**Differential escape of neutralizing antibodies by SARS-CoV-2 Omicron and pre-emergent sarbecoviruses**

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**Supplementary Data Fig 1. Amino acid difference between sarbecovirus RBDs.** Matrix of **(a)** amino acid identity (%) and **(b)** mutation numbers of 16 sarbecovirus RBDs used in multiplex sVNT. RBD sequences are aligned using Geneious alignment with Blosum62 model.

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**Supplementary Data Fig 2. Neutralization titer 50% (NT50) of 20 serum panels determined using multiplex sVNT. (a)** Convalescent serum panels derived from SARS-CoV-2 ancestral, Beta, Delta and SARS-CoV-1 survivors. **(B)** Vaccinated serum panels derived from individuals received two doses of BNT162b2, mRNA-1273, CoronaVac, AZD1222 and BBIBP-CorV. **(C)** Boosted serum panels from individuals received homologous booster (BNT162b2 x3, mRNA-1273 x3, CoronaVac x3) and heterologous booster regime (BNT162b2 x2/mRNA-1273, CoronaVac x2/BNT162b2, CoronVac x2/AZD1222 and CoronaVac x 2/BBIBP-CorV). **(D)** Serum panels derived from individualds with hybrid immunity (SARS-vaccinated, COVID-19-vaccinated, Delta-breakthrough and Omicron-breakthrough).

**Supplementary Data Table 1. Serum panel and WHO IU/ml**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Group** | **Serum Panel** | **Number** | **Geometric mean inhibition (%)a**  | **IU/ml** |
| 1(Convalescent) | Ancestral | 10 | 57.03 | 608 |
| Beta | 10 | 29.15 | 220 |
| Delta | 10 | 41.81 | 357 |
| SARS | 11 | 1.00 | 9 |
| 2(Vaccinated) | BNT162b2 x 2 | 10 | 74.61 | 1211 |
| mRNA-1273 x 2 | 10 | 83.03 | 1884 |
| CoronVac x 2 | 10 | 24.27 | 177 |
| BBIBP-CorV x 2 | 10 | 14.87 | 105 |
| AZD1222 x 2 | 10 | 26.71 | 198 |
| BNT162b2 x 3 | 7 | 90.98 | 3526 |
| mRNA-1273 x 3 | 7 | 79.25 | 1520 |
| BNT162 x 2/mRNA-1273 | 6 | 94.18 | 5312 |
| CoronaVac x 3 | 10 | 23.64 | 172 |
| CoronaVac x 2/BBIBP-CorV | 7 | 24.60 | 180 |
| CoronaVac x 2/AZD1222 | 10 | 66.42 | 859 |
| CoronaVac x 2/BNT162b2 | 6 | 80.11 | 1592 |
| 3(Hybrid) | Delta Breakthrough | 16 | 87.86 | 2644 |
| Omicron breakthrough | 7 | 88.98 | 2906 |
| COVID-19 vaccinated | 10 | 93.46 | 4768 |
| SARS vaccinated | 9 | 83.30 | 1914 |

aGeometric mean inhibition (%) of ancestral SARS-CoV-2 at 1:80 dilution.

**Supplementary Data Table 2. Serum panels and IRB approval.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Group** | **Serum Panel** | **Number** | **IRB** |
| 1(Convalescent) | Ancestral | 10 | Duke-NUS: LH-20-006ECNHG DSRB 2012/00917 |
| Beta | 10 | University of KwaZulu–Natal BREC/00001275/2020 |
| Delta | 10 | Duke-NUS: LH-20-006ECNHG DSRB 2012/00917Faculty of Medicine, Chulalongkorn University, Bangkok, ThailandIRB no 291/63 |
| SARS | 11 | Duke-NUS: LH-20-006ECNHG DSRB E 2020/00091 |
| 2(Vaccinated) | BNT162b2 x 2 | 10 | NUS-IRB-2021-108 |
| mRNA-1273 x 2 | 10 | NUS-IRB-2021-108 |
| CoronVac x 2 | 10 | Faculty of Medicine, Chulalongkorn University, Bangkok, ThailandIRB no 170/64 |
| BBIBP-CorV x 2 | 10 | NUS-IRB-2021-108 |
| AZD1222 x 2 | 10 | Faculty of Medicine, Chulalongkorn University, Bangkok, ThailandIRB no 170/64 |
| BNT162b2 x 3 | 7 | NUS-IRB-2021-108 |
| mRNA-1273 x 3 | 7 | NUS-IRB-2021-108 |
| BNT162 x 2/mRNA-1273 | 6 | NUS-IRB-2021-108 |
| CoronaVac x 3 | 10 | NUS-IRB-2021-108 |
| CoronaVac x 2/BBIBP-CorV | 7 | NUS-IRB-2021-108 |
| CoronaVac x 2/AZD1222 | 10 | Faculty of Medicine, Chulalongkorn University, Bangkok, ThailandIRB no 170/64 |
| CoronaVac x 2/BNT162b2 | 6 | NUS-IRB-2021-108 |
| 3(Hybrid) | Delta Breakthrough | 16 | Duke-NUS: LH-20-006ECNHG DSRB 2012/00917 |
| Omicron breakthrough | 7 | Duke-NUS: LH-20-006ECNHG DSRB 2012/00917 |
| COVID-19 vaccinated | 10 | Duke-NUS: NUS-IRB-2021-840 |
| SARS vaccinated | 9 | Duke-NUS: LH-20-006ECDuke-NUS: NUS-IRB-2021-840 |