

## SUPPLEMENTARY TABLES

Supplementary Table 1. Details of GPER1 ROC in pan-cancer.

| Tumor type  | Tumor(n)   | Normal(n)  | AUC(CI)                   | Cut-off      | Sensitivity  | Specificity  | Positive predictive value | Negative predictive value | YI           |
|-------------|------------|------------|---------------------------|--------------|--------------|--------------|---------------------------|---------------------------|--------------|
| ACC         | 128        | 77         | 0.687(0.598-0.776)        | 2.033        | 0.532        | 0.922        | 0.804                     | 0.766                     | 0.454        |
| BLCA        | 407        | 28         | 0.896(0.835-0.958)        | 1.272        | 0.865        | 0.786        | 0.983                     | 0.286                     | 0.651        |
| BRCA        | 1099       | 292        | <b>0.849(0.827-0.871)</b> | 1.763        | 0.768        | 0.832        | 0.945                     | 0.488                     | 0.6          |
| CESC        | 306        | 13         | 0.843(0.770-0.917)        | 1.128        | 0.596        | 1.000        | 1.000                     | 0.095                     | 0.595        |
| <b>CHOL</b> | <b>36</b>  | <b>9</b>   | <b>0.951(0.886-1.000)</b> | <b>3.181</b> | <b>0.889</b> | <b>0.917</b> | <b>0.727</b>              | <b>0.971</b>              | <b>0.806</b> |
| <b>COAD</b> | <b>290</b> | <b>349</b> | <b>0.964(0.951-0.977)</b> | <b>1.707</b> | <b>0.900</b> | <b>0.928</b> | <b>0.913</b>              | <b>0.918</b>              | <b>0.828</b> |
| DLBC        | 47         | 444        | 0.492(0.422-0.561)        | 1.373        | 0.596        | 0.523        | 0.117                     | 0.924                     | 0.118        |
| ESCA        | 182        | 666        | 0.781(0.745-0.818)        | 1.578        | 0.742        | 0.686        | 0.392                     | 0.907                     | 0.428        |
| GBM         | 689        | 1157       | 0.551(0.524-0.577)        | 2.410        | .0.787       | 0.310        | 0.404                     | 0.709                     | 0.097        |
| HNSC        | 44         | 502        | 0.784(0.725-0.843)        | 1.037        | 0.745        | 0.791        | 0.228                     | 0.968                     | 0.495        |
| <b>KICH</b> | <b>66</b>  | <b>53</b>  | <b>0.902(0.835-0.970)</b> | <b>1.491</b> | <b>0.909</b> | <b>0.868</b> | <b>0.896</b>              | <b>0.885</b>              | <b>0.777</b> |
| KIRC        | 531        | 100        | 0.690(0.635-0.745)        | 3.079        | 0.678        | 0.650        | 0.911                     | 0.275                     | 0.328        |
| KIRP        | 289        | 60         | 0.568(0.494)0.641         | 3.299        | 0.478        | 0.750        | 0.902                     | 0.230                     | 0.228        |
| <b>LAML</b> | <b>173</b> | <b>70</b>  | <b>0.959(0.936-0.983)</b> | <b>0.373</b> | <b>0.913</b> | <b>0.914</b> | <b>0.963</b>              | <b>0.81</b>               | <b>0.828</b> |
| LGG         | 523        | 1152       | 0.548(0.519-0.577)        | 2.058        | 0.946        | 0.161        | 0.339                     | 0.869                     | 0.107        |
| LIHC        | 371        | 160        | 0.548(0.497-0.598)        | 2.683        | 0.447        | 0.706        | 0.779                     | 0.355                     | 0.154        |
| <b>LUAD</b> | <b>535</b> | <b>59</b>  | <b>0.925(0.897-0.952)</b> | <b>2.704</b> | <b>0.898</b> | <b>0.865</b> | <b>0.424</b>              | <b>0.987</b>              | <b>0.764</b> |
| <b>LUSC</b> | <b>498</b> | <b>338</b> | <b>0.919(0.899-0.939)</b> | <b>1.590</b> | <b>0.884</b> | <b>0.822</b> | <b>0.880</b>              | <b>0.827</b>              | <b>0.706</b> |
| OSCC        | 329        | 32         | 0.753 (0.678-0.828)       | 1.627        | 0.906        | 0.520        | 0.155                     | 0.983                     | 0.426        |
| OV          | 427        | 88         | 0.787(0.741-0.833)        | 1.046        | 0.621        | 0.830        | 0.946                     | 0.311                     | 0.450        |
| PAAD        | 179        | 171        | 0.854(0.813-0.895)        | 1.014        | 0.777        | 0.836        | 0.832                     | 0.781                     | 0.613        |
| PRAD        | 496        | 152        | 0.787(0.749-0.824)        | 2.272        | 0.659        | 0.822        | 0.924                     | 0.425                     | 0.482        |
| <b>READ</b> | <b>93</b>  | <b>318</b> | <b>0.965(0.947-0.983)</b> | <b>1.676</b> | <b>0.882</b> | <b>0.947</b> | <b>0.828</b>              | <b>0.965</b>              | <b>0.828</b> |
| SKCM        | 469        | 813        | 0.596(0.561-0.632)        | 0.884        | 0.337        | 0.899        | 0.658                     | 0.702                     | 0.236        |
| <b>STAD</b> | <b>414</b> | <b>210</b> | <b>0.940(0.919-0.960)</b> | <b>2.555</b> | <b>0.903</b> | <b>0.848</b> | <b>0.921</b>              | <b>0.817</b>              | <b>0.751</b> |
| TGCT        | 154        | 165        | 0.831(0.779-0.883)        | 1.094        | 0.747        | 0.952        | 0.935                     | 0.801                     | 0.698        |
| THCA        | 512        | 338        | 0.723(0.689-0.757)        | 2.880        | 0.611        | 0.766        | 0.798                     | 0.566                     | 0.378        |
| THYM        | 119        | 446        | 0.469(0.420-0.517)        | 2.252        | 0.824        | 0.377        | 0.261                     | 0.889                     | 0.200        |
| <b>UCEC</b> | <b>181</b> | <b>101</b> | <b>0.911(0.877-0.945)</b> | <b>1.805</b> | <b>0.845</b> | <b>0.901</b> | <b>0.939</b>              | <b>0.765</b>              | <b>0.746</b> |
| UCS         | 57         | 78         | 0.823 (0.742-0.905)       | 2.051        | 0.737        | 0.859        | 0.792                     | 0.817                     | 0.596        |

Abbreviations: ROC, Receiver Operator Characteristic curve; AUC, Area Under Curve; CI, Confidence Interval; YI, Youden's index.

**Supplementary Table 2. Details of the prognostic K-M analysis of GPER1 in pan-cancer.**

| <b>Cancer</b> | <b>N</b>    | <b>HR (95% CI)</b>     | <b>P value</b> |
|---------------|-------------|------------------------|----------------|
| ACC           | 79          | 0.64(0.30-1.36)        | 0.243          |
| BLCA          | 433         | 1.19(0.89-1.59)        | 0.243          |
| <b>BRCA</b>   | <b>1090</b> | <b>0.69(0.50-0.97)</b> | <b>0.03</b>    |
| CESC          | 309         | 1.04(0.66-1.65)        | 0.865          |
| CHOL          | 45          | 0.70(0.27-1.85)        | 0.473          |
| COAD          | 521         | 1.21(0.82-1.79)        | 0.33           |
| <b>DLBC</b>   | <b>48</b>   | <b>0.09(0.01-0.79)</b> | <b>0.029</b>   |
| <b>ESCA</b>   | <b>173</b>  | <b>0.46(0.28-0.77)</b> | <b>0.003</b>   |
| GBM           | 174         | 0.90(0.64-1.27)        | 0.548          |
| <b>HNSC</b>   | <b>500</b>  | <b>0.75(0.57-0.99)</b> | <b>0.042</b>   |
| KICH          | 89          | 1.30(0.35-4.83)        | 0.698          |
| <b>KIRC</b>   | <b>611</b>  | <b>0.59(0.44-0.80)</b> | <b>0.001</b>   |
| <b>KIRP</b>   | <b>288</b>  | <b>0.45(0.25-0.81)</b> | <b>0.008</b>   |
| LAML          | 151         | 1.18(0.78-1.80)        | 0.436          |
| LGG           | 529         | 0.75(0.54-1.05)        | 0.093          |
| LIHC          | 424         | 1.04(0.74-1.47)        | 0.825          |
| <b>LUAD</b>   | <b>513</b>  | <b>0.71(0.52-0.98)</b> | <b>0.036</b>   |
| LUSC          | 551         | 1.03(0.79-1.35)        | 0.826          |
| MESO          | 86          | 0.69(0.43-1.11)        | 0.131          |
| OS            | 101         | 1.26(0.68-2.35)        | 0.462          |
| OSCC          | 361         | 0.93(0.67-1.29)        | 0.675          |
| OV            | 379         | 1.16(0.89-1.50)        | 0.263          |
| <b>PAAD</b>   | <b>177</b>  | <b>0.59(0.38-0.93)</b> | <b>0.022</b>   |
| PCPG          | 186         | 0.63(0.15-2.65)        | 0.531          |
| PRAD          | 551         | 0.78(0.22-2.80)        | 0.703          |
| READ          | 177         | 2.15(0.93-4.95)        | 0.073          |
| SKCM          | 472         | 1.04(0.80-1.36)        | 0.764          |
| <b>SARC</b>   | <b>259</b>  | <b>0.38(0.20-0.70)</b> | <b>0.002</b>   |
| <b>STAD</b>   | <b>375</b>  | <b>1.50(1.06-2.12)</b> | <b>0.023</b>   |
| TGCT          | 156         | 1.24(0.17-9.35)        | 0.833          |
| THCA          | 568         | 1.72(0.64-4.65)        | 0.284          |
| THYM          | 121         | 0.52(0.13-2.09)        | 0.359          |
| <b>UCEC</b>   | <b>587</b>  | <b>0.53(0.34-0.80)</b> | <b>0.003</b>   |
| UCS           | 56          | 1.10(0.54-2.21)        | 0.798          |
| UVM           | 80          | 1.52(0.67-3.47)        | 0.321          |