Supplemental Materials

Comprehensive Analysis of Two Potential Novel SARS-CoV-2 Entries, TMPRSS2 and IFITM3, in Healthy Individuals and Cancer Patients

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SUPPLEMENTARY INFORMATION

Table S1. ACE2 significant differentially expressed in six type of cancers compared with normal samples.

| Cancer   | Cancer Full Name             | Cancer Number | Normal Number | CancerExp | Normal Exp | Flod Change | p Value   | FDR       |
|----------|------------------------------|---------------|---------------|-----------|------------|-------------|-----------|-----------|
| KICH     | Kidney Chromophobe           | 65            | 24            | 0.1       | 9.49       | 0.01        | 1.10E-27  | 1.50E-25  |
| BRCA     | Breast Invasive Carcinoma    | 1104          | 113           | 1.09      | 0.48       | 2.27        | 9.10E-22  | 8.20E-21  |
| PRAD     | Prostate Adenocarcinoma      | 499           | 52            | 0.19      | 1.8        | 0.11        | 1.60E-13  | 3.40E-12  |
| THCA     | Thyroid Carcinoma            | 510           | 58            | 0.6       | 0.72       | 0.83        | 0.00074   | 0.0023    |
| LIHC     | Liver Hepatocellular Carcinoma | 374         | 50            | 2.34      | 1.07       | 2.19        | 0.0012    | 0.0038    |
| STAD     | Stomach Adenocarcinoma       | 375           | 32            | 4.24      | 35.62      | 0.12        | 0.0048    | 0.013     |
| LUAD     | Lung Adenocarcinoma          | 526           | 59            | 2.79      | 0.82       | 3.38        | 0.047     | 0.097     |
| UCEC     | Uterine Corpus Endometrial Carcinoma | 548       | 35            | 0.66      | 0.38       | 1.75        | 0.039     | 0.1       |
| KIRP     | Kidney Renal Papillary Cell Carcinoma | 289     | 32            | 40.82     | 20.93      | 1.95        | 0.057     | 0.14      |
| COAD     | Colon Adenocarcinoma         | 471           | 41            | 13.62     | 16.42      | 0.83        | 0.073     | 0.17      |
| PAAD     | Pancreatic Adenocarcinoma    | 178           | 4             | 4.83      | 0.78       | 6.18        | 0.046     | 0.38      |
| ESCA     | Esophageal Carcinoma         | 162           | 11            | 2.62      | 0.91       | 2.87        | 0.21      | 0.5       |
| HNSC     | Carcinoma                   | 502           | 44            | 1.41      | 1.1        | 1.17        | 0.47      | 0.62      |
| CHOL     | Cholangiocarcinoma           | 36            | 9             | 10.94     | 1.22       | 8.97        | 0.56      | 0.67      |
| BLCA     | Bladder Urothelial Carcinoma | 411           | 19            | 1.28      | 1.01       | 1.26        | 0.48      | 0.73      |
| KIRC     | Kidney Renal Clear Cell Carcinoma | 535   | 72            | 22.66     | 17.24      | 1.31        | 0.72      | 0.76      |
| LUSC     | Lung Squamous Cell Carcinoma | 501           | 49            | 1.56      | 0.84       | 1.85        | 0.67      | 0.77      |
Table S2. TMPRSS2 significant differentially expressed in ten type of cancers compared with normal samples.

| Cancer   | Cancer Full Name                               | Cancer Number | Normal Number | CancerExp | Normal Exp | Flod Change | p Value    | FDR       |
|----------|------------------------------------------------|---------------|---------------|-----------|------------|-------------|------------|-----------|
| KIRC     | Kidney Renal Clear Cell Carcinoma              | 535           | 72            | 1.47      | 21.24      | 0.07        | 1.4E-90    | 3.3E-88   |
| KIRP     | Kidney Renal Papillary Cell Carcinoma          | 289           | 32            | 1.89      | 21.19      | 0.09        | 1.1E-38    | 1.3E-36   |
| LUSC     | Lung Squamous Cell Carcinoma                   | 501           | 49            | 4.56      | 27.8       | 0.16        | 2.2E-32    | 4.3E-31   |
| COAD     | Colon Adenocarcinoma                           | 471           | 41            | 34.3      | 80.75      | 0.42        | 1.2E-23    | 3.4E-22   |
| UCEC     | Uterine Corpus Endometrial Carcinoma           | 548           | 35            | 6.36      | 1.58       | 4.03        | 2.3E-16    | 4.3E-15   |
| HNSC     | Head and Neck Squamous Cell Carcinoma          | 502           | 44            | 2.39      | 8.73       | 0.27        | 6.1E-13    | 1.1E-11   |
| LUAD     | Lung Adenocarcinoma                            | 526           | 59            | 20.02     | 29.42      | 0.68        | 1.4E-07    | 7.4E-07   |
| BRCA     | Breast Invasive Carcinoma                      | 1104          | 113           | 3.19      | 7.48       | 0.43        | 0.000001   | 0.000037 |
| PRAD     | Prostate Adenocarcinoma                        | 499           | 52            | 251.1     | 184.9      | 1.36        | 0.000012   | 0.000074 |
| LIHC     | Liver Hepatocellular Carcinoma                 | 374           | 50            | 5.77      | 9.02       | 0.64        | 0.0001     | 0.00039   |
| KICH     | Kidney Chromophobe                             | 65            | 24            | 51.51     | 25.05      | 2.06        | 0.027      | 0.063     |
| ESCA     | Esophageal Carcinoma                           | 162           | 11            | 14.99     | 36.17      | 0.41        | 0.013      | 0.072     |
| STAD     | Stomach Adenocarcinoma                         | 375           | 32            | 22.61     | 27.85      | 0.81        | 0.055      | 0.1       |
| THCA     | Thyroid Carcinoma                              | 510           | 58            | 4.7       | 4.04       | 1.17        | 0.11       | 0.21      |
| PAAD     | Pancreatic Adenocarcinoma                      | 178           | 4             | 14.62     | 8.04       | 1.82        | 0.02       | 0.24      |
| BLCA     | Bladder Urothelial Carcinoma                   | 411           | 19            | 16.85     | 8.09       | 2.08        | 0.14       | 0.34      |
| CHOL     | Cholangiocarcinoma                             | 36            | 9             | 15.47     | 8.42       | 1.84        | 0.72       | 0.75      |
Table S3. IFITM3 significant differentially expressed in 11 type of cancers compared with normal samples.

| Cancer  | Cancer Full Name                      | Cancer Number | Normal Number | CancerExp | Normal Exp | Flod Change | p Value   | FDR       |
|---------|---------------------------------------|---------------|---------------|-----------|------------|-------------|-----------|-----------|
| COAD    | Colon Adenocarcinoma                  | 471           | 41            | 403.13    | 136.06     | 2.96        | 2.40E-21  | 5.50E-20  |
| KIRC    | Kidney Renal Clear Cell Carcinoma     | 535           | 72            | 384.87    | 216.88     | 1.77        | 1.40E-18  | 1.20E-17  |
| KICH    | Kidney Chromophobe                    | 65            | 24            | 90.86     | 273.5      | 0.33        | 6.70E-15  | 1.20E-13  |
| HNSC    | Head and Neck Squamous Cell Carcinoma | 502           | 44            | 444.93    | 194.49     | 2.29        | 4.60E-11  | 6.10E-10  |
| LUSC    | Lung Squamous Cell Carcinoma          | 501           | 49            | 276.15    | 412.79     | 0.67        | 3.70E-08  | 1.60E-07  |
| STAD    | Stomach Adenocarcinoma                | 375           | 32            | 490.32    | 239.77     | 2.04        | 2.20E-08  | 2.00E-07  |
| ESCA    | Esophageal Carcinoma                  | 162           | 11            | 318.69    | 123.37     | 2.58        | 1.40E-08  | 8.10E-07  |
| THCA    | Thyroid Carcinoma                     | 510           | 58            | 129.34    | 164.32     | 0.79        | 2.60E-05  | 0.00011   |
| LIHC    | Liver Hepatocellular Carcinoma        | 374           | 50            | 795.2     | 532.06     | 1.49        | 0.00026   | 0.00089   |
| BRCA    | Breast Invasive Carcinoma             | 1104          | 113           | 349.27    | 246.43     | 1.42        | 0.0045    | 0.01      |
| PRAD    | Prostate Adenocarcinoma               | 499           | 52            | 157.68    | 172.69     | 0.91        | 0.012     | 0.038     |
| CHOL    | Cholangiocarcinoma                    | 36            | 9             | 568       | 388.22     | 1.46        | 0.17      | 0.33      |
| UCEC    | Uterine Corpus Endometrial Carcinoma  | 548           | 35            | 607.77    | 587.71     | 1.03        | 0.18      | 0.34      |
| KIRP    | Kidney Renal Papillary Cell Carcinoma | 289           | 32            | 268.14    | 202.85     | 1.32        | 0.2       | 0.39      |
| LUAD    | Lung Adenocarcinoma                   | 526           | 59            | 351.86    | 333.02     | 1.06        | 0.33      | 0.46      |
| BLCA    | Bladder Urothelial Carcinoma          | 411           | 19            | 319.44    | 248.74     | 1.28        | 0.53      | 0.77      |
| PAAD    | Pancreatic Adenocarcinoma             | 178           | 4             | 409.69    | 376.13     | 1.09        | 0.9       | 0.95      |
**Table S4.** The relationship of mutation status among ACE2, TMPRSS2 and IFITM3 in cancers.

| A       | B       | Neither | A Not B | B Not A | Both | Log2 Odds Ratio | p-Value | q-Value | Tendency     |
|---------|---------|---------|---------|---------|-------|-----------------|---------|---------|--------------|
| ACE2    | TMPRSS2 | 9596    | 228     | 348     | 17    | 1.04            | 0.007   | 0.021   | Co-occurrence|
| ACE2    | IFITM3  | 9833    | 238     | 111     | 7     | 1.382           | 0.024   | 0.035   | Co-occurrence|
| TMPRSS2 | IFITM3  | 9707    | 364     | 117     | 1     | -2.133          | 0.072   | 0.072   | Mutual exclusivity |

**Table S5.** The efficiency of ACE2 expression in the survival of pan-cancer patients.

| Cancer | Cancer Full Name                          | Cancer Number | Median | coef. | HR   | p Value     |
|--------|-------------------------------------------|---------------|--------|-------|------|-------------|
| KIRC   | Kidney Renal Clear Cell Carcinoma         | 517           | 15.45  | -0.59 | 0.55 | 0.00016     |
| MESO   | Mesothelioma                              | 85            | 0.03   | -0.73 | 0.48 | 0.0028      |
| OV     | Ovarian Serous Cystadenocarcinoma         | 374           | 0.15   | -0.36 | 0.7  | 0.0073      |
| LIHC   | Liver Hepatocellular Carcinoma            | 369           | 0.22   | -0.43 | 0.65 | 0.017       |
| LUSC   | Lung Squamous Cell Carcinoma              | 469           | 0.8    | -0.28 | 0.76 | 0.054       |
| STAD   | Stomach Adenocarcinoma                    | 365           | 1.28   | -0.06 | 0.94 | 0.7         |
| KICH   | Kidney Chromophobe                        | 64            | 0.07   | -0.16 | 0.86 | 0.82        |
| LUAD   | Lung Adenocarcinoma                       | 503           | 1.02   | 0.03  | 1.03 | 0.84        |
| BRCA   | Breast Invasive Carcinoma                 | 1082          | 0.05   | -0.03 | 0.97 | 0.85        |
| PRAD   | Prostate Adenocarcinoma                   | 495           | 0.1    | -0.02 | 0.98 | 0.97        |
Table S6. The efficiency of TMPRSS2 expression in the survival of pan-cancer patients.

| Cancer  | Cancer Full Name                              | Cancer Number | Median | coef. | HR  | p Value |
|---------|----------------------------------------------|---------------|--------|-------|-----|---------|
| LUAD    | Lung Adenocarcinoma                          | 503           | 14.97  | -0.48 | 0.62| 0.0016  |
| BRCA    | Breast Invasive Carcinoma                    | 1082          | 2.11   | 0.41  | 1.5 | 0.014   |
| UCEC    | Uterine Corpus Endometrial Carcinoma         | 537           | 5.33   | -0.47 | 0.63| 0.029   |
| UVM     | Uveal Melanoma                               | 80            | 0.01   | 0.9   | 2.45| 0.052   |
| KICH    | Kidney Chromophobe                           | 64            | 43.86  | -1.27 | 0.28| 0.09    |
| BLCA    | Bladder Urothelial Carcinoma                 | 406           | 8.53   | -0.24 | 0.78| 0.11    |
| THYM    | Thymoma                                      | 118           | 0.12   | -1.09 | 0.34| 0.13    |
| SARC    | Sarcoma                                      | 261           | 0.01   | 0.27  | 1.31| 0.18    |
| DLBC    | Lymphoid Neoplasm Diffuse Large B-cell Lymphoma | 47        | 0.01   | -1.04 | 0.35| 0.19    |
| READ    | Rectum Adenocarcinoma                        | 159           | 30.36  | 0.49  | 1.64| 0.22    |
Table S7. The efficiency of IFITM3 expression in the survival of pan-cancer patients.

| Cancer     | Cancer Full Name                          | Cancer Number | Median  | coef. | HR  | p Value  |
|------------|-------------------------------------------|---------------|---------|-------|-----|----------|
| LGG        | Brain Lower Grade Glioma                  | 523           | 61.96   | 1.01  | 2.76| 2.2E-08  |
| SKCM       | Skin Cutaneous Melanoma                   | 440           | 289.56  | -0.42 | 0.66| 0.0023   |
| UVM        | Uveal Melanoma                            | 80            | 359.91  | 1.36  | 3.9 | 0.0031   |
| KIRC       | Kidney Renal Clear Cell Carcinoma         | 517           | 367.53  | 0.44  | 1.55| 0.0047   |
| MESO       | Mesothelioma                              | 85            | 902.49  | -0.68 | 0.51| 0.0058   |
| SARC       | Sarcoma                                   | 261           | 352.69  | -0.53 | 0.59| 0.0098   |
| ACC        | Adrenocortical Carcinoma                  | 79            | 133.74  | 0.87  | 2.38| 0.024    |
| PRAD       | Prostate Adenocarcinoma                   | 495           | 130.26  | -1.43 | 0.24| 0.049    |
| TGCT       | Testicular Germ Cell Tumors               | 139           | 276.22  | 20.21 | 596651275.6 | 0.083 |
| HNSC       | Head and Neck Squamous Cell Carcinoma     | 495           | 334.72  | 0.21  | 1.24| 0.12     |
| BRCA       | Breast Invasive Carcinoma                 | 1082          | 277.42  | -0.21 | 0.81| 0.19     |
| THYM       | Thymoma                                   | 118           | 173.27  | 0.79  | 2.21| 0.25     |
| LUSC       | Lung Squamous Cell Carcinoma              | 469           | 236.4   | 0.16  | 1.17| 0.26     |
| LAML       | Acute Myeloid Leukemia                    | 75            | 22.94   | 0.32  | 1.38| 0.28     |
| OV         | Ovarian Serous Cystadenocarcinoma         | 374           | 938.85  | -0.14 | 0.87| 0.28     |
| PCPG       | Pheochromocytoma and Paraganglioma        | 183           | 83.28   | -0.73 | 0.48| 0.32     |
| LIHC       | Liver Hepatocellular Carcinoma            | 369           | 722.18  | 0.17  | 1.19| 0.33     |
| BLCA       | Bladder Urothelial Carcinoma              | 406           | 195.33  | 0.15  | 1.16| 0.34     |
| PAAD       | Pancreatic Adenocarcinoma                 | 178           | 373.1   | 0.19  | 1.2 | 0.38     |
| KICH       | Kidney Chromophobe                        | 64            | 79.61   | -0.6  | 0.55| 0.39     |
Figure S1

**Figure S1.** Prognosis analysis of ACE2, TMPRSS2 and IFITM3 in cancers by LOGpc system.