



## Summary Matrix of known mutations in SARS-CoV-2 variants as of August 2021

| WHO Variant        | PANGO            | Signal Peptide | NTD  | RBD                        | S1/S2               | S2                   | Sequences |
|--------------------|------------------|----------------|--|----------------------------|---------------------|----------------------|-----------|
| <b>Alpha (α)</b>   | B.1.1.7          | -              | 69-70del, Y144del                                    | N501Y                      | A570D, D614G, P681H | T716I, S982A, D1118H | 1,035,853 |
| <b>Beta (β)</b>    | B.1.351          | -              | L18F, D80A, D215G, 242-244del, R246I                 | K417N, E484K, N501Y        | D614G               | A701V                | 29,443    |
| <b>Gamma (γ)</b>   | P.1              | -              | L18F, T20N, P26S, D138Y, R190S                       | K417T, E484K, N501Y        | D614G, H655Y        | T1027I, V1176F       | 59,684    |
| <b>Delta (δ)</b>   | B.1.617.2        | -              | T19R, G142D, E156G, 157-158del<br>New: S2L20, S2X303 | L452R, T478K               | D614G,<br>P681R     | D950N                | 369,710   |
|                    | AY.3             | -              | T19R, G142D<br>E156G, 157-158del                     | L452R, T478K               | D614G,<br>P681R     | D950N                | 7,257     |
| <b>Delta+ (δ+)</b> | B.1.617.2        | -              | T19R, G142D<br>E156G, 157-158del                     | K417N,<br>L452R, T478K     | D614G,<br>P681R     | D950N                | 61        |
|                    | AY.1             | -              | T19R, G142D, E156G<br>157-158del, W258L              | K417N,<br>L452R, T478K     | D614G,<br>P681R     | D950N                | 515       |
|                    | AY.2             | -              | T19R, V70F, G142D, E156G,<br>157-158del, A222V       | K417N,<br>L452R, T478K     | D614G,<br>P681R     | D950N                | 1,050     |
| <b>Epsilon (ε)</b> | B.1.427/ B.1.429 | S13I           | W152C  | L452R                      | D614G               | -                    | 57,060    |
| <b>Iota (ι)</b>    | B.1.526          | L5F            | T95I, D253G  | E484K                      | D614G               | -                    | 35,150    |
| <b>Kappa (κ)</b>   | B.1.617.1        | -              | T95I, G142D, E154K,<br>New: S2L20                    | L452R, E484Q,<br>New: S309 | D614G,<br>P681R     | Q1071H               | 6,017     |

As of 15.08.21 known SARS-CoV-2 infections are 98% Delta in the US and 99% in the UK

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<https://norvax.uk/>

Delta spike P681R mutation enhances SARS-CoV-2 fitness over Alpha variant

<https://www.biorxiv.org/content/10.1101/2021.08.12.456173v1>

Posted August 13, 2021