3558 | [m; spike; nsp11; nsp12; nsp2; nsp7; orf10; orf8; orf9c] | 2 |
|  | IL-102,3,4 | 3586 | [spike; orf8; orf9c] | 2 |
|  | IL-72 | 3574 | [m; orf10; orf9c] | 2 |
|  | IL-62,4 | 3569 | [nsp11; nsp14; nsp5; nsp6; nsp9; orf10; orf8; orf9b] | 2 |
|  | IL-1β2 | 3553 | [orf8] | 2 |
|  | INF-ɑ2 | 3439 |  | 2 |
|  | MOP-12 |  |  |  |
|  | IP-102 | 3627 |  | 2 |
| reduced proliferation | CTLA-43 | 1493 | [nsp10; nsp15; nsp7; orf9b] | 1 |
|  | PD-11,3 | 5133 | [m; spike; nsp15; nsp4; orf6; orf9c] | 1 |
|  | Ki673 | 4288 | [n; nsp5; nsp7; nsp8; orf3a; orf3b; orf7a] | 1 |
|  | IL-53 | 3567 | [spike; nsp10; orf8] | 2 |
|  | IL-133 | 3596 | [m; spike; nsp10; nsp11; nsp12; nsp13; nsp2; nsp4; nsp6; nsp7; orf3a; orf3b; orf7a; orf8; orf9c] | 2 |
|  | IL-93,4 | 3578 |  |  |
|  | IL-223 | 50616 | [spike; orf9c] | 3 |
| NK | Decreased **IFN-γ production** by NK cells | INFλ5 | 3458 |  | 2 |
| Myeloid cells | systemic inflammation may impair the myeloid cells functionality | HLA-DR6 |  |  |  |
|  | CD646 | 2209 |  | 2 |
|  | CD66b6 | 1088 | [m; spike; nsp10] | 2 |
|  | CRP6 | 1401 | [orf8] | 1 |
|  | Ferritin l6 | 2512 |  | 1 |
|  | ferritin h6 | 2495 | [nsp4] | 1 |
|  | D-dimer6 |  |  |  |
|  | ﬁbrinogen7 | |  |  |
|  | LDH a6 | 3939 | [m; nsp11; nsp14; nsp4; nsp7; orf10; orf3b] | 1 |
|  | IL66 | 3569 | [nsp11; nsp14; nsp5; nsp6; nsp9; orf10; orf8; orf9b] | 2 |
| Lymphocyte | severe lymphocyte apoptosis | FAS7 | 355 | [nsp11; nsp2; nsp4; nsp7; orf3a; orf6; orf7a; orf9c] | 1 |
| Monocyte and macrophage | Activation and transcription of proinflammatory genes | ACE24 | 59272 | [e; nsp10; nsp12; nsp15; nsp2; nsp4; nsp6; orf10; orf7a; orf8; orf9b; orf9c] | 1 |
| IL64 | 3569 | [nsp11; nsp14; nsp5; nsp6; nsp9; orf10; orf8; orf9b] | 2 |
|  | IL-104 | 3586 | [spike; orf8; orf9c] | 2 |
|  | TNFα4 | 7124 | [nsp12; orf8] | 1 |
|  | ITGAM  cd1b4 | 3684 | [nsp11] | 2 |
|  | CD144 | 929 | [nsp5] | 2 |
|  | FCGR3Acd164 | 2214 | [nsp10] | 2 |
|  | CD684 | 968 | [m; orf6; orf7a] | 1 |
|  | CD804 | 941 | [e; m; spike; nsp10; nsp11; nsp15; nsp7; orf3a; orf6; orf7a; orf8; orf9b; orf9c] | 2 |
|  | CD1634 | 9332 | [n] | 1 |
|  | MRC1 cd2064 | 4360 | [orf8] | 2 |
|  | PDCD1  PD14 | 5133 |  | 1 |
| PB mononuclear cells | Activation of proinflammatory genes | IL1B4 | 3553 | [orf8] | 2 |
|  | CXCL24 | 2920 | [nsp4; nsp9] | 2 |
|  | CXCL84 | 3576 |  | 2 |
| PBMC | Activation of proinflammatory genes | GDF118 | 10220 | [nsp1; nsp5\_c145a; orf8] | 1 |
|  | NOG8 | 9241 | [spike; nsp5\_c145a; orf3a; orf8; orf9c] | 2 |
|  | IL108 | 3586 | [spike; orf8; orf9c] | 2 |
|  | CXCL108 | 3627 | nsp4 | 2 |
|  | TNFSF108 | 8743 | [spike; nsp11; nsp12; nsp14; nsp15; orf10; orf3a; orf9b] | 1 |
|  | NRG18 | 3084 | [spike; nsp11; nsp15; nsp4; nsp6; orf3a; orf6; orf7a; orf8; orf9c] | 1 |
|  | TIMP18 | 7076 | [nsp10; nsp6; nsp9; orf8] | 2 |
|  | C58 | 727 | [nsp11; nsp4; orf9c] | 2 |
|  | IL188 | 3606 | [nsp2; orf7a] | 2 |
|  | AREG8 | 374 | [e; nsp12; nsp6] | 2 |
|  | CCL48 | 6351 | [spike; nsp4; orf9c] | 1 |
|  | CMTM28 | 146225 | [orf3a; orf9c] | 1 |
|  | CXCL88 | 3576 |  | 2 |
|  | IFNλ8 | 3458 | [spike; nsp11; nsp13; nsp4; nsp7; orf9c] | 2 |
| Lymphocytes | SARS-CoV-2 infection may cause lymphocyte apoptosis | CTSL8 | 1514 | [nsp14] | 1 |
|  | CTSB8 | 1508 | [m; nsp11; nsp4; nsp5\_c145a; nsp6; orf9b] | 1 |
|  | DDIT48 | 54541 | [orf9b] | 2 |
|  | RRAS8 | 6237 | [m; nsp2] | 1 |
|  | CTSD8 | 1509 | [m; nsp11; nsp14; nsp2; nsp4; nsp5\_c145a; nsp6; nsp7; orf10; orf6; orf8] | 1 |
|  | BIRC58 | 332 | [nsp14; nsp15] | 1 |
|  | TNFSF108 | 8743 | [spike; nsp11; nsp12; nsp14; nsp15; orf10; orf3a; orf9b] | 1 |
|  | CTSZ8 | 1522 |  | 1 |
|  | NTRK18 | 4914 |  | 1 |
|  | IGFBP38 | 3486 | [nsp1; nsp14; nsp15; nsp4; orf8; orf9b] | 1 |
|  | CCNB18 | 891 | [nsp1; nsp11; nsp13] | 1 |
|  | RRM28 | 6241 | [nsp1; orf6] | 2 |
|  | CCNB28 | 9133 | [nsp1; nsp10; nsp11; nsp13; nsp14; nsp15; nsp2; orf8; orf9b] | 1 |
|  | GTSE18 | 51512 | [nsp10; nsp12; nsp13] | 1 |
|  | CDK18 | 983 | [nsp1; orf3b] | 1 |
|  | STEAP38 | 55240 | [spike; nsp4; nsp6; orf3a; orf7a] | 2 |
|  | TP53I38 | 9540 |  | 2 |
| BALF | Activation of proinflammatory cytokines | CXCL28 | 2920 | [nsp4; nsp9] | 2 |
|  | TGFB28 | 7042 | [e; nsp4; nsp9; orf6; orf8; orf9b] | 2 |
|  | CCL3L18 | 6349 | [spike; nsp4] | 2 |
|  | CXCL68 | 6372 | [nsp4; nsp9] | 2 |
|  | CCL88 | 6355 | [nsp4; nsp9] | 2 |
|  | SCGB3A18 | 92304 |  | 2 |
|  | TNFSF108 | 8743 | [spike; nsp11; nsp12; nsp14; nsp15; orf10; orf3a; orf9b] | 1 |
|  | CCL28,9 | 6347 | [nsp4; nsp9] | 2 |
|  | CXCL18 | 2919 | [orf10] | 1 |
|  | IL338 | 90865 | [e; nsp10; nsp5; orf8; orf9b] | 2 |
|  | GRN8 | 2896 | [nsp1; nsp11] | 1 |
|  | CXCL168 | 58191 |  | 1 |
| Immune cells of BALF | higher levels of inflammatory cytokines in lung macrophages from patients with severe COVID-19 infection. | IL-89 | 3576 |  | 2 |
|  | IL-69 | 3569 | [nsp11; nsp14; nsp5; nsp6; nsp9; orf10; orf8; orf9b] | 2 |
|  | IL-1β9 | 3553 | [orf8] | 2 |
|  | TNFα9 | 7124 | [nsp12; orf8] | 1 |
|  | CCL39 | 6348 | [m; nsp4; nsp7; orf9c] | 1 |
|  | CCL49 | 6351 | [spike; nsp4; orf9c] | 1 |
|  | CCL79 | 6354 | [spike; orf8] | 1 |
|  | CXCL99 | 4283 | [orf9c] | 1 |
|  | CXCL109 | 3627 | [nsp4] | 2 |
|  | CXCL119 | 6373 | [nsp4] | 2 |
| Primary lung epithelial cells | glycolysis | HK2\*10 | 3099 | [nsp1; nsp11; nsp6; orf6; orf8; orf9b] | 1 |
| glycolysis | GPI10 | 2821 | [nsp11; nsp14; orf3] | 1 |
| glycolysis | PFKP10 | 5214 | [nsp11; nsp14; nsp15; nsp5\_c145a; orf7a] | 1 |
| glycolysis | ENO2\*10 | 2026 | [nsp11; nsp14; nsp15; nsp4; nsp5\_c145a; nsp7; orf10] | 1 |
| glycolysis | PKM\*10 | 5315 | [nsp11; nsp5; nsp7; orf7a; orf9b] | 1 |
| glycolysis | LDHA10 | 3939 | [m; nsp11; nsp14; nsp4; nsp7; orf10; orf3b] | 1 |
| glycolysis | ALDOA10 | 226 | [nsp11; nsp5\_c145a; orf3b; orf6] | 1 |
| glycolysis | PGK110 | 5230 | [nsp11; nsp14; nsp5\_c145a; orf3b; orf6] | 1 |
| glycolysis | BPGM\*10 | 669 | [nsp15] | 2 |
| Pentose-Phosphate | PGD10 | 5226 | [m; nsp11; nsp14; nsp15; nsp4; nsp5\_c145a; nsp9; orf3b; orf6; orf9b] | 1 |
| Pentose-Phosphate | PGLS10 | 25796 | [nsp10; nsp11; nsp15; nsp4; nsp5\_c145a] | 1 |
| Pentose-Phosphate | RBKS10 | 64080 | [nsp11; nsp13; nsp15; nsp4; orf3a] | 2 |
| mitochondria | DNAJC15\*10 | 29103 | [nsp7] | 2 |
| mitochondria | ATP1A1\*10 | 476 | [m; nsp11; nsp6; nsp7; orf10; orf3b; orf6] | 1 |
| mitochondria | UQCRB10 | 7381 | [m; spike; nsp11; nsp2; nsp4; nsp5\_c145a; nsp6; nsp7; orf3b; orf6] | 1 |
| mitochondria | IDH1\*10 | 3417 | [nsp10; nsp11; nsp14; nsp15; nsp4; nsp5\_c145a; orf3b; orf6] | 1 |
| mitochondria | CDK1\*10 | 983 | [nsp1; orf3b] | 1 |
| palmitoylation | ZDHHC1410 | 79683 |  | 2 |
| palmitoylation | IFITM1\*10 | 8519 |  | 2 |
| palmitoylation | IFITM3\*10 | 10410 | [nsp6; orf3b] | 1 |
| lipogenesis | ACAA110 | 30 | [spike; nsp11; nsp12; nsp14; nsp15; nsp5\_c145a; nsp6; orf3b] | 1 |
| lipogenesis | HMGCS1\*10 | 3158 | [nsp13] | 1 |
| lipogenesis | ACAT210 | 39 | [n; nsp10; nsp11; nsp14; nsp15; nsp4; nsp5\_c145a; nsp6; orf3b; orf6; orf7a; orf9b] | 1 |
| lipogenesis | BCKDK10 | 10295 | [nsp14; nsp6; orf7a] | 0 |
| lipogenesis | MVD10 | 4597 | [nsp10; nsp11; nsp14; nsp2; nsp4; orf3b; orf9b] | 2 |
| lipogenesis | FDFT110 | 2222 | [nsp6; nsp7; orf3a; orf3b] | 1 |
| lipogenesis | SQLE\*10 | 6713 | [m; nsp4; nsp6; orf9c] | 2 |
| lipogenesis | DGAT110 | 8694 | [m; spike; nsp6; orf3a; orf9c] | 2 |
| lipogenesis | MTTP10 | 4547 | [nsp7; orf8] | 2 |
| oxidative stress | NFKB1\*10 | 4790 | [nsp13; nsp5] | 1 |
| oxidative stress | JUN10 | 3725 | [e; m; n; nsp1; nsp10; nsp12; nsp13; nsp15; nsp4; nsp5; nsp7; nsp8; nsp9; orf10; orf3b; orf6; orf7a; orf9b] | 1 |
| oxidative stress | FOXO1\*10 | 2308 | [nsp1; nsp11; nsp14; nsp15; nsp2; nsp5] | 1 |
| oxidative stress | GCLC\*10 | 2729 | [nsp14; nsp15; nsp9; orf9b] | 1 |
| oxidative stress | HMOX2\*10 | 3163 | [m; nsp2; nsp4; nsp6; nsp7; orf3b; orf9c] | 1 |
| oxidative stress | IL6\*10 | 3569 | [nsp11; nsp14; nsp5; nsp6; nsp9; orf10; orf8; orf9b] | 2 |
| oxidative stress | SOD210 | 6648 | [m; nsp11; nsp14; nsp15; nsp5\_c145a; nsp6; orf3b; orf6; orf8] | 1 |
| ER stress | ERN110 | 2081 | [nsp10; nsp11; nsp4; nsp5\_c145a; nsp6; nsp9; orf3a; orf8; orf9b; orf9c] | 1 |
| ER stress | EIF2AK210 | 5610 | [n] | 1 |
| ER stress | ATF410 | 468 | [nsp9] | 1 |
| ER stress | CEBPB10 | 1051 |  | 2 |
| ER stress | DNAJB910 | 4189 | [nsp11; orf7a; orf9c] | 2 |
| Cardiomyocytes | cardiac muscle tissue development  regulation of viral process  actin filament organization  proteosomal protein catabolic process  cellular respiration  regulation of lymphocyte activation  sensory perception of smell  pos. reg. of receptor sig.pathway via JAK-STAT | ATP2A211 | 488 | [m; nsp2; nsp6; nsp7; orf3b; orf6; orf7a; orf9c] | 1 |
|  | ENO311 | 2027 | [nsp11; nsp13; nsp4; orf3b; orf6; orf9b] | 1 |
|  | ACTB11 | 60 | [m; spike; nsp5; nsp7; orf10; orf3b; orf9c] | 1 |
|  | TPM211 | 7169 |  | 1 |
|  | TPM411 | 7171 | [nsp11; nsp6; orf3b] | 1 |
|  | CALM311 | 808 | [nsp11; nsp13; nsp7] | 1 |
|  | TPM111 | 7168 | [spike; nsp11; nsp13; orf3b] | 1 |
|  | CALM211 | 805 | [nsp11; nsp13; nsp7] | 1 |
|  | MYL911 | 10398 | [e] | 1 |
|  | MYL611 | 4637 | [nsp11; nsp13; nsp15; orf10; orf3b] | 1 |
|  | TNNC111 | 7134 | [orf9b] | 2 |
|  | CKM11 | 1158 | [e; orf10; orf6; orf9b] | 1 |
|  | MYL711 | 58498 |  | 2 |
|  | MYH1111 | 4629 | [nsp11; nsp14; orf3b] | 1 |
|  | MYLK11 | 4638 | [e] | 2 |
|  | MYL411 | 4635 | [n; nsp10] | 2 |
|  | TNNI111 | 7135 |  | 2 |
|  | TPM311 | 7170 | [nsp11; nsp6; orf6] | 1 |
|  | MYH611 | 4624 | [nsp14; orf9c] | 1 |
|  | TNNI311 | 7137 | [nsp10; nsp11; nsp13; nsp15; orf3a; orf9b] | 1 |
|  | CAPZB11 | 832 | [nsp11; nsp5\_c145a; orf9b] | 1 |
|  | ACTC111 | 70 | [nsp1] | 1 |
|  | MYOM211 | 9172 |  | 2 |
|  | TMOD111 | 7111 | [spike; orf6] | 1 |
|  | TTN11 | 7273 | [orf3a] | 1 |
|  | MYH811 | 4626 | [e] | 1 |
|  | MYO1G11 | 64005 | [nsp15; nsp2; nsp6; nsp7; orf3b] | 1 |
|  | TRIM6311 | 84676 |  | 1 |
|  | TNNT311 | 7140 | [nsp10; nsp13] | 1 |
|  | NEB11 | 4703 | [e; nsp1] | 2 |
|  | MYL311 | 4634 |  | 2 |
|  | OBSCN11 | 84033 | [nsp6; nsp9; orf3a] | 1 |
|  | MYH211 | 4620 | [spike] | 1 |
|  | MYO7A11 | 4647 | [orf3b] | 2 |
|  | MYO3A11 | 53904 |  | 2 |
|  | MYH711 | 4625 |  | 1 |
|  | MYH1511 | 22989 | [nsp7; orf8; orf9c] | 2 |
|  | MYO3B11 | 140469 | [m; nsp10; nsp5\_c145a] | 1 |
|  | MYO1H11 | 283446 |  | 1 |
|  | MYO15A11 | 51168 | [nsp13] | 2 |
|  | MYLK211 | 85366 | [nsp1; nsp4; orf7a] | 2 |
|  | MYO7B11 | 4648 | [m] | 2 |
|  | MYO1A11 | 4640 | [nsp9] | 1 |
|  | MYH411 | 4622 |  | 1 |
|  | MYH111 | 4619 |  | 1 |
|  | MYH1311 | 8735 | [nsp5] | 1 |
|  | MYO1F11 | 4542 | [orf8] | 1 |
| Human bronchial epithelial cell line (16HBE) | Activation of proinflammatory cytokines | IKKβ, 12 | 3551 | [nsp12; nsp13; orf9b] | 1 |
|  | IFNλ12 | 3458 | [spike; nsp11; nsp13; nsp4; nsp7; orf9c] | 2 |
|  | TNF‐α12 | 7124 | [nsp12; orf8] | 1 |
|  | LTa312 |  |  |  |
|  | GMCSF12 |  |  |  |
|  | IL‐1β12 | 3553 | [orf8] | 2 |
|  | IL‐212 | 3558 | [m; spike; nsp11; nsp12; nsp2; nsp7; orf10; orf8; orf9c] | 2 |
|  | IL‐612 | 3569 | [nsp11; nsp14; nsp5; nsp6; nsp9; orf10; orf8; orf9b] | 2 |
|  | IL‐812 | 3576 |  | 2 |
|  | IL‐1212 | 3593 | [nsp11; nsp15; nsp8; orf8] | 1 |
|  | IL‐1312 | 3596 | [m; spike; nsp10; nsp11; nsp12; nsp13; nsp2; nsp4; nsp6; nsp7; orf3a; orf3b; orf7a; orf8; orf9c] | 2 |
|  | IL‐3312 | 90865 | [e; nsp10; nsp5; orf8; orf9b] | 2 |
|  | IL‐412 | 3565 | [m; spike; nsp10; nsp2; nsp4; nsp6; nsp7; orf10; orf8; orf9b; orf9c] | 2 |
|  | IL‐512 | 3567 | [spike; nsp10; orf8] | 2 |
|  | IL‐1012 | 3586 | [spike; orf8; orf9c] | 2 |
|  | IL‐1712 | 3605 | [spike; nsp12; orf8; orf9c] | 1 |
|  | IL‐2212 | 50616 | [spike; orf9c] | 3 |
| Neuronal cells | altered distribution of Tau | [Tau](https://www.ncbi.nlm.nih.gov/gene/4137)13 | 4137 | [n; nsp1; nsp10; nsp13; nsp7; nsp8; orf10; orf7a; orf9b] | 1 |
| apoptosis of neuronal cells | Caspase 313 | 836 | [nsp11; nsp12; nsp13; nsp14; nsp15; nsp4; nsp5\_c145a; orf3a] | 1 |
|  | UNC13A | 23025 | [n; orf6] | 1 |
|  | RAB27A | 5873 | [nsp7] | 2 |
|  | RAB3A | 5864 | [nsp1; nsp10; nsp11; nsp15; nsp7; orf6; orf9c] | 1 |
|  | RIMS1 | 22999 | [nsp7; orf9b] | 2 |
|  | RPH3A | 22895 | [nsp7] | 1 |
|  | SNAP25 | 6616 | [spike; nsp10; nsp11; nsp15; nsp2; nsp4; nsp6; orf3a; orf9b] | 2 |
|  | SNCA | 6622 | [nsp11; nsp5\_c145a; nsp6; nsp7; orf3b; orf8] | 1 |
|  | STX1A | 6804 | [orf3a] | 1 |
|  | STXBP1 | 6812 | [nsp10; nsp11; nsp15; nsp2; nsp4; orf3a] | 1 |
|  | STXBP5 | 134957 | [e; spike; nsp2; nsp6; orf3a; orf9b; orf9c] | 2 |
|  | Syp | 6855 | [nsp11] | 2 |
| Proximal tubule cells | decreased expression of the multi-ligand receptor megalin LRP2 | Megalin14 | 4036 | [nsp10; nsp14; nsp7; nsp9; orf3a] | 1 |
| decreased expression of the multi-ligand receptor megalin LRP3 | SLC22A1214 | 116085 | [spike; nsp6; nsp7; orf9b; orf9c] | 2 |
| decreased expression of the multi-ligand receptor megalin LRP4 | SLC34A114 | 6569 | [nsp11; nsp15; nsp7; orf9b] | 2 |
| decreased expression of the multi-ligand receptor megalin LRP5 | SLC34A314 | 142680 |  | 2 |
| decreased expression of the multi-ligand receptor megalin LRP6 | SLC6A1914 | 340024 | [e; nsp10; nsp13; nsp14; nsp15; nsp4; nsp5; nsp6; nsp7; nsp9; orf10; orf3a; orf3b; orf8; orf9b] | 2 |
| amino acid transporter | EAAT314 | 6505 | [spike; nsp6; nsp7; orf3b; orf9c] | 1 |
| amino acid transporter | PAT214 | 153201 | [n; spike; nsp1; nsp11; nsp12; nsp13; nsp14; nsp15; nsp6; nsp7; nsp8; nsp9; orf10; orf3a; orf3b; orf7a; orf9b] | 2 |
| amino acid transporter | SIT114 | 54716 |  | 2 |
| amino acid transporter | B^0AT114 | 340024 |  | 2 |
| amino acid transporter | B^0AT314 | 348932 |  | 1 |
| amino acid transporter | ASCT214 | 6510 | [spike; nsp6; nsp7; orf3a; orf3b; orf8] | 2 |
| amino acid transporter | SNAT314 | 10991 | [orf6; orf9c] | 2 |
| amino acid transporter | TAT114 | 117247 | [nsp14; nsp4; orf6; orf9c] | 2 |
| amino acid transporter | TMEM2714 | 57393 |  | 2 |
| amino acid transporter | SLC7A914 | 11136 |  | 2 |
| amino acid transporter | SLC3A114 | 6519 | [nsp7] | 2 |
| impaired tubular handling of uric acid | URAT114 | 116085 |  | 2 |
| impaired tubular handling of uric acid | OAT114 | 9356 | [nsp4; orf9c] | 2 |
| impaired tubular handling of uric acid | OAT314 | 9376 |  | 2 |
| impaired tubular handling of uric acid | OAT414 | 55867 | [n; orf9c] | 2 |
| impaired tubular handling of uric acid | GLUT914 | 56606 | [m; spike; nsp11; nsp15; nsp2; nsp6; nsp7; orf3b; orf8; orf9c] | 1 |
| impaired tubular handling of uric acid | ABCG214 | 9429 | [spike; nsp6; nsp7; orf3a; orf3b; orf9b] | 2 |
| impaired tubular handling of uric acid | NPT114 | 6568 |  | 1 |
| impaired tubular handling of uric acid | NPT414 | 10786 |  | 2 |
| Enterocytes (gut organoids) | Defense response to virus | IFI615 | 2537 |  | 2 |
|  | IFI2715 | 3429 |  | 2 |
|  | IFITM115 | 8519 |  | 2 |
|  | MX115 | 4599 | [orf9c] | 1 |
|  | RN7SK15 | 125050 | [e; nsp8] | 1 |
|  | ARC15 | 23237 | [nsp12] | 2 |
|  | DKK115 | 22943 | [nsp4; orf8; orf9c] | 2 |
|  | MT1G15 | 4495 | [nsp4] | 2 |
|  | SAMD915 | 54809 | [nsp15; nsp5\_c145a] | 2 |
|  | IFIT315 | 3437 | [n; nsp15] | 1 |
|  | C10orf9915 | 387695 |  | 1 |
|  | IFIT215 | 3433 | [n] | 1 |
|  | NKX3-115 | 4824 |  | 1 |
|  | LINC0094115 | 1E+08 |  |  |
|  | HSPA615 | 3310 |  | 1 |
|  | IFIT115 | 3434 | [n; nsp10; nsp15] | 1 |
|  | IFI44L15 | 10964 | [orf8; orf9b] | 2 |
|  | CMPK215 | 129607 |  | 1 |
|  | RSAD215 | 91543 | [nsp1; nsp11; nsp13; orf9b] | 2 |
|  | ISG1515 | 9636 | [m; nsp10; nsp11; nsp12; nsp6; nsp7; nsp8] | 2 |
|  | OAS215 | 4939 |  | 2 |
|  | CXCL1115 | 6373 | [nsp4] | 2 |
|  | IFI4415 | 10561 | [nsp11; nsp4; nsp5\_c145a; orf3b; orf8] | 1 |
|  | CXCL1015,16 | 3627 | [nsp4] | 2 |
|  | SLC34A215 | 10568 | [m; nsp6] | 2 |
|  | IFNλ16,17 | 3458 | [spike; nsp11; nsp13; nsp4; nsp7; orf9c] | 3 |
|  | IFN b117 | 3456 | [nsp10] | 2 |
|  | IFNL216 | 282616 |  | 2 |
|  | IFNL316 | 28617 |  | 1 |
|  | CCR116 | 1230 | [spike; nsp15; nsp4; orf9c] | 2 |
|  | CCR816 | 1237 | [nsp10; nsp2; orf9c] | 2 |
|  | IL1616 | 3603 |  | 2 |
|  | IL316 | 3562 | [nsp10; nsp11; nsp7; orf8; orf9b] | 2 |
|  | CCR216 | 729230 | [orf6; orf7a] | 2 |
|  | CCR516 | 1234 | [nsp4; orf3a] | 2 |
|  | IL516 | 3567 | [spike; nsp10; orf8] | 2 |

**Supplementary File 1B. Significant target for each viral protein.**

|  |  |  |
| --- | --- | --- |
| **SARS-Cov-2 Proteins** | **Human proteins which are most effect** | **Number of proteins** |
| **e** | [RN7SK; SLC6A19; MYL9; CKM; MYLK; MYH8; NEB; IL-33; JUN; CD80; ACE2; AREG; TGFB2; STXBP5] | 14 |
| m | [ISG15; SLC34A2; GLUT9; ATP2A2; ACTB; MYO3B; MYO7B; IL-2; IL-13; IL-4; LDHA; PGD; ATP1A1\*; UQCRB; SQLE\*; DGAT1; JUN; HMOX2\*; SOD2; CD80; IL-7; PD-1; CD66b; CD68; CTSB; RRAS; CTSD; CCL3] | 28 |
| n | [IFIT3; IFIT2; IFIT1; PAT2; OAT4; MYL4; ACAT2; JUN; EIF2AK2; Ki67; CD163; UNC13A; Tau] | 13 |
| S | [IFNλ; CCR1; IL-5; SLC22A12; EAAT3; PAT2; ASCT2; GLUT9; ABCG2; ACTB; TPM1; TMOD1; MYH2; IL-2; IL-13; IL-4; IL-10; IL-17; IL-22; UQCRB; ACAA1; DGAT1; CD80; PD-1; CD66b; NOG; TNFSF10; NRG1; CCL4; STEAP3; CCL3L1; CCL7; SNAP25; STXBP5] | 34 |
| nsp1 | [RSAD2; PAT2; ACTC1; NEB; MYLK2; HK2\*; CDK1\*; JUN; FOXO1\*; GDF11; IGFBP3; CCNB1; RRM2; CCNB2; GRN; RAB3A; Tau] | 17 |
| nsp10 | [IFIT1; ISG15; IFN b1; CCR8; IL-3; IL-5; Megalin; SLC6A19; MYL4; TNNI3; TNNT3; MYO3B; IL-13; IL-33; IL-4; PGLS; IDH1\*; ACAT2; MVD; JUN; ERN1; CD80; CD86; CTLA-4; CD66b; ACE2; FCGR3Acd16; TIMP1; CCNB2; GTSE1; RAB3A; SNAP25; STXBP1; Tau] | 34 |
| nsp11 | [RSAD2; ISG15; IFI44; IFNλ; IL-3; SLC34A1; PAT2; GLUT9; ENO3; TPM4; CALM3; TPM1; CALM2; MYL6; MYH11; TPM3; TNNI3; CAPZB; IL-2; IL-6; IL-12; IL-13; HK2\*; GPI; PFKP; ENO2\*; PKM\*; LDHA; ALDOA; PGK1; PGD; PGLS; RBKS; ATP1A1\*; UQCRB; IDH1\*; ACAA1; ACAT2; MVD; FOXO1\*; SOD2; ERN1; DNAJB9; CD80; FAS; ITGAM  cd1b; TNFSF10; NRG1; C5; CTSB; CTSD; CCNB1; CCNB2; GRN; RAB3A; SNAP25; SNCA; STXBP1; Syp; Caspase 3] | 61 |
| nsp12 | [ARC; ISG15; PAT2; IKKβ; TNF-α; IL-2; IL-13; IL-17; ACAA1; JUN; ACE2; TNFSF1; AREG; GTSE1; Caspase 3] | 15 |
| nsp13 | [RSAD2; IFNλ; SLC6A19; PAT2; ENO3; CALM3; TPM1; CALM2; MYL6; TNNI3; TNNT3; MYO15A; IKKβ; IL-13; RBKS; HMGCS1\*; NFKB1\*; JUN; CCNB1; CCNB2; GTSE1; Tau; Caspase 3] | 23 |
| nsp14 | [Megalin; SLC6A19; PAT2; TAT1; MYH11; MYH6; IL-6; GPI; PFKP; ENO2\*; LDHA; PGK1; PGD; IDH1\*; ACAA1; ACAT2; BCKDK; MVD; FOXO1\*; GCLC\*; SOD2; TNFSF10'; CTSL; CTSD; BIRC5; IGFBP3; CCNB2; Caspase 3] | 28 |
| nsp15 | [SAMD9; IFIT3; IFIT1; CCR1; SLC34A1; SLC6A19; PAT2; GLUT9; MYL6; TNNI3; MYO1G; IL-12; PFKP; ENO2\*; BPGM\*; PGD; PGLS; RBKS; IDH1\*; ACAA1; ACAT2; JUN; FOXO1\*; GCLC\*; SOD2; CD80; CTLA-4; PD-1; ACE2; TNFSF10; NRG1; BIRC5; IGFBP3; CCNB2; RAB3A; SNAP25; STXBP1; Caspase 3] | 38 |
| nsp2 | [CCR8; GLUT9; ATP2A2; MYO1G; IL-2; IL-13; IL-4; UQCRB; MVD; FOXO1\*; HMOX2\*; FAS; ACE2; IL-18; RRAS; CTSD; CCNB2; SNAP25; STXBP1; STXBP5] | 20 |
| nsp4 | [DKK1; MT1G; CXCL11; IFI44; CXCL10; IFNλ; CCR1; CCR5; SLC6A19; TAT1; OAT1; ENO3; MYLK2; IL-13; IL-4; ENO2\*; LDHA; PGD; PGLS; RBKS; UQCRB; IDH1\*; ACAT2; MVD; SQLE\*; JUN; HMOX2\*; ERN1; PD-1; ferritin h; FAS; ACE2; CXCL2; NRG1; C5; CCL4; CTSB; CTSD; IGFBP3; STEAP3; TGFB2; CCL3L1; CXCL6; CCL8; CCL2; CCL3; SNAP25; STXBP1; Caspase 3] | 49 |
| nsp5 | [SLC6A19; ACTB; MYH13; IL-6; IL-33; PKM\*; NFKB1\*; JUN; FOXO1\*; Ki67; CD14] | 11 |
| nsp5\_c145a | [SAMD9; IFI44; CAPZB; MYO3B; PFKP; ENO2\*; ALDOA; PGK1; PGD; PGLS; UQCRB; IDH1\*; ACAA1; ACAT2; SOD2; ERN1; GDF11; NOG; CTSB; CTSD; SNCA; Caspase 3] | 22 |
| nsp6 | [ISG15; SLC34A2; SLC22A12; SLC6A19; EAAT3; PAT2; ASCT2; GLUT9; ABCG2; ATP2A2; TPM4; TPM3; MYO1G; OBSCN; IL-6; IL-13; IL-4; HK2\*; ATP1A1\*; UQCRB; IFITM3\*; ACAA1; ACAT2; BCKDK; FDFT1; SQLE\*; DGAT1; HMOX2\*; SOD2; ERN1; ACE2; NRG1; TIMP1; AREG; CTSB; CTSD; STEAP3; SNAP25; SNCA; STXBP5] | 40 |
| nsp7 | [ISG15; IFNλ; IL-3; Megalin; SLC22A12; SLC34A1; SLC6A19; EAAT3; PAT2; ASCT2; SLC3A1; GLUT9; ABCG2; ATP2A2; ACTB; CALM3; CALM2; MYO1G; MYH15; IL-2; IL-13; IL-4; ENO2\*; PKM\*; LDHA; DNAJC15\*; ATP1A1\*; UQCRB; FDFT1; MTTP; JUN; HMOX2\*; CD80; CD86; CTLA-4; Ki67; FAS; CTSD; CCL; RAB27A; RAB3A; RIMS1; RPH3A; SNCA; Tau] | 45 |
| nsp8 | [RN7SK; ISG15; PAT2; IL-12; JUN; Ki67; Tau] | 7 |
| nsp9 | [Megalin; SLC6A19; PAT2; OBSCN; MYO1A; IL-6; PGD; JUN; GCLC\*; ERN1; ATF4; CXCL2; TIMP1; TGFB2; CXCL6; CCL8; CCL2] | 17 |
| orf10 | [SLC6A19; PAT2; ACTB; MYL6; CKM; IL-2; IL-6; IL-4; ENO2\*; LDHA; ATP1A1\*; JUN; IL-7; ACE2; TNFSF10; CTSD; CXCL1; Tau] | 35 |
| orf3a | [CCR5; Megalin; SLC6A19; PAT2; ASCT2; ABCG2; TNNI3; TTN; OBSCN; IL-13; RBKS; FDFT1; DGAT1; ERN1; CD80; Ki67; FAS; NOG; TNFSF10; NRG1; CMTM2; STEAP3; SNAP25; STX1A; STXBP1; STXBP5; Caspase 3] | 27 |
| orf3b | [IFI44; SLC6A19; EAAT3; PAT2; ASCT2; GLUT9; ABCG2; ATP2A2; ENO3; ACTB; TPM4; TPM1; MYL6; MYH11; MYO1G; MYO7A; IL-3; GPI; LDHA; ALDOA; PGK1; PGD; ATP1A1\*; UQCRB; IDH1\*; CDK1\*; IFITM3\*; ACAA1; ACAT2; MVD; FDFT1; JUN; HMOX2\*; SOD2; Ki67; SNCA] | 36 |
| orf6 | [CCR2; SNAT3; TAT1; ATP2A2; ENO3; CKM; TPM3; TMOD1; HK2\*; ALDOA; PGK1; PGD; ATP1A1\*; UQCRB; IDH1\*; ACAT2; JUN; SOD2; CD80; PD-1; FAS; CD68; NRG1; CTSD; RRM2; TGFB2; UNC13A; RAB3A] | 28 |
| orf7a | [CCR2; PAT2; ATP2A2; MYLK2; IL-13; PFKP; PKM\*; ACAT2; BCKDK; JUN; DNAJB9; CD80; Ki67; FAS; ACE2; CD68; NRG1; IL-18; STEAP3; Tau] | 20 |
| orf8 | [DKK1; IFI44L; IFI44; IL-3; IL-5; SLC6A19; ASCT2; GLUT9; MYH15; MYO1F; TNF-α; IL-1β; IL-2; IL-6; IL-12; IL-13; IL-33; IL-4; IL-10; IL-17; HK2\*; MTTP; SOD2; ERN1; CD80; CRP; ACE2; MRC1 cd206; GDF11; NOG; NRG1; TIMP1; CTSD; IGFBP3; CCNB2; TGFB2; CCL7; SNCA] | 38 |
| orf9b | [IFI44L; RSAD2; IL-3; SLC22A12; SLC34A1; SLC6A19; PAT2; ABCG2; ENO3; TNNC1; CKM; TNNI3; CAPZB; IKKβ; IL-6; IL-33; IL-4; HK2\*; PKM\*; PGD; ACAT2; MVD; JUN; GCLC\*; ERN1; CD80; CTLA-4; ACE2; TNFSF10; CTSB; DDIT4; IGFBP3; CCNB2; TGFB2; RIMS1; SNAP25; STXBP5; Tau] | 38 |
| orf9c | [MX1; DKK1; IFNλ; CCR1; CCR8; SLC22A12; EAAT3; SNAT3; TAT1; OAT1; OAT4; GLUT9; ATP2A2; ACTB; MYH6; MYH15; IL-2; IL-13; IL-4; IL-10; IL-17; IL-22; SQLE\*; DGAT1; HMOX2\*'; ERN1; DNAJB9; CD80; IL-7; PD-1; FAS; ACE2; NOG; NRG1; C5; CCL4; CMTM2; CCL3; CXCL9; RAB3A; STXBP5] | 41 |

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