**Supplementary Table 1**

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Genotype/****Condition** | **Replicate** | **n** | **Mean** | **SD** | **Combined n** | **Combined Mean** | **Combined SD** |
| WT Q | 5781 | 266 | 0.6866 | 0.1525 | 381 | 0.6852 | 0.1468 |
| 5783 | 115 | 0.6822 | 0.133 |  |
| WT + TSA Q | 5781 + TSA | 241 | 0.8463 | 0.1831 | 923 | 0.8468 | 0.2047 |
| 5783 + TSA | 682 | 0.8469 | 0.2119 |  |
| HHF2 Q | 7177 | 375 | 0.6775 | 0.119 | 585 | 0.6844 | 0.1331 |
| 7206 | 210 | 0.6967 | 0.1548 |  |
| K16A Q | 7202 | 451 | 0.8374 | 0.1398 | 861 | 0.8168 | 0.126 |
| 7209 | 410 | 0.7942 | 0.1043 |  |
| K16Q Q | 7205 | 357 | 0.8295 | 0.1441 | 867 | 0.8188 | 0.1268 |
| 7210 | 510 | 0.8113 | 0.1126 |  |
| R17R19A Q | 7200 | 394 | 0.914 | 0.161 | 765 | 0.9139 | 0.15 |
| 7207 | 371 | 0.9139 | 0.1375 |  |
| 5toA Q | 7175 | 384 | 0.9702 | 0.1715 | 749 | 0.9662 | 0.1707 |
| 7208 | 365 | 0.962 | 0.17 |  |  |
| HTA1 Q | 6767 | 294 | 1.078 | 0.2775 | 422 | 1.081 | 0.2708 |
| 6773 | 128 | 1.087 | 0.2558 |  |  |
| E65D92A Q | 6618 | 441 | 1.393 | 0.3032 | 591 | 1.387 | 0.3054 |
| 6765 | 150 | 1.37 | 0.3122 |  |  |
| E57A Q | 6768 | 165 | 1.394 | 0.3422 | 258 | 1.393 | 0.3433 |
| 6774 | 93 | 1.391 | 0.3471 |  |  |
| E65A Q | 6769 | 210 | 1.292 | 0.2752 | 420 | 1.305 | 0.2784 |
| 6776 | 210 | 1.319 | 0.2816 |  |  |
| E93A Q | 6772 | 147 | 1.294 | 0.3218 | 410 | 1.307 | 0.339 |
| 6779 | 263 | 1.315 | 0.3486 |  |  |
| WT G1 | 5781 G1 | 182 | 1.092 | 0.2811 | 621 | 1.093 | 0.2665 |
| 5783 G1 | 439 | 1.094 | 0.2605 |  |  |
| R17R19A G1 | 7200 G1 | 134 | 1.078 | 0.3348 | 280 | 1.06 | 0.3558 |
| 7207 G1 | 146 | 1.043 | 0.3745 |  |  |
| 5toA G1 | 7175 G1 | 110 | 1.077 | 0.3704 | 287 | 1.06 | 0.39 |
| 7208 G1 | 177 | 1.05 | 0.4025 |  |  |
| 5toA Q + Phe | 7175 + Phe | 213 | 0.9642 | 0.1652 | 377 | 0.9591 | 0.192 |
| 7208 + Phe | 164 | 0.9525 | 0.2225 |  |  |
| **Games-Howell's multiple comparisons test** | **Mean Diff.** | **95.00% CI of diff.** | **t** | **DF** | **Adjusted P Value** |
| G1 vs. Q | 0.4079 | 0.3772 to 0.4386 | 31.2 | 989.9 | <0.0001 |
| G1 vs. Q + TSA | 0.2464 | 0.2167 to 0.2760 | 19.49 | 1094 | <0.0001 |
| Q vs. Q + TSA | -0.1615 | -0.1852 to -0.1378 | 16 | 975.9 | <0.0001 |
| HHF2 vs. K16A | -0.1324 | -0.1515 to -0.1134 | 18.97 | 1207 | <0.0001 |
| HHF2 vs. K16Q | -0.1344 | -0.1535 to -0.1153 | 19.24 | 1212 | <0.0001 |
| HHF2 vs. R17,R19A | -0.2296 | -0.2507 to -0.2084 | 29.71 | 1318 | <0.0001 |
| HHF2 vs. 5toA | -0.2818 | -0.3046 to -0.2591 | 33.88 | 1332 | <0.0001 |
| K16A vs. K16Q | -0.001992 | -0.01860 to 0.01461 | 0.3276 | 1726 | 0.9975 |
| K16Q vs. R17,R19A | -0.09512 | -0.1140 to -0.07621 | 13.74 | 1504 | <0.0001 |
| R17,R19A vs. 5toA | -0.0523 | -0.07487 to -0.02972 | 6.328 | 1479 | <0.0001 |
| WT Q vs. WT G1 | -0.4079 | -0.4452 to -0.3706 | 31.2 | 989.9 | <0.0001 |
| R17,R19A Q vs. R17,19A G1 | -0.1458 | -0.2088 to -0.08292 | 6.646 | 316 | <0.0001 |
| 5toA Q vs. 5toA G1 | -0.09392 | -0.1623 to -0.02554 | 3.937 | 328.8 | 0.0014 |
| WT G1 vs. R17,19A G1 | 0.03337 | -0.03477 to 0.1015 | 1.402 | 425.7 | 0.7259 |
| WT G1 vs. 5toA G1 | 0.033 | -0.03968 to 0.1057 | 1.3 | 413.8 | 0.785 |
| R17,19A G1 vs. 5toA G1 | -0.0003688 | -0.08999 to 0.08926 | 0.01177 | 562.5 | >0.9999 |
| HTA1 vs. E65A | -0.2285 | -0.2779 to -0.1790 | 12.63 | 871.7 | <0.0001 |
| HTA1 vs. E93A | -0.2304 | -0.2866 to -0.1742 | 11.2 | 765.7 | <0.0001 |
| HTA1 vs. E57A | -0.3164 | -0.3835 to -0.2493 | 12.92 | 421.1 | <0.0001 |
| HTA1 vs. E65,D92A | -0.3102 | -0.3576 to -0.2629 | 17.9 | 1078 | <0.0001 |
| E65A vs. E93A | -0.001958 | -0.06090 to 0.05699 | 0.09081 | 790.4 | >0.9999 |
| E93A vs. E57A | -0.08598 | -0.1603 to -0.01168 | 3.167 | 541.1 | 0.014 |
| E57A vs. E65,D92A | 0.006177 | -0.06173 to 0.07408 | 0.2492 | 442.3 | 0.9991 |
| **Welch's t test** | **Mean Diff.** | **95.00% CI of diff.** | **Welch-corrected t** | **DF** | **P Value** |
| 5toA + Phe vs 5toA | -0.0071 | -0.03010 to 0.01582 | 0.6108 | 680.4 | 0.5415 |