| Mutations | Region | Amino Acid | Slope | Amino Acid | Hydrophobic change before | Alaska | Delta | Beta | Delta | Lambda | Mu | Omega | Oncomir | Theta | Zeta |
|-----------|--------|------------|-------|------------|--------------------------|-------|-------|-------|-------|--------|-----|-------|---------|-------|-------|
| C1440TNS | PF12    | 4144T     | 1.6   | 3.5        | 3.9                        | 682758 | 985137 | 789812 | 1.6   | 512481 | 932122 | 0.005126 | 990655 | 4163847 | 0.007985 | 0.006855 | 0.000315 |
| C1214D   | G614    | 3.22E-02  | 1.6   | 3.5        | 4.5                        | 576878 | 983817 | 679157 | 4.5   | 9904.92   | 990655 | 4163847 | 0.005126 | 990655 | 4163847 | 0.007985 | 0.006855 | 0.000315 |
| C2567TGT | M Q19E   | 0.0325963 | 0.35 | 3.5        | 3.5                        | 0.001179 | 0.004315 | 0.000415 | 0.35 | 3.5        | 0.001179 | 0.004315 | 0.000415 | 0.35 | 3.5        | 0.001179 | 0.004315 | 0.000415 |
| C2523DE  | Spike   | 0.0003067 | 0.3   | 0.7         | 0.9                        | 0.009884 | 0.007185 | 0.012068 | 0.3   | 0.7         | 0.009884 | 0.007185 | 0.012068 | 0.3   | 0.7         | 0.009884 | 0.007185 | 0.012068 |
| C2541SA  | Spike   | 0.0003067 | 0.3   | 0.7         | 0.9                        | 0.009884 | 0.007185 | 0.012068 | 0.3   | 0.7         | 0.009884 | 0.007185 | 0.012068 | 0.3   | 0.7         | 0.009884 | 0.007185 | 0.012068 |
| C2112TET | Spike   | 0.0029407 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| C1153G   | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| G395AT   | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| C2403T   | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| C1108ST  | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| 8235ST   | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| C2525T   | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| 9283ST   | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |
| C2525T   | Spike   | 0.0029368 | 1.8   | 4.2         | 9.8                        | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 | 1.5   | 0.3         | 0.198650 | 1.228137 | 0.806780 |

Table S2: The mutation whitelist of SARS-CoV-2.
