**Supplementary Table 1.** List of SARS-CoV-2 samples from Southeast Asia that were obtained from GISAID on October 12th, 2020

|  |  |  |  |
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| No | Virus Name | Accession ID | Submission Date |
| 1 | HCOV-19/BRUNEI/2/2020 | EPI\_ISL\_435674 | 3/11/2020 |
| 2 | HCOV-19/BRUNEI/3/2020 | EPI\_ISL\_435675 | 3/11/2020 |
| 3 | HCOV-19/BRUNEI/4/2020 | EPI\_ISL\_435676 | 3/21/2020 |
| 4 | HCOV-19/BRUNEI/5/2020 | EPI\_ISL\_435677 | 3/21/2020 |
| 5 | hCoV-19/Brunei/1/2020 | EPI\_ISL\_443187 | 3/11/2020 |
| 6 | hCoV-19/Malaysia/MKAK-CL-2020-5045/2020 | EPI\_ISL\_416829 | 1/24/2020 |
| 7 | hCoV-19/Malaysia/MKAK-CL-2020-5047/2020 | EPI\_ISL\_416866 | 1/24/2020 |
| 8 | hCoV-19/Malaysia/MKAK-CL-2020-5096/2020 | EPI\_ISL\_416885 | 1/30/2020 |
| 9 | hCoV-19/Malaysia/MKAK-CL-2020-6430/2020 | EPI\_ISL\_416886 | 2/4/2020 |
| 10 | hCoV-19/Malaysia/MKAK-CL-2020-7554/2020 | EPI\_ISL\_416907 | 2/6/2020 |
| 11 | hCoV-19/Malaysia/IIUM316/2020 | EPI\_ISL\_455312 | 4/9/2020 |
| 12 | hCoV-19/Malaysia/IIUM91/2020 | EPI\_ISL\_455313 | 4/2/2020 |
| 13 | hCoV-19/Malaysia/IMR\_WC413/2020 | EPI\_ISL\_455791 | 2/8/2020 |
| 14 | hCoV-19/Malaysia/IMR\_WC458/2020 | EPI\_ISL\_455792 | 2/9/2020 |
| 15 | hCoV-19/Malaysia/IMR\_WC1114/2020 | EPI\_ISL\_455793 | 2/29/2020 |
| 16 | hCoV-19/Malaysia/IMR\_WC12286/2020 | EPI\_ISL\_490016 | 4/10/2020 |
| 17 | hCoV-19/Malaysia/IMR\_WC14227/2020 | EPI\_ISL\_490048 | 4/11/2020 |
| 18 | hCoV-19/Malaysia/IMR\_WC80031/2020 | EPI\_ISL\_490090 | 5/23/2020 |
| 19 | hCoV-19/Malaysia/IMR\_WC80109/2020 | EPI\_ISL\_490094 | 5/23/2020 |
| 20 | hCoV-19/Malaysia/IMR\_WC81523/2020 | EPI\_ISL\_490096 | 5/23/2020 |
| 21 | hCoV-19/Malaysia/IMR\_WC81849/2020 | EPI\_ISL\_490098 | 5/23/2020 |
| 22 | hCoV-19/Malaysia/IMR\_WC99023/2020 | EPI\_ISL\_490099 | 5/23/2020 |
| 23 | hCoV-19/Malaysia/IMR\_WC99045/2020 | EPI\_ISL\_490100 | 5/23/2020 |
| 24 | hCoV-19/Malaysia/IMR\_WC90685/2020 | EPI\_ISL\_490101 | 5/29/2020 |
| 25 | hCoV-19/Malaysia/0478/2020 | EPI\_ISL\_501178 | 3/23/2020 |
| 26 | hCoV-19/Malaysia/0784/2020 | EPI\_ISL\_501179 | 3/23/2020 |
| 27 | hCoV-19/Malaysia/0931/2020 | EPI\_ISL\_501180 | 3/23/2020 |
| 28 | hCoV-19/Malaysia/1121/2020 | EPI\_ISL\_501182 | 3/24/2020 |
| 29 | hCoV-19/Malaysia/1399/2020 | EPI\_ISL\_501184 | 3/25/2020 |
| 30 | hCoV-19/Malaysia/1497/2020 | EPI\_ISL\_501185 | 3/25/2020 |
| 31 | hCoV-19/Malaysia/1713/2020 | EPI\_ISL\_501186 | 3/25/2020 |
| 32 | hCoV-19/Malaysia/2063/2020 | EPI\_ISL\_501188 | 3/26/2020 |
| 33 | hCoV-19/Malaysia/2065/2020 | EPI\_ISL\_501189 | 3/26/2020 |
| 34 | hCoV-19/Malaysia/2363/2020 | EPI\_ISL\_501194 | 3/27/2020 |
| 35 | hCoV-19/Malaysia/2813/2020 | EPI\_ISL\_501197 | 3/28/2020 |
| 36 | hCoV-19/Malaysia/3133/2020 | EPI\_ISL\_501201 | 3/30/2020 |
| 37 | hCoV-19/Malaysia/3145/2020 | EPI\_ISL\_501202 | 3/30/2020 |
| 38 | hCoV-19/Malaysia/3499/2020 | EPI\_ISL\_501205 | 3/30/2020 |
| 39 | hCoV-19/Malaysia/3611/2020 | EPI\_ISL\_501207 | 3/31/2020 |
| 40 | hCoV-19/Malaysia/3703/2020 | EPI\_ISL\_501208 | 3/31/2020 |
| 41 | hCoV-19/Malaysia/3706/2020 | EPI\_ISL\_501209 | 3/31/2020 |
| 42 | hCoV-19/Malaysia/3998/2020 | EPI\_ISL\_501210 | 4/1/2020 |
| 43 | hCoV-19/Malaysia/5056/2020 | EPI\_ISL\_501211 | 4/2/2020 |
| 44 | hCoV-19/Malaysia/5815/2020 | EPI\_ISL\_501213 | 4/6/2020 |
| 45 | hCoV-19/Malaysia/5822/2020 | EPI\_ISL\_501214 | 4/6/2020 |
| 46 | hCoV-19/Malaysia/6149/2020 | EPI\_ISL\_501217 | 4/6/2020 |
| 47 | hCoV-19/Malaysia/6306/2020 | EPI\_ISL\_501219 | 4/7/2020 |
| 48 | hCoV-19/Malaysia/6359/2020 | EPI\_ISL\_501220 | 2/25/2020 |
| 49 | hCoV-19/Malaysia/8454/2020 | EPI\_ISL\_501223 | 3/18/2020 |
| 50 | hCoV-19/Malaysia/8816/2020 | EPI\_ISL\_501224 | 3/18/2020 |
| 51 | hCoV-19/Malaysia/9136/2020 | EPI\_ISL\_501225 | 3/19/2020 |
| 52 | hCoV-19/Malaysia/9593/2020 | EPI\_ISL\_501226 | 3/19/2020 |
| 53 | hCoV-19/Malaysia/9857/2020 | EPI\_ISL\_501227 | 3/21/2020 |
| 54 | hCoV-19/Malaysia/MGI-G873/2020 | EPI\_ISL\_528738 | 4/7/2020 |
| 55 | hCoV-19/Malaysia/MGI-M32/2020 | EPI\_ISL\_528739 | 4/2/2020 |
| 56 | hCoV-19/Malaysia/MGI-M64/2020 | EPI\_ISL\_528740 | 4/2/2020 |
| 57 | hCoV-19/Malaysia/MGI-M71/2020 | EPI\_ISL\_528741 | 4/2/2020 |
| 58 | hCoV-19/Malaysia/MGI-M76/2020 | EPI\_ISL\_528742 | 4/2/2020 |
| 59 | hCoV-19/Malaysia/MGI-MAEPS54/2020 | EPI\_ISL\_528743 | 6/4/2020 |
| 60 | hCoV-19/Malaysia/MGI-MAEPS67/2020 | EPI\_ISL\_528744 | 6/4/2020 |
| 61 | hCoV-19/Malaysia/MGI-M23/2020 | EPI\_ISL\_568873 | 4/2/2020 |
| 62 | hCoV-19/Malaysia/MGI-G812/2020 | EPI\_ISL\_568874 | 4/7/2020 |
| 63 | hCoV-19/Malaysia/MGI-MAEPS126/2020 | EPI\_ISL\_568875 | 5/4/2020 |
| 64 | hCoV-19/Indonesia/SA-EIJK-06/2020 | EPI\_ISL\_467375 | 3/23/2020 |
| 65 | hCoV-19/Indonesia/JK-EIJK-07/2020 | EPI\_ISL\_467376 | 4/24/2020 |
| 66 | hCoV-19/Indonesia/TNG-LIPI001/2020 | EPI\_ISL\_518819 | 8/13/2020 |
| 67 | hCoV-19/Indonesia/JT-UGM-202538/2020 | EPI\_ISL\_525492 | 6/26/2020 |
| 68 | hCoV-19/Indonesia/JI-NIHRD-PME0999/2020 | EPI\_ISL\_538498 | 2020 |
| 69 | hCoV-19/Indonesia/JI-NIHRD-PME2054/2020 | EPI\_ISL\_538499 | 2020 |
| 70 | hCoV-19/Indonesia/SU-NIHRD-PME4745/2020 | EPI\_ISL\_538500 | 2020 |
| 71 | hCoV-19/Indonesia/SU-NIHRD-PME4760/2020 | EPI\_ISL\_538501 | 2020 |
| 72 | hCoV-19/Indonesia/BA-NIHRD-PME3926/2020 | EPI\_ISL\_538503 | 2020 |
| 73 | hCoV-19/Indonesia/JK-NIHRD-MI52885/2020 | EPI\_ISL\_538505 | 8/20/2020 |
| 74 | hCoV-19/Indonesia/JK-NIHRD-MI52946/2020 | EPI\_ISL\_538509 | 8/20/2020 |
| 75 | hCoV-19/Indonesia/KS-NIHRD-PME4900/2020 | EPI\_ISL\_538510 | 8/6/2020 |
| 76 | hCoV-19/Indonesia/JI-NIHRD-PME5011/2020 | EPI\_ISL\_538511 | 2020 |
| 77 | hCoV-19/Indonesia/JI-EIJK-10/2020 | EPI\_ISL\_568686 | 3/26/2020 |
| 78 | hCoV-19/Indonesia/JK-EIJK-23/2020 | EPI\_ISL\_568687 | 4/11/2020 |
| 79 | hCoV-19/Indonesia/JK-EIJK-32/2020 | EPI\_ISL\_568688 | 4/22/2020 |
| 80 | hCoV-19/Indonesia/JK-EIJK-38/2020 | EPI\_ISL\_568689 | 5/20/2020 |
| 81 | hCoV-19/Indonesia/JK-EIJK-39/2020 | EPI\_ISL\_568690 | 5/26/2020 |
| 82 | hCoV-19/Indonesia/JK-EIJK-40/2020 | EPI\_ISL\_568691 | 5/27/2020 |
| 83 | hCoV-19/Indonesia/JK-EIJK-43/2020 | EPI\_ISL\_568692 | 6/4/2020 |
| 84 | hCoV-19/Indonesia/PP-EIJK-11/2020 | EPI\_ISL\_568693 | 3/28/2020 |
| 85 | hCoV-19/Indonesia/SA-EIJK-12/2020 | EPI\_ISL\_568694 | 3/27/2020 |
| 86 | hCoV-19/Indonesia/JK-NIHRD-C0027475/2020 | EPI\_ISL\_574433 | 7/3/2020 |
| 87 | hCoV-19/Indonesia/PA-EIJK09/2020 | EPI\_ISL\_574603 | 3/23/2020 |
| 88 | hCoV-19/Indonesia/SA-EIJK13/2020 | EPI\_ISL\_574604 | 3/24/2020 |
| 89 | hCoV-19/Indonesia/YO-EIJK15/2020 | EPI\_ISL\_574605 | 3/30/2020 |
| 90 | hCoV-19/Indonesia/JB-EIJK16/2020 | EPI\_ISL\_574606 | 4/6/2020 |
| 91 | hCoV-19/Indonesia/JK-EIJK19/2020 | EPI\_ISL\_574607 | 4/9/2020 |
| 92 | hCoV-19/Indonesia/JK-EIJK20/2020 | EPI\_ISL\_574608 | 4/9/2020 |
| 93 | hCoV-19/Indonesia/JK-EIJK24/2020 | EPI\_ISL\_574609 | 4/13/2020 |
| 94 | hCoV-19/Indonesia/JK-EIJK34/2020 | EPI\_ISL\_574610 | 4/23/2020 |
| 95 | hCoV-19/Indonesia/BT-EIJK36/2020 | EPI\_ISL\_574611 | 5/6/2020 |
| 96 | hCoV-19/Indonesia/JB-EIJK41/2020 | EPI\_ISL\_574612 | 5/31/2020 |
| 97 | hCoV-19/Indonesia/JK-EIJK42/2020 | EPI\_ISL\_574613 | 6/3/2020 |
| 98 | hCoV-19/Indonesia/JK-EIJK45/2020 | EPI\_ISL\_574614 | 6/4/2020 |
| 99 | hCoV-19/Indonesia/JK-EIJK46/2020 | EPI\_ISL\_574615 | 6/5/2020 |
| 100 | hCoV-19/Indonesia/JK-EIJK47/2020 | EPI\_ISL\_574616 | 6/8/2020 |
| 101 | hCoV-19/Indonesia/JK-EIJK48/2020 | EPI\_ISL\_574617 | 6/8/2020 |
| 102 | hCoV-19/Indonesia/JK-EIJK49/2020 | EPI\_ISL\_574618 | 6/8/2020 |
| 103 | hCoV-19/Indonesia/SA-EIJK50/2020 | EPI\_ISL\_574619 | 6/16/2020 |
| 104 | hCoV-19/Indonesia/SA-EIJK51/2020 | EPI\_ISL\_574620 | 6/17/2020 |
| 105 | hCoV-19/Indonesia/SA-EIJK52/2020 | EPI\_ISL\_574621 | 6/16/2020 |
| 106 | hCoV-19/Indonesia/SA-EIJK53/2020 | EPI\_ISL\_574622 | 6/17/2020 |
| 107 | hCoV-19/Indonesia/SA-EIJK54/2020 | EPI\_ISL\_574623 | 6/18/2020 |
| 108 | hCoV-19/Thailand/61/2020 | EPI\_ISL\_403962 | 1/8/2020 |
| 109 | hCoV-19/Thailand/74/2020 | EPI\_ISL\_403963 | 1/13/2020 |
| 110 | hCoV-19/Thailand/Bangkok-0017/2020 | EPI\_ISL\_423039 | 3/21/2020 |
| 111 | hCoV-19/Thailand/Bangkok-0019/2020 | EPI\_ISL\_423040 | 3/20/2020 |
| 112 | hCoV-19/Thailand/Bangkok-0020/2020 | EPI\_ISL\_423041 | 3/21/2020 |
| 113 | hCoV-19/Thailand/Bangkok-0021/2020 | EPI\_ISL\_423042 | 3/24/2020 |
| 114 | hCoV-19/Thailand/Bangkok-0022/2020 | EPI\_ISL\_423043 | 3/18/2020 |
| 115 | hCoV-19/Thailand/Bangkok-0025/2020 | EPI\_ISL\_429164 | 3/13/2020 |
| 116 | hCoV-19/Thailand/Bangkok-0026/2020 | EPI\_ISL\_429165 | 3/13/2020 |
| 117 | hCoV-19/Thailand/Bangkok-0028/2020 | EPI\_ISL\_429166 | 3/13/2020 |
| 118 | hCoV-19/Thailand/Bangkok-0029/2020 | EPI\_ISL\_429167 | 3/13/2020 |
| 119 | hCoV-19/Thailand/Bangkok-0033/2020 | EPI\_ISL\_429169 | 3/17/2020 |
| 120 | hCoV-19/Thailand/Bangkok-0034/2020 | EPI\_ISL\_429170 | 3/17/2020 |
| 121 | hCoV-19/Thailand/Bangkok-0035/2020 | EPI\_ISL\_429171 | 3/18/2020 |
| 122 | hCoV-19/Thailand/Bangkok-0036/2020 | EPI\_ISL\_429172 | 3/21/2020 |
| 123 | hCoV-19/Thailand/Bangkok-0037/2020 | EPI\_ISL\_429173 | 3/21/2020 |
| 124 | hCoV-19/Thailand/Bangkok-0038/2020 | EPI\_ISL\_429174 | 3/25/2020 |
| 125 | hCoV-19/Thailand/Bangkok-0039/2020 | EPI\_ISL\_429175 | 3/28/2020 |
| 126 | hCoV-19/Thailand/Bangkok-0041/2020 | EPI\_ISL\_429177 | 3/28/2020 |
| 127 | hCoV-19/Thailand/Bangkok-0042/2020 | EPI\_ISL\_429178 | 3/28/2020 |
| 128 | hCoV-19/Thailand/Bangkok-0043/2020 | EPI\_ISL\_429179 | 3/28/2020 |
| 129 | hCoV-19/Thailand/Bangkok-0045/2020 | EPI\_ISL\_429181 | 3/28/2020 |
| 130 | hCoV-19/Thailand/Bangkok-0046/2020 | EPI\_ISL\_429182 | 3/28/2020 |
| 131 | hCoV-19/Thailand/Bangkok-0047/2020 | EPI\_ISL\_429183 | 3/28/2020 |
| 132 | hCoV-19/Thailand/Bangkok-0048/2020 | EPI\_ISL\_429184 | 3/28/2020 |
| 133 | hCoV-19/Thailand/TNIC-1889/2020 | EPI\_ISL\_430837 | 3/3/2020 |
| 134 | hCoV-19/Thailand/NIH-2982/2020 | EPI\_ISL\_430842 | 3/18/2020 |
| 135 | hCoV-19/Thailand/NIH-59/2020 | EPI\_ISL\_434693 | 1/16/2020 |
| 136 | hCoV-19/Thailand/NIH-162/2020 | EPI\_ISL\_434694 | 1/22/2020 |
| 137 | hCoV-19/Thailand/NIH-1889/2020 | EPI\_ISL\_434697 | 3/3/2020 |
| 138 | hCoV-19/Thailand/NIH-2296/2020 | EPI\_ISL\_434699 | 3/13/2020 |
| 139 | hCoV-19/Thailand/NIH-2472/2020 | EPI\_ISL\_434701 | 3/14/2020 |
| 140 | hCoV-19/Thailand/NIH-2489/2020 | EPI\_ISL\_434703 | 3/14/2020 |
| 141 | hCoV-19/Thailand/NIH-2492-2/2020 | EPI\_ISL\_434704 | 3/17/2020 |
| 142 | hCoV-19/Thailand/NIH-2721/2020 | EPI\_ISL\_434706 | 3/16/2020 |
| 143 | hCoV-19/Thailand/NIH-2982-2/2020 | EPI\_ISL\_434708 | 3/18/2020 |
| 144 | hCoV-19/Thailand/SI206917-NT/2020 | EPI\_ISL\_437602 | 3/20/2020 |
| 145 | hCoV-19/Thailand/SI206587-NT/2020 | EPI\_ISL\_437603 | 3/19/2020 |
| 146 | hCoV-19/Thailand/SI206377-NST/2020 | EPI\_ISL\_437604 | 3/1/2020 |
| 147 | hCoV-19/Thailand/SI205929-NT/2020 | EPI\_ISL\_437605 | 3/18/2020 |
| 148 | hCoV-19/Thailand/SI205529-NT/2020 | EPI\_ISL\_437606 | 3/18/2020 |
| 149 | hCoV-19/Thailand/SI205457-NST/2020 | EPI\_ISL\_437607 | 3/16/2020 |
| 150 | hCoV-19/Thailand/SI204514-NT/2020 | EPI\_ISL\_437609 | 3/12/2020 |
| 151 | hCoV-19/Thailand/SI203285-NT/2020 | EPI\_ISL\_437612 | 1/23/2020 |
| 152 | hCoV-19/Thailand/SI202620-NT/2020 | EPI\_ISL\_437615 | 2/22/2020 |
| 153 | hCoV-19/Thailand/SI202205-NT/2020 | EPI\_ISL\_437616 | 2/7/2020 |
| 154 | hCoV-19/Thailand/SI201712-NT/2020 | EPI\_ISL\_437617 | 2/3/2020 |
| 155 | hCoV-19/Thailand/SI200478-NST/2020 | EPI\_ISL\_437619 | 1/26/2020 |
| 156 | hCoV-19/Thailand/SI200468-NT/2020 | EPI\_ISL\_437620 | 1/25/2020 |
| 157 | hCoV-19/Thailand/SI200433-NT/2020 | EPI\_ISL\_437621 | 1/25/2020 |
| 158 | hCoV-19/Thailand/SI200383-NT/2020 | EPI\_ISL\_437622 | 1/23/2020 |
| 159 | hCoV-19/Thailand/SI200040-NT/2020 | EPI\_ISL\_437623 | 1/8/2020 |
| 160 | hCoV-19/Thailand/SI200893-NT/2020 | EPI\_ISL\_437624 | 2/1/2020 |
| 161 | hCoV-19/Thailand/Bangkok-0054/2020 | EPI\_ISL\_446996 | 3/28/2020 |
| 162 | hCoV-19/Thailand/Bangkok-0069/2020 | EPI\_ISL\_447011 | 3/29/2020 |
| 163 | hCoV-19/Thailand/Bangkok-0074/2020 | EPI\_ISL\_447015 | 3/31/2020 |
| 164 | hCoV-19/Thailand/Bangkok-0076/2020 | EPI\_ISL\_447017 | 3/31/2020 |
| 165 | hCoV-19/Thailand/Bangkok-0078/2020 | EPI\_ISL\_447019 | 4/1/2020 |
| 166 | hCoV-19/Thailand/Bangkok-0079/2020 | EPI\_ISL\_447020 | 4/1/2020 |
| 167 | hCoV-19/Thailand/Bangkok-0084/2020 | EPI\_ISL\_447025 | 4/2/2020 |
| 168 | hCoV-19/Thailand/Bangkok-0085/2020 | EPI\_ISL\_447026 | 4/3/2020 |
| 169 | hCoV-19/Thailand/Nonthaburi\_68/2020 | EPI\_ISL\_447910 | 1/15/2020 |
| 170 | hCoV-19/Thailand/Bangkok\_237/2020 | EPI\_ISL\_447912 | 1/25/2020 |
| 171 | hCoV-19/Thailand/Bangkok\_238/2020 | EPI\_ISL\_447913 | 1/31/2020 |
| 172 | hCoV-19/Thailand/Phuket\_247/2020 | EPI\_ISL\_447914 | 1/25/2020 |
| 173 | hCoV-19/Thailand/Bangkok\_323/2020 | EPI\_ISL\_447916 | 1/29/2020 |
| 174 | hCoV-19/Thailand/Nonthaburi\_363/2020 | EPI\_ISL\_447917 | 1/29/2020 |
| 175 | hCoV-19/Thailand/Samut prakarn\_840/2020 | EPI\_ISL\_447919 | 2/4/2020 |
| 176 | hCoV-19/Thailand/Bangkok\_1716/2020 | EPI\_ISL\_447920 | 2/25/2020 |
| 177 | hCoV-19/Thailand/Nonthaburi\_2520/2020 | EPI\_ISL\_450197 | 3/14/2020 |
| 178 | hCoV-19/Thailand/Nonthaburi\_2982/2020 | EPI\_ISL\_455583 | 3/18/2020 |
| 179 | hCoV-19/Thailand/Phatum thani\_2980/2020 | EPI\_ISL\_455584 | 3/18/2020 |
| 180 | hCoV-19/Thailand/Bangkok\_2974/2020 | EPI\_ISL\_455585 | 3/14/2020 |
| 181 | hCoV-19/Thailand/Bangkok\_2972/2020 | EPI\_ISL\_455586 | 3/17/2020 |
| 182 | hCoV-19/Thailand/Nakhonnayok\_2829/2020 | EPI\_ISL\_455587 | 3/13/2020 |
| 183 | hCoV-19/Thailand/Trang\_5008/2020 | EPI\_ISL\_455588 | 3/23/2020 |
| 184 | hCoV-19/Thailand/Nonthaburi\_3480/2020 | EPI\_ISL\_455590 | 3/20/2020 |
| 185 | hCoV-19/Thailand/Nonthaburi\_3479/2020 | EPI\_ISL\_455591 | 3/20/2020 |
| 186 | hCoV-19/Thailand/Nonthaburi\_3478/2020 | EPI\_ISL\_455592 | 3/20/2020 |
| 187 | hCoV-19/Thailand/Bangkok\_2420/2020 | EPI\_ISL\_455604 | 3/13/2020 |
| 188 | hCoV-19/Thailand/Nonthaburi\_2472/2020 | EPI\_ISL\_455605 | 3/14/2020 |
| 189 | hCoV-19/Thailand/Bangkok\_2488/2020 | EPI\_ISL\_455606 | 3/13/2020 |
| 190 | hCoV-19/Thailand/Bangkok\_2489/2020 | EPI\_ISL\_455607 | 3/13/2020 |
| 191 | hCoV-19/Thailand/Bangkok\_2504/2020 | EPI\_ISL\_455608 | 3/14/2020 |
| 192 | hCoV-19/Thailand/Bangkok\_2295/2020 | EPI\_ISL\_455624 | 3/12/2020 |
| 193 | hCoV-19/Thailand/Bangkok-CONI-0106/2020 | EPI\_ISL\_455909 | 3/9/2020 |
| 194 | hCoV-19/Thailand/Bangkok-CONI-0107/2020 | EPI\_ISL\_455910 | 3/11/2020 |
| 195 | hCoV-19/Thailand/Bangkok-CONI-0128/2020 | EPI\_ISL\_455922 | 3/12/2020 |
| 196 | hCoV-19/Thailand/Bangkok-CONI-0132/2020 | EPI\_ISL\_455926 | 3/12/2020 |
| 197 | hCoV-19/Thailand/Bangkok-CONI-0134/2020 | EPI\_ISL\_455928 | 3/13/2020 |
| 198 | hCoV-19/Thailand/Bangkok-CONI-0140/2020 | EPI\_ISL\_455934 | 3/14/2020 |
| 199 | hCoV-19/Thailand/Bangkok-CONI-0141/2020 | EPI\_ISL\_455935 | 3/14/2020 |
| 200 | hCoV-19/Thailand/Bangkok-CONI-0144/2020 | EPI\_ISL\_455938 | 3/15/2020 |
| 201 | hCoV-19/Thailand/Bangkok-CONI-0147/2020 | EPI\_ISL\_455941 | 3/15/2020 |
| 202 | hCoV-19/Thailand/Bangkok-CONI-0149/2020 | EPI\_ISL\_455943 | 3/15/2020 |
| 203 | hCoV-19/Thailand/Bangkok-CONI-0154/2020 | EPI\_ISL\_455947 | 3/16/2020 |
| 204 | hCoV-19/Thailand/Bangkok-CONI-0095/2020 | EPI\_ISL\_458024 | 3/30/2020 |
| 205 | hCoV-19/Thailand/Samut Songkhram-0942/2020 | EPI\_ISL\_489991 | 2020-03 |
| 206 | hCoV-19/Thailand/MUMT-3/2020 | EPI\_ISL\_493137 | 2/25/2020 |
| 207 | hCoV-19/Thailand/MUMT-4/2020 | EPI\_ISL\_493139 | 3/3/2020 |
| 208 | hCoV-19/Thailand/Bangkok-CONI-0163/2020 | EPI\_ISL\_498257 | 3/24/2020 |
| 209 | hCoV-19/Thailand/Bangkok-CONI-0192/2020 | EPI\_ISL\_498264 | 3/22/2020 |
| 210 | hCoV-19/Thailand/Bangkok-CONI-0194/2020 | EPI\_ISL\_498265 | 3/21/2020 |
| 211 | hCoV-19/Thailand/Bangkok-CONI-0201/2020 | EPI\_ISL\_512851 | 3/16/2020 |
| 212 | hCoV-19/Thailand/Bangkok-CONI-0202/2020 | EPI\_ISL\_512852 | 3/16/2020 |
| 213 | hCoV-19/Thailand/Bangkok-CONI-0207/2020 | EPI\_ISL\_512857 | 3/18/2020 |
| 214 | hCoV-19/Thailand/Bangkok-CONI-0208/2020 | EPI\_ISL\_512858 | 3/18/2020 |
| 215 | hCoV-19/Thailand/Bangkok-CONI-0209/2020 | EPI\_ISL\_512859 | 3/18/2020 |
| 216 | hCoV-19/Thailand/Bangkok-CONI-0210/2020 | EPI\_ISL\_512860 | 3/18/2020 |
| 217 | hCoV-19/Thailand/Bangkok-CONI-0211/2020 | EPI\_ISL\_512861 | 3/18/2020 |
| 218 | hCoV-19/Thailand/Bangkok-CONI-0212/2020 | EPI\_ISL\_512862 | 3/18/2020 |
| 219 | hCoV-19/Thailand/Bangkok-CONI-0213/2020 | EPI\_ISL\_512863 | 3/18/2020 |
| 220 | hCoV-19/Thailand/Bangkok-CONI-0214/2020 | EPI\_ISL\_512864 | 3/18/2020 |
| 221 | hCoV-19/Thailand/Bangkok-CONI-0224/2020 | EPI\_ISL\_512866 | 3/25/2020 |
| 222 | hCoV-19/Thailand/Bangkok-CONI-0227/2020 | EPI\_ISL\_512869 | 3/25/2020 |
| 223 | hCoV-19/Thailand/NIH\_3623/2020 | EPI\_ISL\_515288 | 2020-03 |
| 224 | hCoV-19/Thailand/NIH\_3710/2020 | EPI\_ISL\_515289 | 2020-03 |
| 225 | hCoV-19/Thailand/NIH\_3744/2020 | EPI\_ISL\_515291 | 2020-03 |
| 226 | hCoV-19/Thailand/Bangkok-CONI-0217/2020 | EPI\_ISL\_568582 | 3/19/2020 |
| 227 | hCoV-19/Thailand/Bangkok-CONI-0219/2020 | EPI\_ISL\_568583 | 3/19/2020 |
| 228 | hCoV-19/Thailand/Bangkok-CONI-0220/2020 | EPI\_ISL\_568584 | 3/20/2020 |
| 229 | hCoV-19/Thailand/Bangkok-CONI-0221/2020 | EPI\_ISL\_568585 | 3/20/2020 |
| 230 | hCoV-19/Thailand/Bangkok-CONI-0222/2020 | EPI\_ISL\_568586 | 3/20/2020 |
| 231 | hCoV-19/Singapore/2/2020 | EPI\_ISL\_407987 | 1/25/2020 |
| 232 | hCoV-19/Singapore/3/2020 | EPI\_ISL\_407988 | 2/1/2020 |
| 233 | hCoV-19/Singapore/5/2020 | EPI\_ISL\_410536 | 2/6/2020 |
| 234 | hCoV-19/Singapore/6/2020 | EPI\_ISL\_410537 | 2/9/2020 |
| 235 | hCoV-19/Singapore/8/2020 | EPI\_ISL\_410714 | 2/3/2020 |
| 236 | hCoV-19/Singapore/11/2020 | EPI\_ISL\_410719 | 2/2/2020 |
| 237 | hCoV-19/Singapore/24/2020 | EPI\_ISL\_420101 | 3/4/2020 |
| 238 | hCoV-19/Singapore/25/2020 | EPI\_ISL\_420102 | 3/5/2020 |
| 239 | hCoV-19/Singapore/26/2020 | EPI\_ISL\_420103 | 3/5/2020 |
| 240 | hCoV-19/Singapore/27/2020 | EPI\_ISL\_420104 | 3/5/2020 |
| 241 | hCoV-19/Singapore/28/2020 | EPI\_ISL\_420105 | 3/6/2020 |
| 242 | hCoV-19/Singapore/29/2020 | EPI\_ISL\_420106 | 3/6/2020 |
| 243 | hCoV-19/Singapore/31/2020 | EPI\_ISL\_420108 | 3/10/2020 |
| 244 | hCoV-19/Singapore/32/2020 | EPI\_ISL\_420109 | 3/11/2020 |
| 245 | hCoV-19/Singapore/33/2020 | EPI\_ISL\_420110 | 3/11/2020 |
| 246 | hCoV-19/Singapore/34/2020 | EPI\_ISL\_420111 | 3/12/2020 |
| 247 | hCoV-19/Singapore/44/2020 | EPI\_ISL\_428823 | 3/8/2020 |
| 248 | hCoV-19/Singapore/46/2020 | EPI\_ISL\_428825 | 3/16/2020 |
| 249 | hCoV-19/Singapore/49/2020 | EPI\_ISL\_428828 | 3/8/2020 |
| 250 | hCoV-19/Singapore/50/2020 | EPI\_ISL\_428829 | 3/8/2020 |
| 251 | hCoV-19/Singapore/52/2020 | EPI\_ISL\_428831 | 3/13/2020 |
| 252 | hCoV-19/Singapore/54/2020 | EPI\_ISL\_428833 | 4/8/2020 |
| 253 | hCoV-19/Singapore/69/2020 | EPI\_ISL\_428848 | 4/15/2020 |
| 254 | hCoV-19/Singapore/98/2020 | EPI\_ISL\_443190 | 4/9/2020 |
| 255 | hCoV-19/Singapore/99/2020 | EPI\_ISL\_443191 | 4/16/2020 |
| 256 | hCoV-19/Singapore/111/2020 | EPI\_ISL\_443203 | 3/18/2020 |
| 257 | hCoV-19/Singapore/112/2020 | EPI\_ISL\_443204 | 3/18/2020 |
| 258 | hCoV-19/Singapore/117/2020 | EPI\_ISL\_443209 | 3/18/2020 |
| 259 | hCoV-19/Singapore/122/2020 | EPI\_ISL\_443214 | 3/18/2020 |
| 260 | hCoV-19/Singapore/125/2020 | EPI\_ISL\_443217 | 3/21/2020 |
| 261 | hCoV-19/Singapore/128/2020 | EPI\_ISL\_443220 | 3/21/2020 |
| 262 | hCoV-19/Singapore/130/2020 | EPI\_ISL\_443222 | 3/20/2020 |
| 263 | hCoV-19/Singapore/131/2020 | EPI\_ISL\_443223 | 3/20/2020 |
| 264 | hCoV-19/Singapore/132/2020 | EPI\_ISL\_443224 | 3/20/2020 |
| 265 | hCoV-19/Singapore/133/2020 | EPI\_ISL\_443225 | 3/20/2020 |
| 266 | hCoV-19/Singapore/141/2020 | EPI\_ISL\_443233 | 3/17/2020 |
| 267 | hCoV-19/Singapore/142/2020 | EPI\_ISL\_443234 | 3/17/2020 |
| 268 | hCoV-19/Singapore/145/2020 | EPI\_ISL\_443237 | 3/17/2020 |
| 269 | hCoV-19/Singapore/147/2020 | EPI\_ISL\_443239 | 3/17/2020 |
| 270 | hCoV-19/Singapore/148/2020 | EPI\_ISL\_443240 | 3/17/2020 |
| 271 | hCoV-19/Singapore/149/2020 | EPI\_ISL\_443241 | 3/18/2020 |
| 272 | hCoV-19/Singapore/150/2020 | EPI\_ISL\_443242 | 3/18/2020 |
| 273 | hCoV-19/Singapore/152/2020 | EPI\_ISL\_443244 | 4/8/2020 |
| 274 | hCoV-19/Singapore/153/2020 | EPI\_ISL\_443245 | 4/8/2020 |
| 275 | hCoV-19/Singapore/185/2020 | EPI\_ISL\_462303 | 4/28/2020 |
| 276 | hCoV-19/Singapore/187/2020 | EPI\_ISL\_462305 | 2/27/2020 |
| 277 | hCoV-19/Singapore/188/2020 | EPI\_ISL\_462306 | 2/14/2020 |
| 278 | hCoV-19/Singapore/189/2020 | EPI\_ISL\_462307 | 4/20/2020 |
| 279 | hCoV-19/Singapore/190/2020 | EPI\_ISL\_462308 | 4/20/2020 |
| 280 | hCoV-19/Singapore/191/2020 | EPI\_ISL\_462309 | 4/20/2020 |
| 281 | hCoV-19/Singapore/192/2020 | EPI\_ISL\_462310 | 4/20/2020 |
| 282 | hCoV-19/Singapore/193/2020 | EPI\_ISL\_462311 | 4/20/2020 |
| 283 | hCoV-19/Singapore/194/2020 | EPI\_ISL\_462312 | 4/20/2020 |
| 284 | hCoV-19/Singapore/196/2020 | EPI\_ISL\_462314 | 4/20/2020 |
| 285 | hCoV-19/Singapore/197/2020 | EPI\_ISL\_462315 | 4/22/2020 |
| 286 | hCoV-19/Singapore/198/2020 | EPI\_ISL\_462316 | 4/23/2020 |
| 287 | hCoV-19/Singapore/199/2020 | EPI\_ISL\_462317 | 4/23/2020 |
| 288 | hCoV-19/Singapore/202/2020 | EPI\_ISL\_462320 | 4/25/2020 |
| 289 | hCoV-19/Singapore/204/2020 | EPI\_ISL\_462322 | 4/27/2020 |
| 290 | hCoV-19/Singapore/205/2020 | EPI\_ISL\_462323 | 4/28/2020 |
| 291 | hCoV-19/Singapore/206/2020 | EPI\_ISL\_462324 | 4/28/2020 |
| 292 | hCoV-19/Singapore/207/2020 | EPI\_ISL\_462325 | 4/29/2020 |
| 293 | hCoV-19/Singapore/208/2020 | EPI\_ISL\_462326 | 4/29/2020 |
| 294 | hCoV-19/Singapore/210/2020 | EPI\_ISL\_462328 | 3/9/2020 |
| 295 | hCoV-19/Singapore/220/2020 | EPI\_ISL\_462338 | 3/6/2020 |
| 296 | hCoV-19/Singapore/222/2020 | EPI\_ISL\_462340 | 4/7/2020 |
| 297 | hCoV-19/Singapore/225/2020 | EPI\_ISL\_462343 | 4/20/2020 |
| 298 | hCoV-19/Singapore/226/2020 | EPI\_ISL\_462344 | 4/19/2020 |
| 299 | hCoV-19/Singapore/227/2020 | EPI\_ISL\_462345 | 3/26/2020 |
| 300 | hCoV-19/Singapore/230/2020 | EPI\_ISL\_462348 | 4/6/2020 |
| 301 | hCoV-19/Singapore/231/2020 | EPI\_ISL\_462349 | 3/27/2020 |
| 302 | hCoV-19/Singapore/232/2020 | EPI\_ISL\_462350 | 3/31/2020 |
| 303 | hCoV-19/Singapore/233/2020 | EPI\_ISL\_462351 | 3/26/2020 |
| 304 | hCoV-19/Singapore/234/2020 | EPI\_ISL\_462352 | 4/9/2020 |
| 305 | hCoV-19/Singapore/236/2020 | EPI\_ISL\_462354 | 4/7/2020 |
| 306 | hCoV-19/Singapore/237/2020 | EPI\_ISL\_462355 | 4/3/2020 |
| 307 | hCoV-19/Singapore/239/2020 | EPI\_ISL\_462357 | 4/6/2020 |
| 308 | hCoV-19/Singapore/241/2020 | EPI\_ISL\_462359 | 3/24/2020 |
| 309 | hCoV-19/Singapore/252/2020 | EPI\_ISL\_462370 | 3/21/2020 |
| 310 | hCoV-19/Singapore/253/2020 | EPI\_ISL\_462371 | 3/21/2020 |
| 311 | hCoV-19/Singapore/254/2020 | EPI\_ISL\_462372 | 5/15/2020 |
| 312 | hCoV-19/Singapore/255/2020 | EPI\_ISL\_462373 | 3/10/2020 |
| 313 | hCoV-19/Singapore/256/2020 | EPI\_ISL\_462374 | 4/8/2020 |
| 314 | hCoV-19/Singapore/258/2020 | EPI\_ISL\_462376 | 3/21/2020 |
| 315 | hCoV-19/Singapore/259/2020 | EPI\_ISL\_462377 | 4/7/2020 |
| 316 | hCoV-19/Singapore/261/2020 | EPI\_ISL\_462379 | 4/9/2020 |
| 317 | hCoV-19/Singapore/262/2020 | EPI\_ISL\_462380 | 4/14/2020 |
| 318 | hCoV-19/Singapore/263/2020 | EPI\_ISL\_462381 | 4/9/2020 |
| 319 | hCoV-19/Singapore/264/2020 | EPI\_ISL\_462382 | 5/6/2020 |
| 320 | hCoV-19/Singapore/266/2020 | EPI\_ISL\_462384 | 4/7/2020 |
| 321 | hCoV-19/Singapore/267/2020 | EPI\_ISL\_462385 | 3/21/2020 |
| 322 | hCoV-19/Singapore/268/2020 | EPI\_ISL\_462386 | 3/21/2020 |
| 323 | hCoV-19/Singapore/269/2020 | EPI\_ISL\_462387 | 3/17/2020 |
| 324 | hCoV-19/Singapore/271/2020 | EPI\_ISL\_462389 | 3/20/2020 |
| 325 | hCoV-19/Singapore/273/2020 | EPI\_ISL\_462391 | 3/21/2020 |
| 326 | hCoV-19/Singapore/277/2020 | EPI\_ISL\_462395 | 4/8/2020 |
| 327 | hCoV-19/Singapore/278/2020 | EPI\_ISL\_462396 | 3/21/2020 |
| 328 | hCoV-19/Singapore/279/2020 | EPI\_ISL\_462397 | 4/17/2020 |
| 329 | hCoV-19/Singapore/281/2020 | EPI\_ISL\_462399 | 4/14/2020 |
| 330 | hCoV-19/Singapore/323ilmn/2020 | EPI\_ISL\_469100 | 3/26/2020 |
| 331 | hCoV-19/Singapore/346/2020 | EPI\_ISL\_469101 | 4/8/2020 |
| 332 | hCoV-19/Singapore/348/2020 | EPI\_ISL\_469103 | 3/31/2020 |
| 333 | hCoV-19/Singapore/349/2020 | EPI\_ISL\_469104 | 3/31/2020 |
| 334 | hCoV-19/Singapore/350/2020 | EPI\_ISL\_469105 | 4/6/2020 |
| 335 | hCoV-19/Singapore/351/2020 | EPI\_ISL\_469106 | 3/28/2020 |
| 336 | hCoV-19/Singapore/352/2020 | EPI\_ISL\_469107 | 5/28/2020 |
| 337 | hCoV-19/Singapore/353/2020 | EPI\_ISL\_469108 | 5/14/2020 |
| 338 | hCoV-19/Singapore/354/2020 | EPI\_ISL\_469109 | 4/7/2020 |
| 339 | hCoV-19/Singapore/355/2020 | EPI\_ISL\_469110 | 4/8/2020 |
| 340 | hCoV-19/Singapore/356/2020 | EPI\_ISL\_469111 | 4/8/2020 |
| 341 | hCoV-19/Singapore/358/2020 | EPI\_ISL\_469113 | 4/6/2020 |
| 342 | hCoV-19/Singapore/359/2020 | EPI\_ISL\_469114 | 4/6/2020 |
| 343 | hCoV-19/Singapore/362/2020 | EPI\_ISL\_469117 | 4/13/2020 |
| 344 | hCoV-19/Singapore/364/2020 | EPI\_ISL\_469119 | 4/20/2020 |
| 345 | hCoV-19/Singapore/365/2020 | EPI\_ISL\_469120 | 4/6/2020 |
| 346 | hCoV-19/Singapore/375/2020 | EPI\_ISL\_469124 | 3/19/2020 |
| 347 | hCoV-19/Singapore/376/2020 | EPI\_ISL\_469125 | 4/4/2020 |
| 348 | hCoV-19/Singapore/377/2020 | EPI\_ISL\_469126 | 4/11/2020 |
| 349 | hCoV-19/Singapore/378/2020 | EPI\_ISL\_469127 | 3/25/2020 |
| 350 | hCoV-19/Singapore/379/2020 | EPI\_ISL\_469128 | 4/17/2020 |
| 351 | hCoV-19/Singapore/380/2020 | EPI\_ISL\_469129 | 4/5/2020 |
| 352 | hCoV-19/Singapore/381/2020 | EPI\_ISL\_469130 | 4/17/2020 |
| 353 | hCoV-19/Singapore/382/2020 | EPI\_ISL\_469131 | 4/17/2020 |
| 354 | hCoV-19/Singapore/384/2020 | EPI\_ISL\_469133 | 4/10/2020 |
| 355 | hCoV-19/Singapore/386/2020 | EPI\_ISL\_469135 | 4/17/2020 |
| 356 | hCoV-19/Singapore/387/2020 | EPI\_ISL\_469136 | 4/17/2020 |
| 357 | hCoV-19/Singapore/390/2020 | EPI\_ISL\_469139 | 6/6/2020 |
| 358 | hCoV-19/Singapore/393/2020 | EPI\_ISL\_469142 | 4/17/2020 |
| 359 | hCoV-19/Singapore/394/2020 | EPI\_ISL\_469143 | 3/9/2020 |
| 360 | hCoV-19/Singapore/395/2020 | EPI\_ISL\_469144 | 4/17/2020 |
| 361 | hCoV-19/Singapore/396/2020 | EPI\_ISL\_469145 | 4/17/2020 |
| 362 | hCoV-19/Singapore/398/2020 | EPI\_ISL\_469147 | 5/21/2020 |
| 363 | hCoV-19/Singapore/470/2020 | EPI\_ISL\_477170 | 2/16/2020 |
| 364 | hCoV-19/Singapore/481/2020 | EPI\_ISL\_477171 | 3/16/2020 |
| 365 | hCoV-19/Singapore/431nan/2020 | EPI\_ISL\_477172 | 3/18/2020 |
| 366 | hCoV-19/Singapore/451nan/2020 | EPI\_ISL\_477174 | 3/20/2020 |
| 367 | hCoV-19/Singapore/159nan/2020 | EPI\_ISL\_477177 | 3/21/2020 |
| 368 | hCoV-19/Singapore/278nan/2020 | EPI\_ISL\_477178 | 3/22/2020 |
| 369 | hCoV-19/Singapore/488/2020 | EPI\_ISL\_477182 | 4/13/2020 |
| 370 | hCoV-19/Singapore/489/2020 | EPI\_ISL\_477184 | 4/13/2020 |
| 371 | hCoV-19/Singapore/490/2020 | EPI\_ISL\_477187 | 4/26/2020 |
| 372 | hCoV-19/Singapore/491/2020 | EPI\_ISL\_477188 | 4/26/2020 |
| 373 | hCoV-19/Singapore/492/2020 | EPI\_ISL\_477189 | 4/26/2020 |
| 374 | hCoV-19/Singapore/493/2020 | EPI\_ISL\_477190 | 4/26/2020 |
| 375 | hCoV-19/Singapore/494/2020 | EPI\_ISL\_477191 | 4/26/2020 |
| 376 | hCoV-19/Singapore/495/2020 | EPI\_ISL\_477192 | 4/27/2020 |
| 377 | hCoV-19/Singapore/512/2020 | EPI\_ISL\_479590 | 5/23/2020 |
| 378 | hCoV-19/Singapore/514/2020 | EPI\_ISL\_479592 | 5/24/2020 |
| 379 | hCoV-19/Singapore/515/2020 | EPI\_ISL\_479593 | 5/26/2020 |
| 380 | hCoV-19/Singapore/516/2020 | EPI\_ISL\_479594 | 5/27/2020 |
| 381 | hCoV-19/Singapore/520/2020 | EPI\_ISL\_479598 | 4/15/2020 |
| 382 | hCoV-19/Singapore/521/2020 | EPI\_ISL\_479599 | 4/15/2020 |
| 383 | hCoV-19/Singapore/522/2020 | EPI\_ISL\_479600 | 4/15/2020 |
| 384 | hCoV-19/Singapore/523/2020 | EPI\_ISL\_479601 | 4/15/2020 |
| 385 | hCoV-19/Singapore/524/2020 | EPI\_ISL\_479602 | 4/14/2020 |
| 386 | hCoV-19/Singapore/525/2020 | EPI\_ISL\_479603 | 4/14/2020 |
| 387 | hCoV-19/Singapore/577/2020 | EPI\_ISL\_483600 | 4/12/2020 |
| 388 | hCoV-19/Singapore/579/2020 | EPI\_ISL\_483602 | 4/6/2020 |
| 389 | hCoV-19/Singapore/580/2020 | EPI\_ISL\_483603 | 5/20/2020 |
| 390 | hCoV-19/Singapore/581/2020 | EPI\_ISL\_483604 | 4/30/2020 |
| 391 | hCoV-19/Singapore/582/2020 | EPI\_ISL\_483605 | 4/4/2020 |
| 392 | hCoV-19/Singapore/583/2020 | EPI\_ISL\_483606 | 5/19/2020 |
| 393 | hCoV-19/Singapore/585/2020 | EPI\_ISL\_483608 | 6/26/2020 |
| 394 | hCoV-19/Singapore/587/2020 | EPI\_ISL\_483610 | 3/27/2020 |
| 395 | hCoV-19/Singapore/588/2020 | EPI\_ISL\_483611 | 6/27/2020 |
| 396 | hCoV-19/Singapore/590/2020 | EPI\_ISL\_483613 | 3/26/2020 |
| 397 | hCoV-19/Singapore/591/2020 | EPI\_ISL\_483614 | 6/26/2020 |
| 398 | hCoV-19/Singapore/598/2020 | EPI\_ISL\_483621 | 3/31/2020 |
| 399 | hCoV-19/Singapore/641/2020 | EPI\_ISL\_493401 | 4/24/2020 |
| 400 | hCoV-19/Singapore/648/2020 | EPI\_ISL\_493408 | 4/24/2020 |
| 401 | hCoV-19/Singapore/650/2020 | EPI\_ISL\_493410 | 4/13/2020 |
| 402 | hCoV-19/Singapore/651/2020 | EPI\_ISL\_493411 | 5/8/2020 |
| 403 | hCoV-19/Singapore/654/2020 | EPI\_ISL\_493414 | 2/18/2020 |
| 404 | hCoV-19/Singapore/655/2020 | EPI\_ISL\_493415 | 3/29/2020 |
| 405 | hCoV-19/Singapore/660/2020 | EPI\_ISL\_493420 | 4/21/2020 |
| 406 | hCoV-19/Singapore/661/2020 | EPI\_ISL\_493421 | 2/7/2020 |
| 407 | hCoV-19/Singapore/666/2020 | EPI\_ISL\_498564 | 7/3/2020 |
| 408 | hCoV-19/Singapore/667/2020 | EPI\_ISL\_498565 | 7/2/2020 |
| 409 | hCoV-19/Singapore/668/2020 | EPI\_ISL\_498566 | 5/15/2020 |
| 410 | hCoV-19/Singapore/669/2020 | EPI\_ISL\_498567 | 7/2/2020 |
| 411 | hCoV-19/Singapore/670/2020 | EPI\_ISL\_498568 | 7/1/2020 |
| 412 | hCoV-19/Singapore/671/2020 | EPI\_ISL\_498569 | 6/22/2020 |
| 413 | hCoV-19/Singapore/672/2020 | EPI\_ISL\_498570 | 6/23/2020 |
| 414 | hCoV-19/Singapore/673/2020 | EPI\_ISL\_498571 | 7/2/2020 |
| 415 | hCoV-19/Singapore/686/2020 | EPI\_ISL\_498584 | 7/4/2020 |
| 416 | hCoV-19/Singapore/691/2020 | EPI\_ISL\_498589 | 7/11/2020 |
| 417 | hCoV-19/Singapore/695/2020 | EPI\_ISL\_498593 | 7/14/2020 |
| 418 | hCoV-19/Singapore/696/2020 | EPI\_ISL\_498594 | 7/16/2020 |
| 419 | hCoV-19/Singapore/733/2020 | EPI\_ISL\_500539 | 6/22/2020 |
| 420 | hCoV-19/Singapore/734/2020 | EPI\_ISL\_500540 | 6/22/2020 |
| 421 | hCoV-19/Singapore/735/2020 | EPI\_ISL\_500541 | 4/16/2020 |
| 422 | hCoV-19/Singapore/721/2020 | EPI\_ISL\_500542 | 6/24/2020 |
| 423 | hCoV-19/Singapore/722/2020 | EPI\_ISL\_500543 | 6/24/2020 |
| 424 | hCoV-19/Singapore/723/2020 | EPI\_ISL\_500544 | 6/24/2020 |
| 425 | hCoV-19/Singapore/724/2020 | EPI\_ISL\_500545 | 6/24/2020 |
| 426 | hCoV-19/Singapore/725/2020 | EPI\_ISL\_500546 | 6/24/2020 |
| 427 | hCoV-19/Singapore/726/2020 | EPI\_ISL\_500547 | 6/24/2020 |
| 428 | hCoV-19/Singapore/727/2020 | EPI\_ISL\_500548 | 6/23/2020 |
| 429 | hCoV-19/Singapore/729/2020 | EPI\_ISL\_500550 | 6/22/2020 |
| 430 | hCoV-19/Singapore/730/2020 | EPI\_ISL\_500551 | 6/22/2020 |
| 431 | hCoV-19/Singapore/731/2020 | EPI\_ISL\_500552 | 6/22/2020 |
| 432 | hCoV-19/Singapore/732/2020 | EPI\_ISL\_500553 | 6/22/2020 |
| 433 | hCoV-19/Singapore/744/2020 | EPI\_ISL\_500554 | 6/30/2020 |
| 434 | hCoV-19/Singapore/601nan/2020 | EPI\_ISL\_500555 | 6/30/2020 |
| 435 | hCoV-19/Singapore/742/2020 | EPI\_ISL\_500556 | 7/4/2020 |
| 436 | hCoV-19/Singapore/737/2020 | EPI\_ISL\_500557 | 7/6/2020 |
| 437 | hCoV-19/Singapore/738/2020 | EPI\_ISL\_500558 | 7/6/2020 |
| 438 | hCoV-19/Singapore/747/2020 | EPI\_ISL\_500561 | 7/1/2020 |
| 439 | hCoV-19/Singapore/748/2020 | EPI\_ISL\_500562 | 6/22/2020 |
| 440 | hCoV-19/Singapore/749/2020 | EPI\_ISL\_500564 | 6/15/2020 |
| 441 | hCoV-19/Singapore/750/2020 | EPI\_ISL\_500565 | 6/15/2020 |
| 442 | hCoV-19/Singapore/752/2020 | EPI\_ISL\_500566 | 6/10/2020 |
| 443 | hCoV-19/Singapore/753/2020 | EPI\_ISL\_500567 | 6/10/2020 |
| 444 | hCoV-19/Singapore/754/2020 | EPI\_ISL\_500568 | 6/8/2020 |
| 445 | hCoV-19/Singapore/755/2020 | EPI\_ISL\_500569 | 6/6/2020 |
| 446 | hCoV-19/Singapore/756/2020 | EPI\_ISL\_500570 | 6/5/2020 |
| 447 | hCoV-19/Singapore/757/2020 | EPI\_ISL\_500571 | 6/5/2020 |
| 448 | hCoV-19/Singapore/763/2020 | EPI\_ISL\_509373 | 6/19/2020 |
| 449 | hCoV-19/Singapore/764/2020 | EPI\_ISL\_509374 | 6/17/2020 |
| 450 | hCoV-19/Singapore/765/2020 | EPI\_ISL\_509375 | 6/11/2020 |
| 451 | hCoV-19/Singapore/767/2020 | EPI\_ISL\_509377 | 6/4/2020 |
| 452 | hCoV-19/Singapore/768/2020 | EPI\_ISL\_509378 | 6/3/2020 |
| 453 | hCoV-19/Singapore/769/2020 | EPI\_ISL\_509379 | 7/14/2020 |
| 454 | hCoV-19/Singapore/770/2020 | EPI\_ISL\_509380 | 7/16/2020 |
| 455 | hCoV-19/Singapore/771/2020 | EPI\_ISL\_509381 | 7/15/2020 |
| 456 | hCoV-19/Singapore/772/2020 | EPI\_ISL\_509382 | 7/15/2020 |
| 457 | hCoV-19/Singapore/773/2020 | EPI\_ISL\_509383 | 7/15/2020 |
| 458 | hCoV-19/Singapore/774/2020 | EPI\_ISL\_509384 | 7/14/2020 |
| 459 | hCoV-19/Singapore/775/2020 | EPI\_ISL\_509385 | 7/13/2020 |
| 460 | hCoV-19/Singapore/776/2020 | EPI\_ISL\_509386 | 7/13/2020 |
| 461 | hCoV-19/Singapore/777/2020 | EPI\_ISL\_509387 | 7/13/2020 |
| 462 | hCoV-19/Singapore/778/2020 | EPI\_ISL\_509388 | 7/12/2020 |
| 463 | hCoV-19/Singapore/779/2020 | EPI\_ISL\_509389 | 7/11/2020 |
| 464 | hCoV-19/Singapore/780/2020 | EPI\_ISL\_509390 | 7/7/2020 |
| 465 | hCoV-19/Singapore/782/2020 | EPI\_ISL\_509392 | 6/18/2020 |
| 466 | hCoV-19/Singapore/783/2020 | EPI\_ISL\_509393 | 6/13/2020 |
| 467 | hCoV-19/Singapore/784/2020 | EPI\_ISL\_509394 | 6/9/2020 |
| 468 | hCoV-19/Singapore/846/2020 | EPI\_ISL\_518010 | 7/12/2020 |
| 469 | hCoV-19/Singapore/847/2020 | EPI\_ISL\_518011 | 7/12/2020 |
| 470 | hCoV-19/Singapore/834\_2/2020 | EPI\_ISL\_518013 | 6/15/2020 |
| 471 | hCoV-19/Singapore/849/2020 | EPI\_ISL\_518014 | 6/14/2020 |
| 472 | hCoV-19/Singapore/835\_2/2020 | EPI\_ISL\_518015 | 6/17/2020 |
| 473 | hCoV-19/Singapore/836\_2/2020 | EPI\_ISL\_518016 | 6/16/2020 |
| 474 | hCoV-19/Singapore/963/2020 | EPI\_ISL\_548972 | 9/14/2020 |
| 475 | hCoV-19/Singapore/964/2020 | EPI\_ISL\_548973 | 9/9/2020 |
| 476 | hCoV-19/Singapore/975/2020 | EPI\_ISL\_548983 | 3/23/2020 |
| 477 | hCoV-19/Singapore/979/2020 | EPI\_ISL\_548987 | 3/11/2020 |
| 478 | hCoV-19/Singapore/981/2020 | EPI\_ISL\_548989 | 3/15/2020 |
| 479 | hCoV-19/Singapore/985/2020 | EPI\_ISL\_548993 | 3/28/2020 |
| 480 | hCoV-19/Singapore/989/2020 | EPI\_ISL\_548997 | 3/23/2020 |
| 481 | hCoV-19/Singapore/990/2020 | EPI\_ISL\_548998 | 3/15/2020 |
| 482 | hCoV-19/Singapore/993/2020 | EPI\_ISL\_549001 | 3/14/2020 |
| 483 | hCoV-19/Singapore/994/2020 | EPI\_ISL\_549002 | 3/22/2020 |
| 484 | hCoV-19/Singapore/995/2020 | EPI\_ISL\_549003 | 3/22/2020 |
| 485 | hCoV-19/Singapore/1008/2020 | EPI\_ISL\_574493 | 3/25/2020 |
| 486 | hCoV-19/Singapore/1/2020 | EPI\_ISL\_406973 | 1/23/2020 |
| 487 | hCoV-19/Singapore/3Clin/2020 | EPI\_ISL\_418994 | 1/29/2020 |
| 488 | hCoV-19/Singapore/35/2020 | EPI\_ISL\_422428 | 2/6/2020 |
| 489 | hCoV-19/Singapore/36/2020 | EPI\_ISL\_422429 | 2/16/2020 |
| 490 | hCoV-19/Singapore/37/2020 | EPI\_ISL\_422430 | 3/13/2020 |
| 491 | hCoV-19/Singapore/87/2020 | EPI\_ISL\_435692 | 4/21/2020 |
| 492 | hCoV-19/Singapore/90/2020 | EPI\_ISL\_435695 | 4/23/2020 |
| 493 | hCoV-19/Singapore/92/2020 | EPI\_ISL\_435697 | 3/18/2020 |
| 494 | hCoV-19/Singapore/94/2020 | EPI\_ISL\_435699 | 3/18/2020 |
| 495 | hCoV-19/Singapore/95/2020 | EPI\_ISL\_435700 | 3/18/2020 |
| 496 | hCoV-19/Singapore/156/2020 | EPI\_ISL\_443248 | 3/20/2020 |
| 497 | hCoV-19/Singapore/160/2020 | EPI\_ISL\_462278 | 3/19/2020 |
| 498 | hCoV-19/Singapore/165/2020 | EPI\_ISL\_462283 | 1/27/2020 |
| 499 | hCoV-19/Singapore/169/2020 | EPI\_ISL\_462287 | 3/14/2020 |
| 500 | hCoV-19/Singapore/170/2020 | EPI\_ISL\_462288 | 4/15/2020 |
| 501 | hCoV-19/Singapore/172/2020 | EPI\_ISL\_462290 | 3/19/2020 |
| 502 | hCoV-19/Singapore/173/2020 | EPI\_ISL\_462291 | 3/19/2020 |
| 503 | hCoV-19/Singapore/174/2020 | EPI\_ISL\_462292 | 3/17/2020 |
| 504 | hCoV-19/Singapore/282/2020 | EPI\_ISL\_462400 | 4/9/2020 |
| 505 | hCoV-19/Singapore/286/2020 | EPI\_ISL\_462404 | 3/21/2020 |
| 506 | hCoV-19/Singapore/287/2020 | EPI\_ISL\_462405 | 3/18/2020 |
| 507 | hCoV-19/Singapore/288/2020 | EPI\_ISL\_462406 | 4/30/2020 |
| 508 | hCoV-19/Singapore/289/2020 | EPI\_ISL\_462407 | 4/6/2020 |
| 509 | hCoV-19/Singapore/290/2020 | EPI\_ISL\_462408 | 4/14/2020 |
| 510 | hCoV-19/Singapore/292/2020 | EPI\_ISL\_462410 | 3/20/2020 |
| 511 | hCoV-19/Singapore/294/2020 | EPI\_ISL\_462412 | 5/3/2020 |
| 512 | hCoV-19/Singapore/295/2020 | EPI\_ISL\_462413 | 4/7/2020 |
| 513 | hCoV-19/Singapore/299/2020 | EPI\_ISL\_462417 | 4/14/2020 |
| 514 | hCoV-19/Singapore/300/2020 | EPI\_ISL\_462418 | 4/1/2020 |
| 515 | hCoV-19/Singapore/301/2020 | EPI\_ISL\_462419 | 4/6/2020 |
| 516 | hCoV-19/Singapore/302/2020 | EPI\_ISL\_462420 | 3/21/2020 |
| 517 | hCoV-19/Singapore/328/2020 | EPI\_ISL\_469082 | 4/17/2020 |
| 518 | hCoV-19/Singapore/329/2020 | EPI\_ISL\_469083 | 4/17/2020 |
| 519 | hCoV-19/Singapore/330/2020 | EPI\_ISL\_469084 | 4/17/2020 |
| 520 | hCoV-19/Singapore/333/2020 | EPI\_ISL\_469087 | 4/17/2020 |
| 521 | hCoV-19/Singapore/335/2020 | EPI\_ISL\_469089 | 4/14/2020 |
| 522 | hCoV-19/Singapore/344/2020 | EPI\_ISL\_469098 | 4/1/2020 |
| 523 | hCoV-19/Singapore/345/2020 | EPI\_ISL\_469099 | 4/8/2020 |
| 524 | hCoV-19/Singapore/72/2020 | EPI\_ISL\_469274 | 4/6/2020 |
| 525 | hCoV-19/Singapore/407/2020 | EPI\_ISL\_475938 | 4/28/2020 |
| 526 | hCoV-19/Singapore/408/2020 | EPI\_ISL\_475939 | 4/21/2020 |
| 527 | hCoV-19/Singapore/409/2020 | EPI\_ISL\_475940 | 4/22/2020 |
| 528 | hCoV-19/Singapore/411/2020 | EPI\_ISL\_475942 | 4/28/2020 |
| 529 | hCoV-19/Singapore/412/2020 | EPI\_ISL\_475943 | 5/18/2020 |
| 530 | hCoV-19/Singapore/413/2020 | EPI\_ISL\_475944 | 4/21/2020 |
| 531 | hCoV-19/Singapore/416/2020 | EPI\_ISL\_475947 | 4/21/2020 |
| 532 | hCoV-19/Singapore/417/2020 | EPI\_ISL\_475948 | 3/18/2020 |
| 533 | hCoV-19/Singapore/418/2020 | EPI\_ISL\_475949 | 3/18/2020 |
| 534 | hCoV-19/Singapore/419/2020 | EPI\_ISL\_475950 | 3/18/2020 |
| 535 | hCoV-19/Singapore/420/2020 | EPI\_ISL\_475951 | 4/9/2020 |
| 536 | hCoV-19/Singapore/422/2020 | EPI\_ISL\_475953 | 4/9/2020 |
| 537 | hCoV-19/Singapore/423/2020 | EPI\_ISL\_475954 | 3/14/2020 |
| 538 | hCoV-19/Singapore/424/2020 | EPI\_ISL\_475955 | 3/21/2020 |
| 539 | hCoV-19/Singapore/426/2020 | EPI\_ISL\_475957 | 3/20/2020 |
| 540 | hCoV-19/Singapore/427/2020 | EPI\_ISL\_475958 | 3/20/2020 |
| 541 | hCoV-19/Singapore/428/2020 | EPI\_ISL\_475959 | 3/20/2020 |
| 542 | hCoV-19/Singapore/429/2020 | EPI\_ISL\_475960 | 3/20/2020 |
| 543 | hCoV-19/Singapore/431/2020 | EPI\_ISL\_475962 | 3/17/2020 |
| 544 | hCoV-19/Singapore/432/2020 | EPI\_ISL\_475963 | 3/18/2020 |
| 545 | hCoV-19/Singapore/435/2020 | EPI\_ISL\_475966 | 3/13/2020 |
| 546 | hCoV-19/Singapore/436/2020 | EPI\_ISL\_475967 | 4/9/2020 |
| 547 | hCoV-19/Singapore/437/2020 | EPI\_ISL\_475968 | 3/20/2020 |
| 548 | hCoV-19/Singapore/438/2020 | EPI\_ISL\_475969 | 3/20/2020 |
| 549 | hCoV-19/Singapore/439/2020 | EPI\_ISL\_475970 | 3/24/2020 |
| 550 | hCoV-19/Singapore/440/2020 | EPI\_ISL\_475971 | 4/8/2020 |
| 551 | hCoV-19/Singapore/441/2020 | EPI\_ISL\_475972 | 4/8/2020 |
| 552 | hCoV-19/Singapore/442/2020 | EPI\_ISL\_475973 | 4/15/2020 |
| 553 | hCoV-19/Singapore/448/2020 | EPI\_ISL\_475979 | 4/15/2020 |
| 554 | hCoV-19/Singapore/450/2020 | EPI\_ISL\_475981 | 3/19/2020 |
| 555 | hCoV-19/Singapore/452/2020 | EPI\_ISL\_475983 | 3/19/2020 |
| 556 | hCoV-19/Singapore/454/2020 | EPI\_ISL\_475985 | 3/19/2020 |
| 557 | hCoV-19/Singapore/455/2020 | EPI\_ISL\_475986 | 3/19/2020 |
| 558 | hCoV-19/Singapore/459/2020 | EPI\_ISL\_475990 | 4/20/2020 |
| 559 | hCoV-19/Singapore/462/2020 | EPI\_ISL\_475993 | 4/27/2020 |
| 560 | hCoV-19/Singapore/466/2020 | EPI\_ISL\_475997 | 1/31/2020 |
| 561 | hCoV-19/Singapore/478/2020 | EPI\_ISL\_476814 | 3/13/2020 |
| 562 | hCoV-19/Singapore/455nan/2020 | EPI\_ISL\_476818 | 3/20/2020 |
| 563 | hCoV-19/Singapore/274nan/2020 | EPI\_ISL\_476819 | 3/22/2020 |
| 564 | hCoV-19/Singapore/527/2020 | EPI\_ISL\_479483 | 4/26/2020 |
| 565 | hCoV-19/Singapore/528/2020 | EPI\_ISL\_479484 | 4/27/2020 |
| 566 | hCoV-19/Singapore/529/2020 | EPI\_ISL\_479485 | 4/26/2020 |
| 567 | hCoV-19/Singapore/530/2020 | EPI\_ISL\_479486 | 4/26/2020 |
| 568 | hCoV-19/Singapore/531/2020 | EPI\_ISL\_479487 | 4/26/2020 |
| 569 | hCoV-19/Singapore/532/2020 | EPI\_ISL\_479488 | 4/26/2020 |
| 570 | hCoV-19/Singapore/533/2020 | EPI\_ISL\_479489 | 4/26/2020 |
| 571 | hCoV-19/Singapore/534/2020 | EPI\_ISL\_479490 | 4/27/2020 |
| 572 | hCoV-19/Singapore/535/2020 | EPI\_ISL\_479491 | 4/26/2020 |
| 573 | hCoV-19/Singapore/536/2020 | EPI\_ISL\_479492 | 4/26/2020 |
| 574 | hCoV-19/Singapore/498/2020 | EPI\_ISL\_479576 | 4/18/2020 |
| 575 | hCoV-19/Singapore/499/2020 | EPI\_ISL\_479577 | 4/17/2020 |
| 576 | hCoV-19/Singapore/500/2020 | EPI\_ISL\_479578 | 4/16/2020 |
| 577 | hCoV-19/Singapore/507/2020 | EPI\_ISL\_479585 | 5/15/2020 |
| 578 | hCoV-19/Singapore/508/2020 | EPI\_ISL\_479586 | 5/15/2020 |
| 579 | hCoV-19/Singapore/510/2020 | EPI\_ISL\_479588 | 5/22/2020 |
| 580 | hCoV-19/Singapore/511/2020 | EPI\_ISL\_479589 | 5/22/2020 |
| 581 | hCoV-19/Singapore/24nan/2020 | EPI\_ISL\_482672 | 3/3/2020 |
| 582 | hCoV-19/Singapore/372/2020 | EPI\_ISL\_482673 | 4/4/2020 |
| 583 | hCoV-19/Singapore/371/2020 | EPI\_ISL\_482674 | 4/6/2020 |
| 584 | hCoV-19/Singapore/370/2020 | EPI\_ISL\_482675 | 4/6/2020 |
| 585 | hCoV-19/Singapore/368nan/2020 | EPI\_ISL\_482676 | 4/5/2020 |
| 586 | hCoV-19/Singapore/367/2020 | EPI\_ISL\_482677 | 3/17/2020 |
| 587 | hCoV-19/Singapore/6nan/2020 | EPI\_ISL\_482680 | 2/9/2020 |
| 588 | hCoV-19/Singapore/544/2020 | EPI\_ISL\_482682 | 6/2/2020 |
| 589 | hCoV-19/Singapore/318/2020 | EPI\_ISL\_482683 | 6/2/2020 |
| 590 | hCoV-19/Singapore/316/2020 | EPI\_ISL\_482684 | 6/2/2020 |
| 591 | hCoV-19/Singapore/537/2020 | EPI\_ISL\_482685 | 6/2/2020 |
| 592 | hCoV-19/Singapore/538/2020 | EPI\_ISL\_482686 | 6/2/2020 |
| 593 | hCoV-19/Singapore/539/2020 | EPI\_ISL\_482687 | 6/2/2020 |
| 594 | hCoV-19/Singapore/540/2020 | EPI\_ISL\_482688 | 6/2/2020 |
| 595 | hCoV-19/Singapore/541/2020 | EPI\_ISL\_482689 | 6/2/2020 |
| 596 | hCoV-19/Singapore/542/2020 | EPI\_ISL\_482690 | 6/2/2020 |
| 597 | hCoV-19/Singapore/543/2020 | EPI\_ISL\_482691 | 6/2/2020 |
| 598 | hCoV-19/Singapore/545/2020 | EPI\_ISL\_482692 | 5/28/2020 |
| 599 | hCoV-19/Singapore/546/2020 | EPI\_ISL\_482693 | 5/27/2020 |
| 600 | hCoV-19/Singapore/547/2020 | EPI\_ISL\_482694 | 5/27/2020 |
| 601 | hCoV-19/Singapore/548/2020 | EPI\_ISL\_482695 | 5/27/2020 |
| 602 | hCoV-19/Singapore/549/2020 | EPI\_ISL\_482696 | 5/18/2020 |
| 603 | hCoV-19/Singapore/550/2020 | EPI\_ISL\_482697 | 5/18/2020 |
| 604 | hCoV-19/Singapore/551/2020 | EPI\_ISL\_482698 | 5/18/2020 |
| 605 | hCoV-19/Singapore/552/2020 | EPI\_ISL\_482699 | 6/6/2020 |
| 606 | hCoV-19/Singapore/557/2020 | EPI\_ISL\_483580 | 5/10/2020 |
| 607 | hCoV-19/Singapore/560/2020 | EPI\_ISL\_483583 | 4/11/2020 |
| 608 | hCoV-19/Singapore/564/2020 | EPI\_ISL\_483587 | 4/3/2020 |
| 609 | hCoV-19/Singapore/573/2020 | EPI\_ISL\_483596 | 4/15/2020 |
| 610 | hCoV-19/Singapore/574/2020 | EPI\_ISL\_483597 | 4/14/2020 |
| 611 | hCoV-19/Singapore/575/2020 | EPI\_ISL\_483598 | 5/19/2020 |
| 612 | hCoV-19/Singapore/602/2020 | EPI\_ISL\_490052 | 5/14/2020 |
| 613 | hCoV-19/Singapore/603/2020 | EPI\_ISL\_490053 | 6/29/2020 |
| 614 | hCoV-19/Singapore/610/2020 | EPI\_ISL\_490060 | 5/10/2020 |
| 615 | hCoV-19/Singapore/612/2020 | EPI\_ISL\_490062 | 5/10/2020 |
| 616 | hCoV-19/Singapore/613/2020 | EPI\_ISL\_490063 | 5/8/2020 |
| 617 | hCoV-19/Singapore/614/2020 | EPI\_ISL\_490064 | 5/9/2020 |
| 618 | hCoV-19/Singapore/615/2020 | EPI\_ISL\_490065 | 5/9/2020 |
| 619 | hCoV-19/Singapore/617/2020 | EPI\_ISL\_490067 | 5/8/2020 |
| 620 | hCoV-19/Singapore/618/2020 | EPI\_ISL\_490068 | 5/8/2020 |
| 621 | hCoV-19/Singapore/619/2020 | EPI\_ISL\_490069 | 5/10/2020 |
| 622 | hCoV-19/Singapore/622/2020 | EPI\_ISL\_490072 | 5/10/2020 |
| 623 | hCoV-19/Singapore/623/2020 | EPI\_ISL\_490073 | 5/10/2020 |
| 624 | hCoV-19/Singapore/625/2020 | EPI\_ISL\_490075 | 5/9/2020 |
| 625 | hCoV-19/Singapore/480/2020 | EPI\_ISL\_492978 | 3/15/2020 |
| 626 | hCoV-19/Singapore/484/2020 | EPI\_ISL\_492979 | 3/21/2020 |
| 627 | hCoV-19/Singapore/632/2020 | EPI\_ISL\_493392 | 4/15/2020 |
| 628 | hCoV-19/Singapore/635/2020 | EPI\_ISL\_493395 | 4/20/2020 |
| 629 | hCoV-19/Singapore/703/2020 | EPI\_ISL\_498601 | 6/9/2020 |
| 630 | hCoV-19/Singapore/704/2020 | EPI\_ISL\_498602 | 6/7/2020 |
| 631 | hCoV-19/Singapore/706/2020 | EPI\_ISL\_498604 | 6/13/2020 |
| 632 | hCoV-19/Singapore/707/2020 | EPI\_ISL\_498605 | 6/11/2020 |
| 633 | hCoV-19/Singapore/710/2020 | EPI\_ISL\_498608 | 7/17/2020 |
| 634 | hCoV-19/Singapore/711/2020 | EPI\_ISL\_498609 | 7/17/2020 |
| 635 | hCoV-19/Singapore/712/2020 | EPI\_ISL\_498610 | 7/17/2020 |
| 636 | hCoV-19/Singapore/715/2020 | EPI\_ISL\_498613 | 7/19/2020 |
| 637 | hCoV-19/Singapore/717/2020 | EPI\_ISL\_498615 | 7/20/2020 |
| 638 | hCoV-19/Singapore/718/2020 | EPI\_ISL\_498616 | 7/21/2020 |
| 639 | hCoV-19/Singapore/720/2020 | EPI\_ISL\_498618 | 7/22/2020 |
| 640 | hCoV-19/Singapore/31nan/2020 | EPI\_ISL\_507002 | 3/14/2020 |
| 641 | hCoV-19/Singapore/758/2020 | EPI\_ISL\_507003 | 3/14/2020 |
| 642 | hCoV-19/Singapore/759/2020 | EPI\_ISL\_507004 | 3/14/2020 |
| 643 | hCoV-19/Singapore/760/2020 | EPI\_ISL\_507005 | 4/26/2020 |
| 644 | hCoV-19/Singapore/761/2020 | EPI\_ISL\_507006 | 4/27/2020 |
| 645 | hCoV-19/Singapore/788/2020 | EPI\_ISL\_512824 | 4/6/2020 |
| 646 | hCoV-19/Singapore/789/2020 | EPI\_ISL\_512825 | 4/6/2020 |
| 647 | hCoV-19/Singapore/790/2020 | EPI\_ISL\_512826 | 4/8/2020 |
| 648 | hCoV-19/Singapore/796/2020 | EPI\_ISL\_512832 | 7/22/2020 |
| 649 | hCoV-19/Singapore/801/2020 | EPI\_ISL\_512837 | 7/25/2020 |
| 650 | hCoV-19/Singapore/802/2020 | EPI\_ISL\_512838 | 7/26/2020 |
| 651 | hCoV-19/Singapore/829/2020 | EPI\_ISL\_516801 | 3/10/2020 |
| 652 | hCoV-19/Singapore/830/2020 | EPI\_ISL\_516802 | 3/12/2020 |
| 653 | hCoV-19/Singapore/831/2020 | EPI\_ISL\_516803 | 3/22/2020 |
| 654 | hCoV-19/Singapore/832/2020 | EPI\_ISL\_516804 | 3/24/2020 |
| 655 | hCoV-19/Singapore/833/2020 | EPI\_ISL\_516805 | 3/25/2020 |
| 656 | hCoV-19/Singapore/814/2020 | EPI\_ISL\_516814 | 8/10/2020 |
| 657 | hCoV-19/Singapore/815/2020 | EPI\_ISL\_516815 | 8/11/2020 |
| 658 | hCoV-19/Singapore/816/2020 | EPI\_ISL\_516816 | 8/11/2020 |
| 659 | hCoV-19/Singapore/825/2020 | EPI\_ISL\_516825 | 8/11/2020 |
| 660 | hCoV-19/Singapore/826/2020 | EPI\_ISL\_516826 | 8/11/2020 |
| 661 | hCoV-19/Singapore/836/2020 | EPI\_ISL\_517999 | 6/16/2020 |
| 662 | hCoV-19/Singapore/837/2020 | EPI\_ISL\_518001 | 7/29/2020 |
| 663 | hCoV-19/Singapore/838/2020 | EPI\_ISL\_518002 | 7/26/2020 |
| 664 | hCoV-19/Singapore/839/2020 | EPI\_ISL\_518003 | 7/26/2020 |
| 665 | hCoV-19/Singapore/840/2020 | EPI\_ISL\_518004 | 7/22/2020 |
| 666 | hCoV-19/Singapore/841/2020 | EPI\_ISL\_518005 | 7/22/2020 |
| 667 | hCoV-19/Singapore/842/2020 | EPI\_ISL\_518006 | 7/19/2020 |
| 668 | hCoV-19/Singapore/843/2020 | EPI\_ISL\_518007 | 7/19/2020 |
| 669 | hCoV-19/Singapore/844/2020 | EPI\_ISL\_518008 | 7/18/2020 |
| 670 | hCoV-19/Singapore/845/2020 | EPI\_ISL\_518009 | 7/19/2020 |
| 671 | hCoV-19/Singapore/743/2020 | EPI\_ISL\_524445 | 7/4/2020 |
| 672 | hCoV-19/Singapore/740/2020 | EPI\_ISL\_524447 | 7/6/2020 |
| 673 | hCoV-19/Singapore/741/2020 | EPI\_ISL\_524448 | 7/6/2020 |
| 674 | hCoV-19/Singapore/786/2020 | EPI\_ISL\_524449 | 6/3/2020 |
| 675 | hCoV-19/Singapore/872/2020 | EPI\_ISL\_536413 | 5/26/2020 |
| 676 | hCoV-19/Singapore/877/2020 | EPI\_ISL\_536418 | 8/28/2020 |
| 677 | hCoV-19/Singapore/897/2020 | EPI\_ISL\_536438 | 9/6/2020 |
| 678 | hCoV-19/Singapore/899/2020 | EPI\_ISL\_536440 | 3/12/2020 |
| 679 | hCoV-19/Singapore/902/2020 | EPI\_ISL\_536443 | 8/28/2020 |
| 680 | hCoV-19/Singapore/903/2020 | EPI\_ISL\_536444 | 9/3/2020 |
| 681 | hCoV-19/Singapore/904/2020 | EPI\_ISL\_536445 | 9/3/2020 |
| 682 | hCoV-19/Singapore/905/2020 | EPI\_ISL\_536446 | 9/7/2020 |
| 683 | hCoV-19/Singapore/907/2020 | EPI\_ISL\_536448 | 4/12/2020 |
| 684 | hCoV-19/Singapore/36nan/2020 | EPI\_ISL\_538435 | 2/16/2020 |
| 685 | hCoV-19/Singapore/913/2020 | EPI\_ISL\_538436 | 2/20/2020 |
| 686 | hCoV-19/Singapore/46nan/2020 | EPI\_ISL\_538437 | 3/16/2020 |
| 687 | hCoV-19/Singapore/914/2020 | EPI\_ISL\_538438 | 3/16/2020 |
| 688 | hCoV-19/Singapore/915/2020 | EPI\_ISL\_538439 | 3/17/2020 |
| 689 | hCoV-19/Singapore/135nan/2020 | EPI\_ISL\_538440 | 3/18/2020 |
| 690 | hCoV-19/Singapore/173nan/2020 | EPI\_ISL\_538441 | 3/20/2020 |
| 691 | hCoV-19/Singapore/427nan/2020 | EPI\_ISL\_538442 | 3/20/2020 |
| 692 | hCoV-19/Singapore/916/2020 | EPI\_ISL\_538443 | 3/21/2020 |
| 693 | hCoV-19/Singapore/917/2020 | EPI\_ISL\_538444 | 3/24/2020 |
| 694 | hCoV-19/Singapore/918/2020 | EPI\_ISL\_538445 | 4/9/2020 |
| 695 | hCoV-19/Singapore/50nan/2020 | EPI\_ISL\_538446 | 3/6/2020 |
| 696 | hCoV-19/Singapore/148nan/2020 | EPI\_ISL\_538447 | 3/16/2020 |
| 697 | hCoV-19/Singapore/113nan/2020 | EPI\_ISL\_538448 | 3/17/2020 |
| 698 | hCoV-19/Singapore/129nan/2020 | EPI\_ISL\_538449 | 3/20/2020 |
| 699 | hCoV-19/Singapore/919/2020 | EPI\_ISL\_538450 | 3/21/2020 |
| 700 | hCoV-19/Singapore/920/2020 | EPI\_ISL\_538451 | 3/22/2020 |
| 701 | hCoV-19/Singapore/921/2020 | EPI\_ISL\_538452 | 3/23/2020 |
| 702 | hCoV-19/Singapore/922/2020 | EPI\_ISL\_538453 | 3/24/2020 |
| 703 | hCoV-19/Singapore/923/2020 | EPI\_ISL\_538454 | 3/24/2020 |
| 704 | hCoV-19/Singapore/924/2020 | EPI\_ISL\_538455 | 3/25/2020 |
| 705 | hCoV-19/Singapore/925/2020 | EPI\_ISL\_538456 | 3/25/2020 |
| 706 | hCoV-19/Singapore/323nan/2020 | EPI\_ISL\_538457 | 3/25/2020 |
| 707 | hCoV-19/Singapore/926/2020 | EPI\_ISL\_538458 | 3/26/2020 |
| 708 | hCoV-19/Singapore/927/2020 | EPI\_ISL\_538459 | 3/26/2020 |
| 709 | hCoV-19/Singapore/928/2020 | EPI\_ISL\_538460 | 3/28/2020 |
| 710 | hCoV-19/Singapore/929/2020 | EPI\_ISL\_538461 | 3/28/2020 |
| 711 | hCoV-19/Singapore/930/2020 | EPI\_ISL\_538462 | 3/29/2020 |
| 712 | hCoV-19/Singapore/931/2020 | EPI\_ISL\_538463 | 3/29/2020 |
| 713 | hCoV-19/Singapore/932/2020 | EPI\_ISL\_538464 | 3/29/2020 |
| 714 | hCoV-19/Singapore/933/2020 | EPI\_ISL\_538465 | 3/31/2020 |
| 715 | hCoV-19/Singapore/956/2020 | EPI\_ISL\_538490 | 4/7/2020 |
| 716 | hCoV-19/Singapore/957/2020 | EPI\_ISL\_538491 | 4/8/2020 |
| 717 | hCoV-19/Singapore/958/2020 | EPI\_ISL\_538492 | 4/8/2020 |
| 718 | hCoV-19/Singapore/959/2020 | EPI\_ISL\_538493 | 4/9/2020 |
| 719 | hCoV-19/Singapore/794nan/2020 | EPI\_ISL\_538494 | 4/9/2020 |
| 720 | hCoV-19/Singapore/960/2020 | EPI\_ISL\_538495 | 4/10/2020 |
| 721 | hCoV-19/Singapore/961/2020 | EPI\_ISL\_538496 | 4/10/2020 |
| 722 | hCoV-19/Singapore/962/2020 | EPI\_ISL\_538497 | 4/10/2020 |
| 723 | hCoV-19/Singapore/996/2020 | EPI\_ISL\_549004 | 3/23/2020 |
| 724 | hCoV-19/Singapore/997/2020 | EPI\_ISL\_549005 | 3/15/2020 |
| 725 | hCoV-19/Singapore/1019/2020 | EPI\_ISL\_574504 | 3/23/2020 |
| 726 | hCoV-19/Singapore/1023/2020 | EPI\_ISL\_574508 | 3/24/2020 |
| 727 | hCoV-19/Singapore/1030/2020 | EPI\_ISL\_574515 | 3/24/2020 |
| 728 | hCoV-19/Singapore/1031/2020 | EPI\_ISL\_574516 | 3/23/2020 |
| 729 | hCoV-19/Singapore/1035/2020 | EPI\_ISL\_574520 | 3/23/2020 |
| 730 | hCoV-19/Singapore/1036/2020 | EPI\_ISL\_574521 | 3/22/2020 |
| 731 | hCoV-19/Singapore/1037/2020 | EPI\_ISL\_574522 | 3/24/2020 |
| 732 | hCoV-19/Singapore/1038/2020 | EPI\_ISL\_574523 | 3/22/2020 |
| 733 | hCoV-19/Singapore/1044/2020 | EPI\_ISL\_574529 | 3/23/2020 |
| 734 | hCoV-19/Singapore/1047/2020 | EPI\_ISL\_574532 | 3/22/2020 |
| 735 | hCoV-19/Singapore/1049/2020 | EPI\_ISL\_574534 | 3/23/2020 |
| 736 | hCoV-19/Singapore/1050/2020 | EPI\_ISL\_574535 | 3/24/2020 |
| 737 | hCoV-19/Singapore/1051/2020 | EPI\_ISL\_574536 | 3/22/2020 |
| 738 | hCoV-19/Singapore/1052/2020 | EPI\_ISL\_574537 | 3/23/2020 |
| 739 | hCoV-19/Singapore/1053/2020 | EPI\_ISL\_574538 | 3/23/2020 |
| 740 | hCoV-19/Singapore/1054/2020 | EPI\_ISL\_574539 | 3/24/2020 |
| 741 | hCoV-19/Singapore/1055/2020 | EPI\_ISL\_574540 | 3/24/2020 |
| 742 | hCoV-19/Singapore/73/2020 | EPI\_ISL\_435678 | 3/25/2020 |
| 743 | hCoV-19/Singapore/78/2020 | EPI\_ISL\_435683 | 4/9/2020 |
| 744 | hCoV-19/Singapore/79/2020 | EPI\_ISL\_435684 | 4/11/2020 |
| 745 | hCoV-19/Singapore/80/2020 | EPI\_ISL\_435685 | 4/11/2020 |
| 746 | hCoV-19/Singapore/81/2020 | EPI\_ISL\_435686 | 4/13/2020 |
| 747 | hCoV-19/Singapore/82/2020 | EPI\_ISL\_435687 | 4/14/2020 |
| 748 | hCoV-19/Singapore/83/2020 | EPI\_ISL\_435688 | 4/16/2020 |
| 749 | hCoV-19/Singapore/84/2020 | EPI\_ISL\_435689 | 4/18/2020 |
| 750 | hCoV-19/Singapore/855/2020 | EPI\_ISL\_527364 | 8/17/2020 |
| 751 | hCoV-19/Singapore/856/2020 | EPI\_ISL\_527365 | 8/17/2020 |
| 752 | hCoV-19/Singapore/858/2020 | EPI\_ISL\_527367 | 8/17/2020 |
| 753 | hCoV-19/Singapore/859/2020 | EPI\_ISL\_527368 | 8/17/2020 |
| 754 | hCoV-19/Singapore/862/2020 | EPI\_ISL\_527371 | 4/12/2020 |
| 755 | hCoV-19/Singapore/864/2020 | EPI\_ISL\_527373 | 8/20/2020 |
| 756 | hCoV-19/Singapore/867/2020 | EPI\_ISL\_527376 | 4/26/2020 |
| 757 | hCoV-19/Singapore/868/2020 | EPI\_ISL\_527377 | 4/23/2020 |
| 758 | hCoV-19/Singapore/934/2020 | EPI\_ISL\_538466 | 3/31/2020 |
| 759 | hCoV-19/Singapore/217nan/2020 | EPI\_ISL\_538467 | 4/1/2020 |
| 760 | hCoV-19/Singapore/935/2020 | EPI\_ISL\_538468 | 4/1/2020 |
| 761 | hCoV-19/Singapore/936/2020 | EPI\_ISL\_538469 | 4/2/2020 |
| 762 | hCoV-19/Singapore/937/2020 | EPI\_ISL\_538470 | 4/2/2020 |
| 763 | hCoV-19/Singapore/564nan/2020 | EPI\_ISL\_538471 | 4/2/2020 |
| 764 | hCoV-19/Singapore/938/2020 | EPI\_ISL\_538472 | 4/2/2020 |
| 765 | hCoV-19/Singapore/939/2020 | EPI\_ISL\_538473 | 4/3/2020 |
| 766 | hCoV-19/Singapore/940/2020 | EPI\_ISL\_538474 | 4/3/2020 |
| 767 | hCoV-19/Singapore/941/2020 | EPI\_ISL\_538475 | 4/4/2020 |
| 768 | hCoV-19/Singapore/942/2020 | EPI\_ISL\_538476 | 4/4/2020 |
| 769 | hCoV-19/Singapore/943/2020 | EPI\_ISL\_538477 | 4/4/2020 |
| 770 | hCoV-19/Singapore/944/2020 | EPI\_ISL\_538478 | 4/5/2020 |
| 771 | hCoV-19/Singapore/945/2020 | EPI\_ISL\_538479 | 4/5/2020 |
| 772 | hCoV-19/Singapore/946/2020 | EPI\_ISL\_538480 | 4/6/2020 |
| 773 | hCoV-19/Singapore/947/2020 | EPI\_ISL\_538481 | 4/6/2020 |
| 774 | hCoV-19/Singapore/948/2020 | EPI\_ISL\_538482 | 4/6/2020 |
| 775 | hCoV-19/Singapore/949/2020 | EPI\_ISL\_538483 | 4/6/2020 |
| 776 | hCoV-19/Singapore/950/2020 | EPI\_ISL\_538484 | 4/6/2020 |
| 777 | hCoV-19/Singapore/951/2020 | EPI\_ISL\_538485 | 4/7/2020 |
| 778 | hCoV-19/Singapore/952/2020 | EPI\_ISL\_538486 | 4/7/2020 |
| 779 | hCoV-19/Singapore/953/2020 | EPI\_ISL\_538487 | 4/7/2020 |
| 780 | hCoV-19/Singapore/954/2020 | EPI\_ISL\_538488 | 4/7/2020 |
| 781 | hCoV-19/Singapore/955/2020 | EPI\_ISL\_538489 | 4/7/2020 |
| 782 | hCoV-19/Singapore/1041/2020 | EPI\_ISL\_574526 | 3/22/2020 |
| 783 | hCoV-19/Singapore/1042/2020 | EPI\_ISL\_574527 | 3/22/2020 |
| 784 | hCoV-19/Singapore/1043/2020 | EPI\_ISL\_574528 | 3/24/2020 |
| 785 | hCoV-19/Philippines/PGC03/2020 | EPI\_ISL\_434555 | 3/26/2020 |
| 786 | hCoV-19/Philippines/PGC06/2020 | EPI\_ISL\_434558 | 3/28/2020 |
| 787 | hCoV-19/Myanmar/NIH-4385/2020 | EPI\_ISL\_434709 | 2020 |
| 788 | hCoV-19/Myanmar/MMC\_137/2020 | EPI\_ISL\_512844 | 4/22/2020 |
| 789 | hCoV-19/Vietnam/39607/2020 | EPI\_ISL\_416428 | 3/7/2020 |
| 790 | hCoV-19/Vietnam/CM295/2020 | EPI\_ISL\_416430 | 3/6/2020 |
| 791 | hCoV-19/Vietnam/VNHN\_022/2020 | EPI\_ISL\_435303 | 3/7/2020 |
| 792 | hCoV-19/Vietnam/VNHN\_026/2020 | EPI\_ISL\_435305 | 3/7/2020 |
| 793 | hCoV-19/Vietnam/VNHN\_0299/2020 | EPI\_ISL\_435308 | 3/9/2020 |
| 794 | hCoV-19/Vietnam/VNHN\_0300/2020 | EPI\_ISL\_435310 | 3/9/2020 |
| 795 | hCoV-19/Vietnam/VNHN\_0418/2020 | EPI\_ISL\_435311 | 3/10/2020 |
| 796 | hCoV-19/Vietnam/VNHN\_0419/2020 | EPI\_ISL\_435312 | 3/10/2020 |
| 797 | hCoV-19/Vietnam/VNHN\_0764/2020 | EPI\_ISL\_435314 | 3/13/2020 |
| 798 | hCoV-19/Vietnam/VNHN\_0837/2020 | EPI\_ISL\_435315 | 3/15/2020 |
| 799 | hCoV-19/Vietnam/VNHN\_0985/2020 | EPI\_ISL\_435316 | 3/17/2020 |
| 800 | hCoV-19/Vietnam/VNHN\_01097/2020 | EPI\_ISL\_435317 | 3/18/2020 |
| 801 | hCoV-19/Vietnam/IBT-14Mar/2020 | EPI\_ISL\_448222 | 3/15/2020 |
| 802 | hCoV-19/Vietnam/VNHN\_1098/2020 | EPI\_ISL\_455694 | 3/18/2020 |
| 803 | hCoV-19/Vietnam/VNHN\_1099/2020 | EPI\_ISL\_455695 | 3/18/2020 |
| 804 | hCoV-19/Vietnam/VNHN\_1167/2020 | EPI\_ISL\_455696 | 3/18/2020 |
| 805 | hCoV-19/Vietnam/VNHN\_1528/2020 | EPI\_ISL\_455697 | 3/22/2020 |
| 806 | hCoV-19/Vietnam/VNHN\_1226/2020 | EPI\_ISL\_455698 | 3/19/2020 |
| 807 | hCoV-19/Vietnam/VNHN\_1492/2020 | EPI\_ISL\_455699 | 3/21/2020 |
| 808 | hCoV-19/Vietnam/VNHN\_2406/2020 | EPI\_ISL\_455700 | 3/25/2020 |
| 809 | hCoV-19/Vietnam/VNHN\_1713/2020 | EPI\_ISL\_455701 | 3/23/2020 |
| 810 | hCoV-19/Vietnam/VNHN\_3096/2020 | EPI\_ISL\_455702 | 3/27/2020 |
| 811 | hCoV-19/Vietnam/VNHN\_3085/2020 | EPI\_ISL\_455703 | 3/27/2020 |
| 812 | hCoV-19/Vietnam/VNHN\_3916/2020 | EPI\_ISL\_455704 | 3/31/2020 |
| 813 | hCoV-19/Vietnam/VNHN\_3913/2020 | EPI\_ISL\_455705 | 3/31/2020 |
| 814 | hCoV-19/Vietnam/VNHN\_3629/2020 | EPI\_ISL\_455706 | 3/30/2020 |
| 815 | hCoV-19/Vietnam/VNHN\_4189/2020 | EPI\_ISL\_455707 | 4/2/2020 |
| 816 | hCoV-19/Vietnam/VNHN\_4864/2020 | EPI\_ISL\_455708 | 4/10/2020 |
| 817 | hCoV-19/Vietnam/VNHN\_4851/2020 | EPI\_ISL\_455709 | 4/9/2020 |
| 818 | hCoV-19/Vietnam/VNHN\_4868/2020 | EPI\_ISL\_455710 | 4/9/2020 |
| 819 | hCoV-19/Vietnam/VNHN\_4806/2020 | EPI\_ISL\_455711 | 4/8/2020 |
| 820 | hCoV-19/Vietnam/VNHN\_4875/2020 | EPI\_ISL\_455712 | 4/10/2020 |
| 821 | hCoV-19/Vietnam/VNHN\_301/2020 | EPI\_ISL\_455714 | 3/9/2020 |
| 822 | hCoV-19/Vietnam/VNHN\_4958/2020 | EPI\_ISL\_455718 | 4/10/2020 |
| 823 | hCoV-19/Vietnam/IBT-NIHE-16/2020 | EPI\_ISL\_479758 | 3/28/2020 |
| 824 | hCoV-19/Vietnam/HCMC-05006/2020 | EPI\_ISL\_498177 | 3/23/2020 |
| 825 | hCoV-19/Vietnam/VNHN\_0207/2020 | EPI\_ISL\_511891 | 3/8/2020 |
| 826 | hCoV-19/Vietnam/VNHN\_0897/2020 | EPI\_ISL\_511894 | 3/16/2020 |
| 827 | hCoV-19/Vietnam/VNHN\_0899/2020 | EPI\_ISL\_511895 | 3/16/2020 |
| 828 | hCoV-19/Vietnam/VNHN\_1166/2020 | EPI\_ISL\_511896 | 3/18/2020 |
| 829 | hCoV-19/Vietnam/VNHN\_1863/2020 | EPI\_ISL\_511897 | 3/23/2020 |
| 830 | hCoV-19/Vietnam/VNHN\_5152/2020 | EPI\_ISL\_511898 | 4/14/2020 |
| 831 | hCoV-19/Timor-Leste/TL26/2020 | EPI\_ISL\_456596 | 2020 |
| 832 | hCoV-19/Timor-Leste/TL05/2020 | EPI\_ISL\_456597 | 4/11/2020 |
| 833 | hCoV-19/Timor-Leste/TL25/2020 | EPI\_ISL\_456600 | 3/30/2020 |
| 834 | hCoV-19/Timor-Leste/TL07/2020 | EPI\_ISL\_456606 | 4/11/2020 |
| 835 | hCoV-19/Timor-Leste/TL21/2020 | EPI\_ISL\_456607 | 4/14/2020 |
| 836 | hCoV-19/Timor-Leste/TL18/2020 | EPI\_ISL\_456608 | 4/12/2020 |
| 837 | hCoV-19/Timor-Leste/TL23/2020 | EPI\_ISL\_456611 | 4/18/2020 |
| 838 | hCoV-19/Cambodia/0012/2020 | EPI\_ISL\_411902 | 1/27/2020 |

**Supplementary Table 2.** Consensus sequence of Spike and Nucleocapsid

|  |  |  |
| --- | --- | --- |
| **Protein Description** | **Length** | **Consensus Sequence** |
| Nukleocapsid | 420 aa | MSDNGPQNQRNAxRITFGGPSDSTGSNQNGERSGARSKQRRPQGLPNNTASWFTALTQHG  KEDLKFPRGQGVPINTNSSPDDQIGYYRRATRRIRGGDGKMKDLSPRWYFYYLGTGPEAG  LPYGANKDGIIWVATEGALNTPKDHIGTRNPANNAAIVLQLPQGTTLPKGFYAEGSRGGS  QASSRSSSRSRNSSRNSTPGSSRGTSPARMAGNGGDAALALLLLDRLNQLESKMSGKGQQ  QQGQTVTKKSAAEASKKPRQKRTATKAYNVTQAFGRRGPEQTQGNFGDQELIRQGTDYKH  WPQIAQFAPSASAFFGMSRIGMEVTPSGTWLTYTGAIKLDDKDPNFKDQVILLNKHIDAY  KTFPPTEPKKDKKKKADETQALPQRQKKQQTVTLLPAADLDDFSKQLQQSMSSADSTQA\* |
| Spike | 1274 aa | MFVFLVLLPLVSSQCVNLTTRTQLPPAYTNSFTRGVYYPDKVFRSSVLHSTQDLFLPFFS  NVTWFHAIHVSGTNGTKRFDNPVLPFNDGVYFASTEKSNIIRGWIFGTTLDSKTQSLLIV  NNATNVVIKVCEFQFCNDPFLGVYYHKNNKSWMESEFRVYSSANNCTFEYVSQPFLMDLE  GKQGNFKNLREFVFKNIDGYFKIYSKHTPINLVRDLPQGFSALEPLVDLPIGINITRFQT  LLALHRSYLTPGDSSSGWTAGAAAYYVGYLQPRTFLLKYNENGTITDAVDCALDPLSETK  CTLKSFTVEKGIYQTSNFRVQPTESIVRFPNITNLCPFGEVFNATRFASVYAWNRKRISN  CVADYSVLYNSASFSTFKCYGVSPTKLNDLCFTNVYADSFVIRGDEVRQIAPGQTGKIAD  YNYKLPDDFTGCVIAWNSNNLDSKVGGNYNYLYRLFRKSNLKPFERDISTEIYQAGSTPC  NGVEGFNCYFPLQSYGFQPTNGVGYQPYRVVVLSFELLHAPATVCGPKKSTNLVKNKCVN  FNFNGLTGTGVLTESNKKFLPFQQFGRDIADTTDAVRDPQTLEILDITPCSFGGVSVITP  GTNTSNQVAVLYQDVNCTEVPVAIHADQLTPTWRVYSTGSNVFQTRAGCLIGAEHVNNSY  ECDIPIGAGICASYQTQTNSPRRARSVASQSIIAYTMSLGAENSVAYSNNSIAIPTNFTI  SVTTEILPVSMTKTSVDCTMYICGDSTECSNLLLQYGSFCTQLNRALTGIAVEQDKNTQE  VFAQVKQIYKTPPIKDFGGFNFSQILPDPSKPSKRSFIEDLLFNKVTLADAGFIKQYGDC  LGDIAARDLICAQKFNGLTVLPPLLTDEMIAQYTSALLAGTITSGWTFGAGAALQIPFAM  QMAYRFNGIGVTQNVLYENQKLIANQFNSAIGKIQDSLSSTASALGKLQDVVNQNAQALN  TLVKQLSSNFGAISSVLNDILSRLDKVEAEVQIDRLITGRLQSLQTYVTQQLIRAAEIRA  SANLAATKMSECVLGQSKRVDFCGKGYHLMSFPQSAPHGVVFLHVTYVPAQEKNFTTAPA  ICHDGKAHFPREGVFVSNGTHWFVTQRNFYEPQIITTDNTFVSGNCDVVIGIVNNTVYDP  LQPELDSFKEELDKYFKNHTSPDVDLGDISGINASVVNIQKEIDRLNEVAKNLNESLIDL  QELGKYEQYIKWPWYIWLGFIAGLIAIVMVTIMLCCMTSCCSCLKGCCSCGSCCKFDEDD  SEPVLKGVKLHYT\* |

**Supplementary Table 3.** Characteristics of selected B-cell epitope

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Protein Regiona | B-cell Epitope | Antigenicity Score | Physicochemical Properties | | Interaction with HLA class II | |
| Hydrophobicity (GRAVY score) | *Half-life*b  (hours) | HLA IIc | *Core peptide* |
| N-terminal domain (NTD) of S1 subunit Spike of SARS-CoV and similar betacorona-virus lineage B | 70VSGTNGTKRFDNPVLP85 | 1.0718 | -0.631 | 100 | DRB1\_0301 | VSGTNGTKR |
| DRB1\_0301 | KRFDNPVLP |
| DRB1\_1001 | TKRFDNPVL |
| DRB1\_1302 | KRFDNPVLP |
| The middle portion of the Nucleocapsid | 91TRRIRGGDGKMKDLSP106 | 1.3552 | -1.4 | 7.2 | HLA-DQA10501-DQB10301 | IRGGDGKMK |
| 114GTGPEAGLPYGANKDG129 | 1.0381 | -0.887 | 30 | HLA-DQA10501-DQB10301 | PEAGLPYGA |
| HLA-DQA10301-DQB10301 | PEAGLPYGA |
| 32RSGARSKQRRPQGLPN47 | 1.2967 | -2.025 | 1 | DRB1\_1301 | SGARSKQRR |
| DRB1\_1301 | ARSKQRRPQ |
| 169KGFYAEGSRGGSQASS184 | 1.0419 | -0.944 | 1.3 | DRB1\_1101 | FYAEGSRGG |
| HLA-DQA10201-DQB10301 | SRGGSQASS |
| HLA-DQA10201-DQB10301 | EGSRGGSQA |
| HLA-DQA10301-DQB10301 | GSRGGSQAS |
| HLA-DQA10301-DQB10301 | SRGGSQASS |
| HLA-DQA10501-DQB10301 | FYAEGSRGG |
| HLA-DQA10501-DQB10301 | AEGSRGGSQ |
| HLA-DQA10501-DQB10301 | GSRGGSQAS |
| HLA-DQA10501-DQB10301 | SRGGSQASS |
| 200GSSRGTSPARMAGNGG215 | 1.3170 | -0.856 | 30 | HLA-DQA10102-DQB10602 | RGTSPARMA |
| HLA-DQA10201-DQB10301 | GSSRGTSPA |
| HLA-DQA10201-DQB10301 | SSRGTSPAR |
| HLA-DQA10201-DQB10301 | SRGTSPARM |
| HLA-DQA10201-DQB10301 | RGTSPARMA |
| HLA-DQA10201-DQB10303 | SRGTSPARM |
| HLA-DQA10201-DQB10303 | RGTSPARMA |
| HLA-DQA10201-DQB10303 | TSPARMAGN |
| HLA-DQA10201-DQB10402 | SSRGTSPAR |
| HLA-DQA10201-DQB10402 | RGTSPARMA |
| 192NSSRNSTPGSSRGTSP207 | 1.0778 | -1.637 | 1.4 | HLA-DQA10201-DQB10301 | STPGSSRGT |
| HLA-DQA10201-DQB10301 | TPGSSRGTS |
| HLA-DQA10201-DQB10301 | PGSSRGTSP |
| HLA-DQA10201-DQB10402 | STPGSSRGT |
| HLA-DQA10501-DQB10301 | SRNSTPGSS |
| HLA-DQA10501-DQB10301 | STPGSSRGT |
| HLA-DQA10501-DQB10303 | PGSSRGTSP |

a Protein region was defined based on the alignment of consensus protein with the annotated reference sequence of Spike protein [No. ref: YP\_009724390.1) and Nucleocapsid (No. ref: YP\_009724397.2)

b Half-life in mammalian cell

c HLA class II alleles that were detected to be able to recognize the peptide sequence with 9-mer in size containing in the B-cell epitope (it was alco called by overlapped HTL epitope with B-cell epitope)

**Supplementary Table 4.** HLA class I and II alleles of Indonesia population (used for the T-cell epitope prediction)

|  |  |
| --- | --- |
| **HLA class** | **HLA allele** |
| HLA class I | HLA-A01:01,HLA-A02:01,HLA-A02:03,HLA-A02:06,HLA-A02:11,HLA-A03:01,HLA-A11:01,HLA-A11:04,HLA-A24:02,HLA-A24:07,HLA-A24:10,HLA-A26:01,HLA-A29:01,HLA-A30:01,HLA-A32:01,HLA-A33:03,HLA-A34:01,HLA-A74:01,HLA-B07:02,  HLA-B07:05,HLA-B08:01,HLA-B13:01,HLA-B13:02,HLA-B15:01,HLA-B15:02,HLA-B15:10,HLA-B15:12,HLA-B15:13,HLA-B15:17,HLA-B15:21,HLA-B15:25,HLA-B15:32,HLA-B18:01,HLA-B18:02,HLA-B27:06,HLA-B35:01,HLA-B35:02,HLA-B35:03  HLA-B35:05,HLA-B35:30,HLA-B37:01,HLA-B38:02,HLA-B39:15,HLA-B40:01,HLA-B40:02,HLA-B40:06,HLA-B41:01,HLA-B44:03,HLA-B48:01,HLA-B51:01,HLA-B51:02,HLA-B52:01,HLA-B56:01,HLA-B57:01,HLA-B58:01 |
| HLA class II | DRB1\_0101,DRB1\_0301,DRB1\_0402,DRB1\_0403,DRB1\_0404,DRB1\_0405,DRB1\_0701,  DRB1\_0802,DRB1\_0901,DRB1\_1001,DRB1\_1101,DRB1\_1201,DRB1\_1301,DRB1\_1302,  DRB1\_1501,DRB1\_1602,HLA-DQA10101-DQB10501,HLA-DQA10102-DQB10501,  HLA-DQA10102-DQB10502, HLA-DQA10102-DQB10602,HLA-DQA10103-DQB10603,HLA-DQA10201-DQB10301,HLA-DQA10201-DQB10303,  HLA-DQA10201-DQB10402,HLA-DQA10301-DQB10301,HLA-DQA10301-DQB10302,HLA-DQA10501-DQB10201,HLA-DQA10501-DQB10301,HLA-DQA10501-DQB10302,HLA-DQA10501-DQB10303 |

**Supplementary Table 5.** Characteristics of selected T-cell epitope

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Protein Regiona | T-cell epitope | HLA alleleb | | Antigenicity Score | Physicochemical Properties | | Population coverage |
| HLA Class I | HLA  Class II | Hydrophobicity (GRAVY Score) | Half lifec (hours) |
| N-terminal domain (NTD) of S1 subunit Spike of SARS-CoV and similar betacorona-virus lineage B | 36VYYPDKVFR44 | HLA-A\*33:03 | DRB1\_0301 | 0.8863 | -0.544 | 100 | 33.01% |
| Unknown until the RBD of S1 Subunit Spike of SARS-CoV-2 | 312IYQTSNFRV320 | * HLA-A\*24:02 * HLA-A\*24:07 * HLA-A\*24:10 | * DRB1\_0701 * DRB1\_0901 * DRB1\_1302 * DRB1\_1602 | 1.0766 | -0.311 | 20 | 72.72% |
| RBD of S1 subunit Spike of SARS-CoV-2 | 454RLFRKSNLK462 | * HLA-A\*03:01 * HLA-A\*11:01 * HLA-A\*11:04 * HLA-A\*30:01 * HLA-A\*74:01 | DRB1\_1301 | 1.4188 | -1.189 | 1 | 37.18% |
| 456FRKSNLKPF464 | * HLA-B\*08:01 * HLA-B\*27:06 | DRB1\_0701 | 0.8958 | -0.978 | 1.1 | 25.44% |

a Protein region was defined based on the alignment of consensus protein with the annotated reference sequence of Spike protein [No. ref: YP\_009724390.1) and Nucleocapsid (No. ref: YP\_009724397.2)

b HLA alleles that were detected to be able to recognize the corresponding epitopes

c Half-life in mammalian cell

**Supplementary Table 6.** Docking evaluation of selected T-cell epitope with the representative of HLA Class I and II allele

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Protein | T-cell epitope | Docking with HLA-A\*24:02 (PDB ID: 3WLB) | | Docking with HLA-DRB1\*04:05  (PDB ID: 6BIR) | |
| RMSD (Å) | ΔG (kcal/mol) | RMSD (Å) | ΔG (kcal/mol) |
| Spike | 36VYYPDKVFR44 | 1.9 ± 0.0 | -8.4 | 0.6 ± 0.4 | -8.4 |
| 312IYQTSNFRV320 | 0.3 ± 0.2 | -10.9 | 0.4 ± 0.3 | -10.4 |
| 454RLFRKSNLK462 | 0.4 ± 0.2 | -9.2 | 0.5 ± 0.3 | -8.1 |
| 456FRKSNLKPF464 | 1.8 ± 0.0 | -8.6 | 1.2 ± 0.1 | -7.8 |

**Supplementary Table 7.** Docking evaluation of HTL epitope in B-cell epitope with the representative of HLA Class II allele

|  |  |  |  |
| --- | --- | --- | --- |
| Protein | B-cell epitopea | Docking with HLA-DRB1\*04:05 (PDB ID: 6BIR) | |
| RMSD (Å) | ΔG (kcal/mol) |
| Spike | 70VSGTNGT***KRFDNPVLP***85 | 5.5 ± 0.1 | -8.1 |
| Nucleocapsid | 91TRR***IRGGDGKMK***DLSP106 | 0.6 ± 0.3 | -7.5 |
| 114GTG***PEAGLPYGA***NKDG129 | 4.8 ± 0.1 | -8.2 |
| 32R***SGARSKQRR***PQGLPN47 | 2.1 ± 0.1 | -10.1 |
| 169KGFYAEG***SRGGSQASS***184 | 0.4 ± 0.2 | -9.7 |
| 200GSS***RGTSPARMA***GNGG215 | 0.7 ± 0.4 | -8.4 |
| 192NSSRN***STPGSSRGT***SP207 | 1.3 ± 0.1 | -9.8 |

a The bold and italic peptide sequences were the core peptide that was detected to be recognized by HLA class II

**Supplementary Table 8.** Docking parameter of the docked complex between selected T-cell epitope and HLA class I and II alleles

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **HLA Allele** | **Sequence** | **HADDOCK Score** | **Cluster size** | **RMSD from the overall lowest-energy (Å)** | **Van der Waals energy** | **Electrostatic energy** | **Desolvation energy** | **Restraints violation energy** | **Buried Surface Area** | **Z-Score** |
| HLA-A\*24:02  (PDB ID: 3WLB) | 36VYYPDKVFR44 | -40.4 ± 3.1 | 26 | 1.9 ± 0.0 | -54.3 ± 5.5 | -66.1 ± 16.2 | -31.1 ± 2.0 | 582.4 ± 85.5 | 1389.7 ± 45.9 | -1.9 |
| 312IYQTSNFRV320 | -27.5 ± 8.2 | 14 | 0.3 ± 0.2 | -55.6 ± 5.9 | -114.6 ± 23.4 | -5.1 ± 2.6 | 561.6 ± 96.6 | 1287.6 ± 46.2 | -2.2 |
| 454RLFRKSNLK462 | -41.2 ± 7.3 | 13 | 0.4 ± 0.2 | -49.4 ± 1.8 | -169.0 ± 28.2 | -15.2 ± 1.6 | 572.3 ± 80.4 | 1458.8 ± 59.6 | -2.3 |
| 456FRKSNLKPF464 | -51.6 ± 0.5 | 50 | 1.8 ± 0.0 | -57.2 ± 3.0 | -88.2 ± 8.5 | -37.2 ± 2.9 | 604.9 ± 41.3 | 1424.9 ± 56.9 | -2 |
| HLA kelas II (PDB ID: 6BIR) | 36VYYPDKVFR44 | -24.3 ± 6.8 | 11 | 2.1 ± 0.0 | -53.3 ± 4.4 | -58.6 ± 4.8 | -32.2 ± 3.1 | 729.4 ± 74.1 | 1332.9 ± 45.2 | -1.7 |
| 312IYQTSNFRV320 | -11.5 ± 2.5 | 26 | 2.0 ± 0.0 | -45.9 ± 2.3 | -92.8 ± 23.6 | -17.5 ± 1.9 | 703.9 ± 35.9 | 1296.8 ± 58.1 | -1.2 |
| 454RLFRKSNLK462 | -13.1 ± 1.7 | 109 | 2.0 ± 0.1 | -44.1 ± 5.3 | -104.3 ± 4.9 | -16.9 ± 3.7 | 688.0 ± 32.9 | 1324.0 ± 45.5 | -1.2 |
| 456FRKSNLKPF464 | -32.0 ± 4.3 | 50 | 0.5 ± 0.3 | -58.3 ± 5.6 | -89.2 ± 23.2 | -29.1 ± 1.7 | 732.8 ± 50.7 | 1494.9 ± 34.4 | -2.3 |

**Supplementary Table 9.** Docking parameter of the complex between HTL-epitope contained in B-cell epitope with HLA class II alleles

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Protein region** | **B-cell epitope sequence** | **HTL epitope Sequence** | **HADDOCK Score** | **Cluster size** | **RMSD from the overall lowest-energy structure(Å)** | **Van der Waals energy** | **Electrostatic energy** | **Desolvation energy** | **Restraints violation energy** | **Buried Surface Area** | **Z-Score** |
| Spike | 70VSGTNGTKRFDNPVLP85 | KRFDNPVLP | -15.1 ± 6.4 | 48 | 2.1 ± 0.0 | -48.7 ± 5.8 | -76.2 ± 12.4 | -17.4 ± 3.1 | 661.4 ± 90.2 | 1257.9 ± 29.1 | -2.1 |
| Nucleocapsid | 91TRRIRGGDGKMKDLSP106 | IRGGDGKMK | 6.9 ± 8.2 | 58 | 0.8 ± 0.5 | -35.5 ± 6.6 | -108.0 ± 13.0 | -5.9 ± 0.9 | 698.9 ± 34.5 | 1111.2 ± 20.2 | -1.8 |
| 114GTGPEAGLPYGANKDG129 | PEAGLPYGA | -0.7 ± 10.2 | 25 | 1.7 ± 0.1 | -40.9 ± 4.5 | -93.9 ± 7.0 | -22.6 ± 3.1 | 815.7 ± 62.8 | 1011.5 ± 44.8 | -2.3 |
| 32RSGARSKQRRPQGLPN47 | SGARSKQRR | -6.7 ± 8.0 | 49 | 1.9 ± 0.0 | -44.8 ± 7.8 | -126.6 ± 18.4 | 2.6 ± 1.3 | 608.7 ± 87.0 | 1226.8 ± 99.4 | -1.9 |
| 169KGFYAEGSRGGSQASS184 | SRGGSQASS | 16.8 ± 2.2 | 97 | 1.2 ± 0.2 | -34.9 ± 1.6 | -55.3 ± 14.7 | -2.6 ± 0.7 | 652.9 ± 15.9 | 976.3 ± 33.8 | -1.5 |
| 200GSSRGTSPARMAGNGG215 | RGTSPARMA | 3.0 ± 15.6 | 14 | 1.0 ± 0.6 | -45.0 ± 4.7 | -62.7 ± 13.0 | -9.7 ± 2.9 | 702.3 ± 192.8 | 1188.0 ± 63.7 | -1.8 |
| 192NSSRNSTPGSSRGTSP207 | STPGSSRGT | 11.0 ± 2.3 | 98 | 1.9 ± 0.0 | -44.4 ± 2.4 | -25.6 ± 2.9 | -13.3 ± 1.4 | 737.8 ± 28.6 | 1107.5 ± 22.9 | -1.4 |

**Supplementary Table 10.** The same residue of HLA-DRB1\*04:05 (PDB ID: 6BIR) that was used for the interaction with each B-cell epitope and the ligand control

|  |  |  |  |
| --- | --- | --- | --- |
| HTL epitope contained in B-cell epitope sequencea | Receptor | The residue (s) of the receptorb | |
| Hydrogen bondc | Non-bonded contactd |
| 77KRFDNPVLP85 | HLA-DRB1\*04:05 | Glu11 | Gln9, Glu11 |
| 94IRGGDGKMK102 | HLA-DRB1\*04:05 | Glu11, Asn62 | Glu11, Asn62, Asp66, Asn69 |
| 116PEAGLPYGA124 | HLA-DRB1\*04:05 | Glu11 | Gln9, Glu11, Asp66 |
| 33SGARSKQRR41 | HLA-DRB1\*04:05 | Glu11 | Gln9, Glu11, Asp66 |
| 176SRGGSQASS184 | HLA-DRB1\*04:05 | Gln9, Asn69 | Gln9, Glu11, Asp66, Asn69 |
| 203RGTSPARMA211 | HLA-DRB1\*04:05 | Glu11 | Glu11, Asp66, Asn69 |
| 197STPGSSRGT205 | HLA-DRB1\*04:05 | Glu11 | Glu11, Asp66, Asn69 |

a Predicted the core peptide interaction with HLA-DRB1\*04:05.

b Ligand control of HLA-DRB1\*04:05 is Citrullinated Vimentin 424cit419-431 protein

c Distance between Hydrogen and acceptor atom is < 2.7 Å, while the distance between donor and acceptor atom is <3.3 Å

d Non-bonded contact is the interaction between ligand (epitope) and receptor involving the C or S atom with a distance of ≤3.9Å

**Supplementary Table 11.** The same residue of HLA-A\*24:02 (PDB ID: 3WLB) or HLA-DRB1\*04:05 (PDB ID: 6BIR) that were used for the interaction with each of the T-cell epitope and the ligand control

|  |  |  |  |
| --- | --- | --- | --- |
| T-cell epitope | Receptor | The residue (s) of the receptora | |
| Hydrogen bondb | Non-bonded contactc |
| 36VYYPDKVFR44 | HLA-A\*24:02 | Gln156 | Lys66, His70, Asn77, Ile80, Tyr84, Phe99, Tyr116, Thr143, Lys146, Trp147, Val152, Gln155, Gln156, Tyr159 |
| 312IYQTSNFRV320 | HLA-A\*24:02 | Asn77, Tyr84, Lys146, Trp147, Gln156 | His70, Asn77, Ile80, Tyr84, Phe99, Tyr116, Tyr123, Thr143, Lys146, Trp147, Val152, Gln156 |
| 454RLFRKSNLK462 | HLA-A\*24:02 | Asn77, Lys146, Gln156 | His70, Asn77, Ile80, Tyr84, Tyr116, Tyr123, Thr143, Lys146, Trp147, Val152, Gln156 |
| 456FRKSNLKPF464 | HLA-A\*24:02 | Asn77, Trp147, Gln156 | His70, Asn77, Ile80, Tyr84, Leu95, Phe99, Tyr116, Tyr123, Thr143, Lys146, Trp147, Val152, Gln155, Gln156, Tyr159 |
| 36VYYPDKVFR44 | HLA-DRB1\*04:05 | - | Gln9, Glu11, Asp66, Asn69 |
| 312IYQTSNFRV320 | HLA-DRB1\*04:05 | Gln9, Glu11 | Gln9, Glu11, Asp66, |
| 454RLFRKSNLK462 | HLA-DRB1\*04:05 | - | Gln9, Glu11, Asp66 |
| 456FRKSNLKPF464 | HLA-DRB1\*04:05 | Gln9, Glu11, Asn62 | Gln9, Glu11, Asn62, Asn69, Arg76 |

a Ligand control of HLA-A\*24:02 is Nef126-10 protein (immunodominant CTL epitope), while the ligand control of HLA-DRB1\*04:05 is Citrullinated Vimentin 424cit419-431 protein

b Distance between Hydrogen and acceptor atom is < 2.7 Å, while the distance between donor and acceptor atom is <3.3 Å

c Non-bonded contact is the interaction between ligand (epitope) and receptor involving the C or S atom with a distance of ≤3.9Å

**Supplementary Table 12.** Tertiary structure validation of multi-epitope vaccine

|  |  |  |  |
| --- | --- | --- | --- |
| **Server** | **Validation Parameter** | Threshold | **MEV** |
| **SAVES 6.0** | ERRAT score (Overall Quality Factor) | >50 | 76.245 |
| Verify 3D (Based on DSSP "define the secondary structure of protein" algorithm) | ≥ 80% | 82.53% |
| Ramachandran (most favoured) | >90% | 94.6% |
| Ramachandran (additional allowed) | - | 5.4% |
| Ramachandran (generously allowed) | - | 0.0% |
| Ramachandran (disallowed) | 0% | 0.0% |
| **MolProbity** | Ramachandran favoured | 95-98% | 97.4% |
| **ProSA** | Z-score | In the native protein range | -3.15 |
| Majority of residue energy | Negatives | Negatives |

**Supplementary Table 13.** The docking score of the MEV-receptor complexes calculated by the HADDOCK Server

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Receptor** | | **MEV-Receptor complex parameter** | | | | | | | | |
| Receptor name | PDB ID | HADDOCK score | Cluster size | RMSD (Å) | Van der Waals energy | Electrostatic energy | Desolvation energy | Restraints violation energy | Buried Surface Area | Z-Score |
| TLR-4 (A-chain) | 3FXI | -83.8 ± 15.4 | 10 | 1.1 ± 0.7 | -61.1 ± 1.5 | -449.7 ± 43.9 | -10.3 ± 4.1 | 775.0 ± 168.4 | 2102.2 ± 26.9 | -2.2 |
| TLR-4 (B-chain) | 3FXI | -50.7 ± 7.5 | 8 | 4.8 ± 3.6 | -58.7 ± 23.7 | -432.7 ± 114.8 | 11.9 ± 8.9 | 827.1 ± 29.4 | 2314.0 ± 326.9 | -1.2 |
| TLR-8 (A-chain) | 3W3J | -101.0 ± 5.2 | 14 | 3.1 ± 0.3 | -86.8 ± 6.2 | -401.4 ± 64.6 | -10.8 ± 0.2 | 768.8 ± 94.1 | 2948.0 ± 80.7 | -1.4 |
| TLR-8 (B-chain) | 3W3J | -95.8 ± 16.9 | 4 | 0.9 ± 0.5 | -85.6 ± 5.3 | -361.3 ± 40.0 | -27.6 ± 1.6 | 897.8 ± 68.8 | 2998.6 ± 101.2 | -1.6 |
| HLA-A\*24:02 (A-chain) | 3WLB | -71.6 ± 23.2 | 6 | 1.6 ± 0.9 | -56.6 ± 7.0 | -448.1 ± 92.4 | 5.0 ± 6.1 | 696.0 ± 134.8 | 2522.7 ± 137.0 | -1.6 |
| HLA-A\*24:02 (B-chain) | 3WLB | -91.3 ± 3.1 | 15 | 4.0 ± 0.8 | -41.5 ± 5.8 | -412.4 ± 34.5 | -14.7 ± 3.6 | 474.2 ± 85.2 | 1816.2 ± 45.7 | -1.8 |
| HLA-DRB1\*04:05 (A-chain) | 6BIR | -79.1 ± 12.9 | 74 | 1.1 ± 0.9 | -68.1 ± 10.7 | -519.3 ± 55.7 | -15.2 ± 10.4 | 1080.6 ± 88.8 | 2739.0 ± 121.8 | -1.5 |
| HLA-DRB1\*04:05 (B-chain) | 6BIR | -30.9 ± 17.2 | 10 | 0.6 ± 0.3 | -98.6 ± 3.1 | -314.8 ± 11.6 | -17.6 ± 2.1 | 1483.2 ± 158.1 | 3093.3 ± 147.0 | -2.3 |

**Supplementary Table 14.** The docking score of the MEV-receptor complexes calculated by HADDOCK Server calculated by FireDock, Prodigy-Haddock, and Hawkdock Server

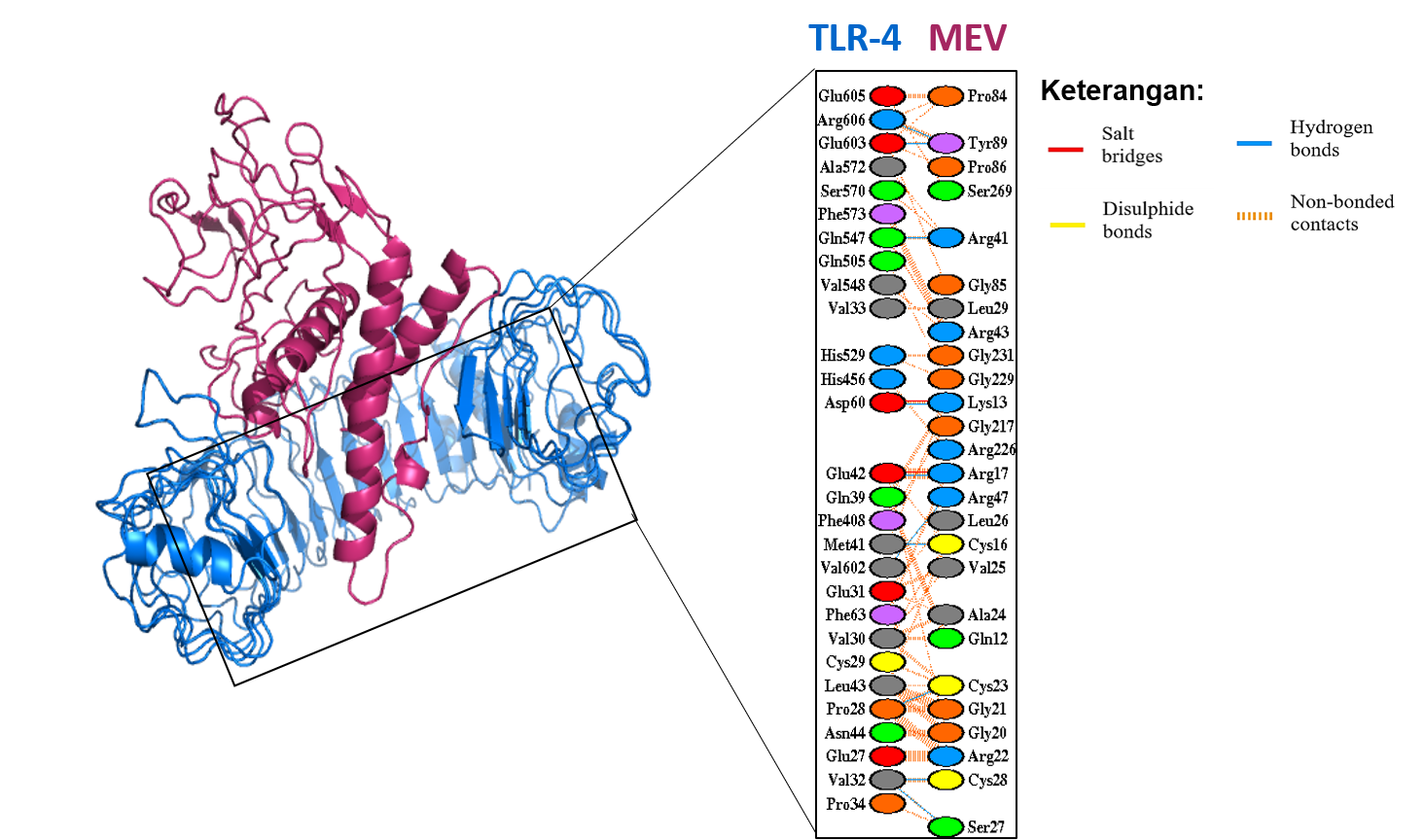
|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Receptor | | MEV-Receptor Complex parameter calculated by | | | | | | | | | |
| FireDock Server | | | | | | | Prodigy - Haddock | | MM-GBSA - HawkDock |
| Receptor name | PDB ID | Rank | [Solution Number](http://bioinfo3d.cs.tau.ac.il/FireDock/bin/showRes.pl?id=KV12BCK.pdb32_22_14_10_0_121&from=1&to=20&sortBy=1) | [Global Energy](http://bioinfo3d.cs.tau.ac.il/FireDock/bin/showRes.pl?id=KV12BCK.pdb32_22_14_10_0_121&from=1&to=20&sortBy=2) | [Attractive VdW](http://bioinfo3d.cs.tau.ac.il/FireDock/bin/showRes.pl?id=KV12BCK.pdb32_22_14_10_0_121&from=1&to=20&sortBy=3) | [Repulsive VdW](http://bioinfo3d.cs.tau.ac.il/FireDock/bin/showRes.pl?id=KV12BCK.pdb32_22_14_10_0_121&from=1&to=20&sortBy=4) | [ACE](http://bioinfo3d.cs.tau.ac.il/FireDock/bin/showRes.pl?id=KV12BCK.pdb32_22_14_10_0_121&from=1&to=20&sortBy=5) | [HB](http://bioinfo3d.cs.tau.ac.il/FireDock/bin/showRes.pl?id=KV12BCK.pdb32_22_14_10_0_121&from=1&to=20&sortBy=6) | ΔG (kcal mol-1) | Kd (M) at 25.0 ℃ | Binding free energy of complex (kcal/mol) |
| TLR-4 (A-chain) | 3FXI | 1 | 1 | -77.05 | -57.80 | 18.31 | 9.62 | -6.47 | -14.1 | 4.80E-11 | -153.57 |
| TLR-4 (B-chain) | 3FXI | 1 | 1 | -94.23 | -48.19 | 2.53 | -4.80 | -3.05 | -13.8 | 7.70E-11 | -143.46 |
| TLR-8 (A-chain) | 3W3J | 1 | 1 | -54.48 | -56.50 | 29.10 | 15.98 | -7.59 | -16.2 | 1.30E-12 | -100.36 |
| TLR-8 (B-chain) | 3W3J | 1 | 1 | -105.47 | -71.02 | 15.62 | 3.08 | -11.05 | -17.2 | 2.30E-13 | -111.19 |
| HLA-A\*24:02 (A-chain) | 3WLB | 1 | 1 | -65.67 | -60.51 | 19.22 | 10.95 | -8.99 | -12.9 | 3.60E-10 | -98.47 |
| HLA-A\*24:02 (B-chain) | 3WLB | 1 | 1 | -105.79 | -56.44 | 6.99 | -0.01 | -5.78 | -9.7 | 7.70E-08 | -75.79 |
| HLA-DRB1\*04:05 (A-chain) | 6BIR | 1 | 1 | -113.37 | -72.18 | 18.56 | -8.19 | -2.62 | -13.6 | 9.80E-11 | -168.13 |
| HLA-DRB1\*04:05 (B-chain) | 6BIR | 1 | 1 | -95.76 | -68.79 | 29.76 | 5.32 | -13.07 | -14.9 | 1.20E-11 | -106.53 |

**Supplementary Table 15.** Optimized MEV-encoded DNA sequence

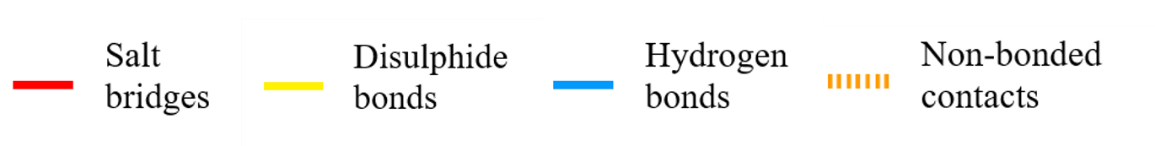
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Codon Optimized DNA sequence of Multi-epitope Vaccine (MEV) | Length | CAI | | GC content | |
| Parameter | Score | Parameter | Score |
| GAGGCCGCAGCAAAGGGCATCATCAACACCCTGCAGAAATACTACTGCCGGG  TGAGAGGGGGCAGGTGCGCTGTCCTGAGTTGCCTGCCCAAGGAGGAGCAGAT  CGGGAAGTGTTCTACTAGAGGCAGGAAGTGTTGCCGCCGGAAGAAAGAGGCC  GCCGCCAAGGCAAAGTTCGTCGCCGCATGGACCCTGAAGGCCGCCGCCGGCC  CCGGCCCTGGCGTGTACTACCCCGACAAAGTTTTTAGGGGACCAGGCCCAGG  GATTTACCAGACCAGCAACTTTAGAGTGGGCCCAGGACCTGGCAGACTGTTC  AGGAAAAGCAACCTGAAGGGTCCTGGACCTGGCTTCAGAAAGTCCAACCTGA  AGCCCTTCAAGAAGGTGAGCGGTACAAACGGCACTAAACGGTTCGATAACCC  TGTGCTCCCCAAGAAGACCAGGCGCATCCGGGGCGGCGACGGCAAGATGAAA  GATCTTTCTCCCAAGAAGGGCACCGGCCCAGAGGCCGGCCTGCCTTATGGGG  CCAATAAGGACGGGAAGAAAAGATCCGGCGCCAGAAGTAAGCAGAGAAGACC  TCAGGGACTGCCAAACAAAAAGAAGGGATTTTACGCTGAAGGGTCAAGAGGA  GGCTCCCAGGCCAGCAGCAAGAAGGGAAGCAGCAGAGGCACCTCCCCAGCCC  GGATGGCCGGCAATGGCGGCAAGAAAAATAGCAGCAGGAACTCTACCCCTGG  CAGCAGCAGGGGCACTTCCCCCAAGAAAGCAAAGTTCGTGGCCGCCTGGACC  CTGAAAGCCGCCGCCGGCGGAGGAAGC | 807 bp | >0.8 | 0.91 | 35-60% | 59.85% |

**Supplementary Table 16.** DNA Sequence of Insert in pcDNA3.1(+) [except the MEV]

|  |  |
| --- | --- |
| Sequence Name | DNA Sequences |
| 5'UTR of VEEV | ATGGGCGGCGCAAGAGAGAAGCCCAAACCAATTACCTACCCAAA |
| nsP1-4 of VEEV (Optimized) | ATGGAAAAGGTGCACGTGGATATCGAGGAGGACTCCCCATTCCTGAGGGCTCTGCAGCGGTCCTTCCCTCAGTTTGAAGTGGAAGCCAAGCAGGTGACCGACAATGACCACGCAAATGCCAGAGCTTTCTCCCACCTTGCCTCCAAACTGATTGAGACCGAGGTTGATCCCTCTGACACCATTCTGGACATTGGAAGTGCTCCTGCCCGCCGAATGTACAGTAAACACAAGTACCACTGTATCTGCCCTATGAGATGCGCCGAGGACCCTGACCGGTTGTATAAGTATGCCACCAAGCTGAAGAAGAACTGCAAGGAAATTACAGACAAGGAGCTCGACAAAAAGATGAAGGAGCTGGCCGCCGTTATGTCCGACCCAGACCTGGAGACAGAGACCATGTGTCTGCATGACGATGAAAGCTGCCGATATGAGGGGCAGGTCGCAGTGTACCAGGATGTGTACGCCGTTGACGGCCCTACAAGTCTGTACCACCAGGCCAATAAGGGCGTGAGAGTGGCATACTGGATCGGGTTTGACACTACCCCATTCATGTTCAAGAACCTGGCCGGCGCTTATCCCTCCTACTCCACAAACTGGGCCGACGAGACAGTGCTGACAGCCCGGAATATCGGACTGTGCAGTTCTGATGTGATGGAGAGGAGCAGAAGAGGCATGAGCATCCTGCGGAAGAAGTACCTGAAGCCTTCCAATAATGTGCTCTTCTCCGTGGGCAGCACGATCTACCATGAAAAGAGGGACCTGCTGCGGAGCTGGCACCTGCCCAGCGTGTTTCATCTGCGGGGCAAACAGAACTACACTTGCAGATGCGAAACCATCGTCTCCTGCGACGGATATGTGGTGAAACGCATCGCCATCTCTCCCGGCCTGTACGGGAAGCCCTCTGGCTATGCAGCCACCATGCACCGGGAAGGCTTCCTGTGCTGCAAGGTTACCGACACACTGAATGGAGAGAGGGTCTCTTTCCCAGTGTGTACCTACGTGCCCGCCACACTGTGCGATCAGATGACAGGGATTCTGGCCACCGACGTGAGCGCCGATGACGCCCAGAAACTGCTGGTTGGACTGAACCAGAGAATCGTGGTGAACGGCAGAACCCAGAGAAATACCAATACAATGAAAAACTACCTGCTGCCTGTGGTGGCACAGGCCTTCGCCAGATGGGCAAAAGAGTACAAAGAGGACCAGGAGGACGAGCGGCCCCTGGGGCTGAGGGACAGGCAGCTGGTGATGGGCTGCTGCTGGGCCTTCAGAAGACACAAGATTACTTCCATCTACAAACGGCCAGACACCCAGACCATCATTAAGGTGAATTCAGACTTCCATAGTTTCGTGCTGCCTCGGATTGGCAGCAACACCCTGGAGATTGGACTGAGAACTCGGATTAGGAAGATGCTGGAAGAACACAAGGAGCCTAGTCCCCTGATCACTGCCGAGGATATCCAGGAGGCCAAGTGCGCCGCCGACGAGGCTAAAGAGGTGAGGGAGGCCGAGGAGCTGAGGGCCGCTCTGCCCCCCCTCGCCGCCGACTTTGAGGAGCCTACCCTGGAGGCCGACGTGGACCTGATGCTGCAGGAGGCCGGCGCCGGCAGCGTGGAGACTCCCAGGGGCCTAATTAAGGTGACTTCATACGCCGGTGAGGACAAAATCGGTTCCTATGCTGTGCTGAGCCCCCAGGCCGTGCTGAAATCTGAGAAGCTGAGCTGCATTCACCCCCTCGCTGAGCAGGTGATCGTGATTACACACAGCGGCCGGAAGGGCCGGTATGCCGTGGAGCCCTACCACGGCAAGGTGGTGGTGCCCGAAGGCCACGCCATCCCTGTGCAGGATTTCCAGGCCTTGTCAGAGTCCGCTACAATCGTGTACAATGAAAGAGAGTTCGTGAACAGGTACCTGCATCATATCGCCACCCACGGAGGGGCCCTGAACACCGACGAGGAGTATTATAAGACCGTGAAGCCTTCCGAGCACGACGGCGAGTATCTGTATGATATCGATAGGAAGCAGTGCGTGAAGAAAGAGCTGGTTACAGGCCTGGGGCTGACAGGAGAGCTGGTGGACCCTCCCTTCCACGAGTTCGCATACGAGTCTCTGAGGACAAGGCCAGCTGCCCCCTACCAGGTGCCAACCATCGGCGTGTACGGCGTGCCAGGAAGCGGCAAGTCCGGCATTATTAAGAGTGCCGTGACCAAGAAGGACCTGGTGGTCAGCGCTAAAAAGGAGAACTGCGCAGAGATCATCAGAGATGTCAAAAAGATGAAGGGACTGGACGTGAATGCCCGCACTGTGGACAGCGTGCTGCTGAACGGCTGTAAGCACCCTGTGGAGACACTGTATATCGACGAGGCCTTCGCCTGTCACGCTGGCACACTGCGCGCCCTGATCGCCATCATTCGGCCTAAGAAGGCCGTGCTGTGCGGCGATCCAAAGCAGTGTGGGTTCTTCAATATGATGTGCCTGAAGGTGCACTTCAATCACGAGATCTGTACCCAGGTGTTCCACAAGAGCATTTCACGCAGATGCACTAAGAGCGTGACCTCCGTGGTGAGCACCCTGTTCTACGATAAACGGATGAGAACCACCAACCCAAAGGAGACTAAGATTGTGATCGACACCACAGGGAGCACTAAGCCCAAACAGGATGACCTGATCCTGACCTGTTTCAGGGGATGGGTGAAACAGCTGCAGATCGATTACAAGGGTAATGAGATCATGACCGCTGCCGCTTCCCAGGGCCTGACCAGAAAAGGCGTGTATGCCGTGCGCTACAAGGTGAACGAGAATCCACTGTACGCCCCTACTAGTGAGCACGTGAACGTGCTGCTGACTAGAACCGAGGACAGGATCGTGTGGAAAACCCTGGCCGGCGACCCCTGGATTAAGATCCTGACCGCCAAATATCCAGGCAATTTCACAGCCACCATCGAAGAGTGGCAGGCAGAGCACGACGCCATCATGCGGCACATCCTGGAAAGGCCAGACCCAACCGACGTGTTCCAGAACAAGGCCAACGTGTGCTGGGCCAAAGCTCTGGTGCCTGTGCTGAAGACCGCAGGCATCGATATGACCACAGAGCAATGGAACACCGTCGACTATTTTGAGACCGATAAGGCTCACAGCGCAGAAATTGTGCTGAACCAGCTGTGCGTGAGGTTCTTTGGCCTGGACCTGGATAGCGGGCTGTTCTCCGCTCCCACAGTGCCTCTGTCCATAAGAAATAACCACTGGGATAACAGCCCATCTCCAAATATGTACGGCCTGAATAAGGAGGTGGTGCGGCAGCTGAGCCGCCGGTACCCACAGCTCCCAAGGGCAGTGGCCACCGGCCGCGTGTACGATATGAACACAGGAACACTGAGGAACTACGATCCTAGAATTAATCTGGTGCCTGTCAACAGACGCCTGCCTCACGCCCTGGTGCTCCACCACAATGAGCATCCTCAGTCTGACTTTAGCAGCTTCGTGTCCAAACTGAAGGGCAGGACCGTGCTCGTGGTGGGCGAGAAGCTGTCCGTGCCTGGCAAGAAGGTGGATTGGCTGTCCGATCAGCCTGAAGCCACATTCCGAGCCAGACTGGACCTGGGAATCCCTGGAGACGTCCCCAAGTATGACATCGTGTTCATCAATGTGCGGACTCCTTACAAGTACCACCACTATCAGCAATGCGAGGACCACGCCATCAAGCTGAGCATGCTTACCAAAAAGGCCTGTCTGCACCTGAACCCAGGCGGCACATGCGTTTCAATCGGGTACGGGTACGCTGATAGAGCCTCTGAATCTATCATTGGCGCCATCGCCCGCCAGTTTAAGTTTAGCCGGGTGTGTAAGCCCAAGAGCTCTCATGAGGAGACTGAGGTTCTGTTCGTGTTCATCGGATACGATAGAAAAGCCCGGACTCACAACCCCTATAAGCTGAGCTCTACCCTGACTAACATCTACACAGGATCCCGCCTGCACGAGGCAGGGTGCGCCCCCAGCTACCACGTGGTGCGCGGCGATATAGCTACAGCAACCGAGGGAGTGATTATTAATGCAGCTAACAGCAAGGGGCAGCCCGGCGGCGGCGTGTGCGGAGCCCTGTATAAGAAGTTCCCAGAGAGCTTCGATCTCCAGCCCATTGAGGTGGGCAAGGCCCGCCTGGTGAAGGGCGCCGCTAAGCACATCATTCACGCCGTGGGCCCAAATTTCAATAAAGTGAGCGAGGTGGAGGGCGATAAGCAGCTGGCAGAGGCCTATGAGAGCATAGCCAAGATCGTCAACGATAATAATTACAAAAGCGTGGCCATCCCCCTGCTGAGCACAGGCATTTTCAGCGGTAACAAGGATAGACTTACTCAGTCACTGAATCACCTGCTGACAGCCCTTGACACCACAGATGCCGACGTGGCTATCTATTGCAGGGATAAGAAGTGGGAGATGACCCTCAAAGAGGCCGTGGCCAGGAGAGAGGCAGTGGAGGAAATCTGCATCTCCGACGACAGTTCAGTGACTGAGCCAGATGCTGAGCTGGTGCGCGTGCACCCAAAGTCCAGCCTGGCAGGCCGGAAGGGCTACTCTACTTCCGACGGGAAAACCTTCAGCTATCTCGAGGGAACCAAGTTTCATCAGGCCGCCAAGGACATCGCCGAGATCAATGCTATGTGGCCCGTGGCCACTGAGGCCAATGAGCAGGTGTGCATGTACATCCTGGGCGAATCTATGAGCTCCATCCGCTCAAAGTGTCCAGTGGAGGAATCCGAGGCCTCAACCCCCCCTTCCACCCTCCCTTGCCTGTGTATCCACGCCATGACCCCCGAACGGGTGCAGAGGCTGAAGGCCTCAAGACCCGAGCAGATTACCGTGTGCTCCTCTTTCCCTCTGCCAAAGTACCGGATCACAGGCGTGCAGAAAATCCAGTGCAGCCAGCCCATTTTGTTCTCTCCTAAGGTGCCCGCCTACATCCACCCACGAAAATATCTGGTGGAGACCCCACCAGTGGAAGAGACACCCGAGAGCCCTGCTGAGAATCAGTCCACCGAGGGCACCCCTGAACAGCCCGCCCTGGTGAACGTGGACGCCACCCGCACCAGGATGCCCGAGCCAATCATCATCGAAGAGGAAGAGGAGGACTCAATTAGCCTGCTCAGCGACGGGCCCACACACCAGGTGCTTCAGGTGGAGGCTGACATTCACGGAAGCCCCAGCGTGTCATCCTCATCCTGGTCCATTCCACATGCCAGTGACTTCGACGTGGACTCACTGTCCATTCTGGATACCCTGGACGGCGCCAGCGTGACCAGCGGCGCAGTCAGCGCTGAGACCAACTCATACTTCGCCAGATCTATGGAATTCAGAGCTCGACCCGTACCCGCCCCAAGAACTGTGTTCCGCAACCCTCCTCACCCTGCACCGCGGACTAGGACCCCTCCCCTGGCCCATTCTCGAGCCAGCTCCAGGACCAGCCTGGTGAGCACCCCCCCCGGCGTGAACAGGGTGATTACTAGAGAAGAGCTGGAAGCACTGACCCCTTCCAGAGCCCCCTCCAGAAGCGCCTCTCGCACCAGCCTGGTGTCAAATCCACCAGGCGTGAACCGCGTGATTACCAGAGAGGAGTTCGAGGCCTTTGTGGCTCAGCAGCAGTGAAGGTTCGATGCCGGCGCCTATATCTTCAGCAGCGATACCGGCCAAGGACACCTGCAGCAGAAAAGCGTGCGGCAGACTGTGCTCTCAGAGGTGGTGCTGGAGCGCACCGAGCTGGAGATCTCTTATGCCCCCCGGCTGGATCAGGAGAAAGAGGAGCTTCTGCGGAAGAAGCTGCAGCTGAACCCCACACCTGCAAACCGGTCCAGATACCAGTCACGCCGCGTGGAGAACATGAAGGCCATTACCGCCAGGAGGATCCTCCAGGGTCTCGGCCACTACCTCAAGGCCGAGGGCAAAGTGGAATGTTATCGCACCCTCCACCCTGTGCCCCTCTACAGCTCCAGCGTGAACAGGGCCTTTTCCAGCCCCAAAGTCGCCGTGGAGGCATGTAACGCCATGCTGAAGGAGAACTTCCCCACCGTCGCCTCCTATTGTATTATTCCCGAGTACGACGCCTACCTGGACATGGTGGACGGCGCCTCCTGCTGCCTGGATACAGCAAGCTTCTGTCCTGCCAAGCTGAGATCGTTCCCTAAGAAGCACAGTTACCTGGAGCCTACAATCCGATCCGCCGTGCCTAGCGCCATCCAGAACACCCTGCAGAACGTGCTGGCCGCGGCCACTAAGCGGAACTGTAATGTGACCCAGATGCGGGAGCTGCCTGTTCTCGACTCTGCTGCCTTCAATGTGGAGTGCTTTAAAAAGTACGCCTGTAACAACGAGTACTGGGAGACCTTCAAGGAGAATCCCATTAGGCTGACCGAGGAAAATGTGGTGAACTACATCACTAAACTGAAGGGGCCCAAGGCAGCCGCCCTGTTCGCTAAGACCCACAACCTGAACATGCTGCAGGACATTCCCATGGACAGATTCGTGATGGACCTGAAGAGAGATGTCAAAGTGACCCCTGGAACTAAACACACAGAAGAGAGACCAAAGGTGCAGGTCATCCAGGCCGCCGATCCACTGGCCACAGCCGACCTGTGCGGCATCCACAGGGAGCTTGTGCGCAGGCTGAATGCCGTGCTCCTGCCCAATATACATACCCTGTTCGATATGTCTGCCGAGGATTTTGATGCTATTATTGCCGAACATTTCCAGCCAGGTGATTGTGTGCTCGAGACTGATATCGCCAGCTTCGACAAGTCCGAAGACGATGCCATGGCCCTGACAGCCCTGATGATTCTGGAGGACCTGGGGGTTGACGCCGAACTGCTGACACTCATCGAAGCCGCCTTTGGCGAGATTAGCTCTATTCATCTGCCCACCAAAACTAAGTTTAAGTTCGGAGCCATGATGAAATCAGGAATGTTCCTGACTTTGTTTGTGAATACTGTGATTAACATTGTGATTGCCTCCAGGGTGCTGCGAGAACGTCTGACCGGGAGCCCTTGTGCTGCCTTTATCGGCGACGATAACATTGTGAAGGGCGTCAAGTCCGACAAGCTGATGGCTGACAGGTGCGCTACCTGGCTGAACATGGAGGTGAAAATCATCGATGCCGTGGTGGGCGAGAAAGCCCCTTATTTCTGCGGAGGATTTATCCTGTGTGACAGCGTGACCGGCACAGCCTGTAGAGTGGCTGACCCTCTGAAGCGGCTGTTCAAGCTGGGCAAGCCCCTTGCTGTGGACGACGAACACGACGACGACCGGAGGCGGGCACTGCACGAGGAGTCCACCCGGTGGAACCGGGTGGGGATTCTGCCCGAACTGTGCAAAGCCGTGGAGAGCAGATACGAAACTGTGGGCACCTCCATCATCGTGATGGCCATGACCACCCTGGCTTCCTCCGTGAAGAGCTTCAGTTACCTGAGAGGCGCACCCATCACCCTGTACGGCTGA |
| Non-coding segment of VEEV | TAACCTGAATGGACTACGACATAGTCTAGTCCGCCAAG |
| tPa signal sequence | ATGGATGCAATGAAGAGAGGGCTCTGCTGTGTGCTGCTGCTGTGTGGAGCAGTCTTCGTTTCGCCCAGCCAGGAAATCCATGCCCGATTCAGAAGAGGAGCCAGA |
| 3'UTR of VEEV | TGAACATAGCAGCAATTGGCAAGCTGCTTATATAGAACTTGCGGCGATTGGCATGCCGCTTTAAAATTTTATTTTATTTTCTTTTCTTTTCCGAATCGGATTTTGTTTTTAATATTTC |

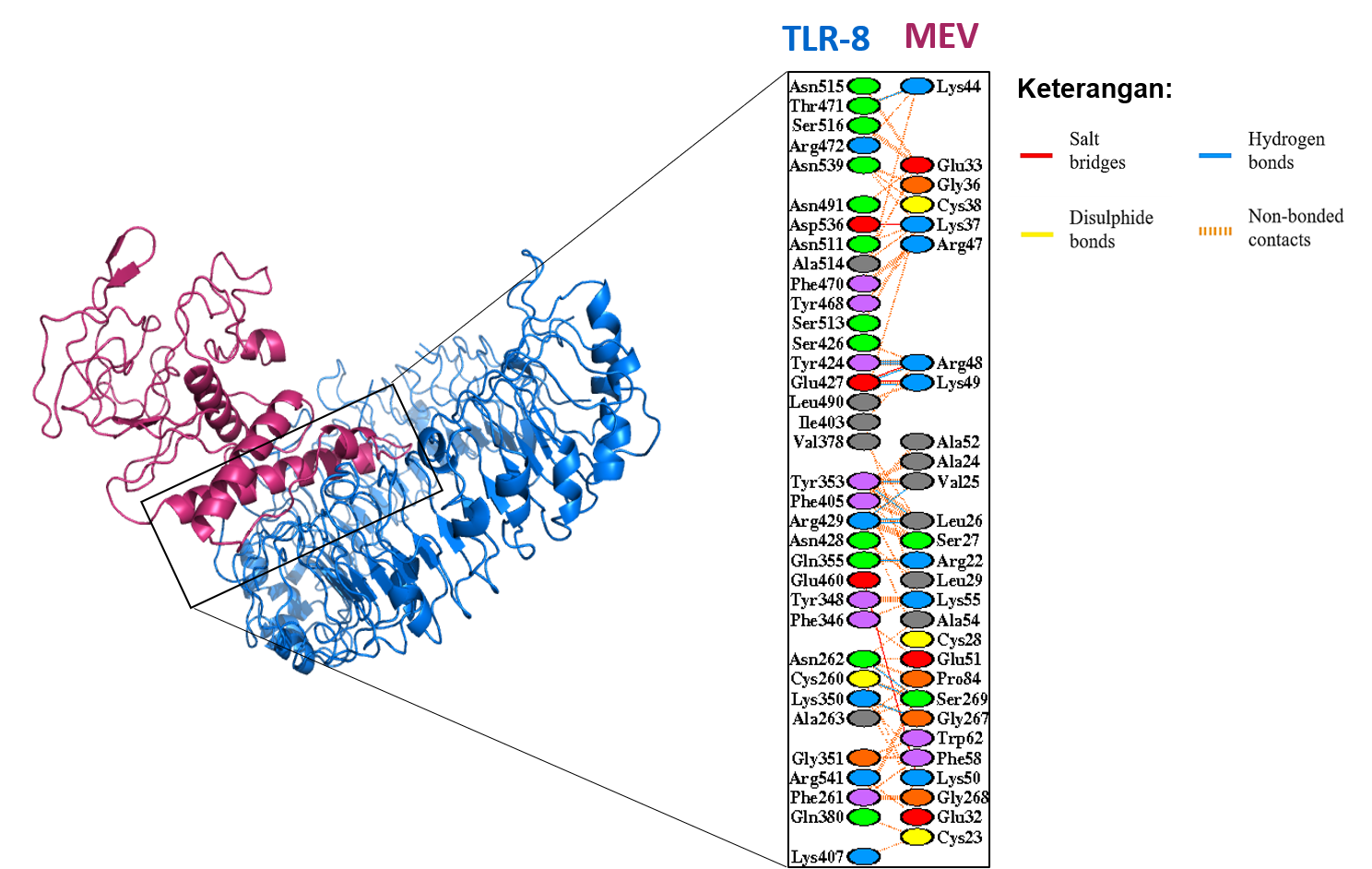


**Legend:**

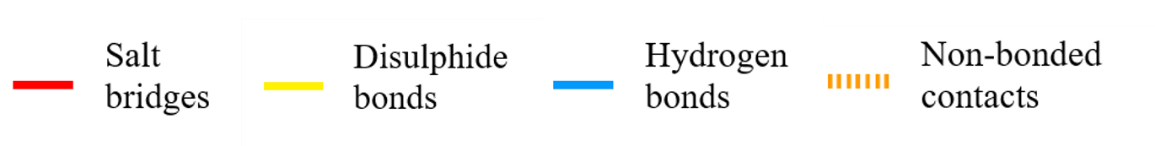


|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chain** | **Number of interface residue(s)** | **Area of interface (Å2)** | **Total of salt bridges** | **Total of disulfide bond(s)** | **The sum of hydrogen bond(s)** | **Total of non-bonded contact(s)** |
| TLR-4 (PDB ID: 3FXI) | 28 | 1319 | 2 | - | 10 | 235 |
| KV-1 | 26 | 1368 |

(a)

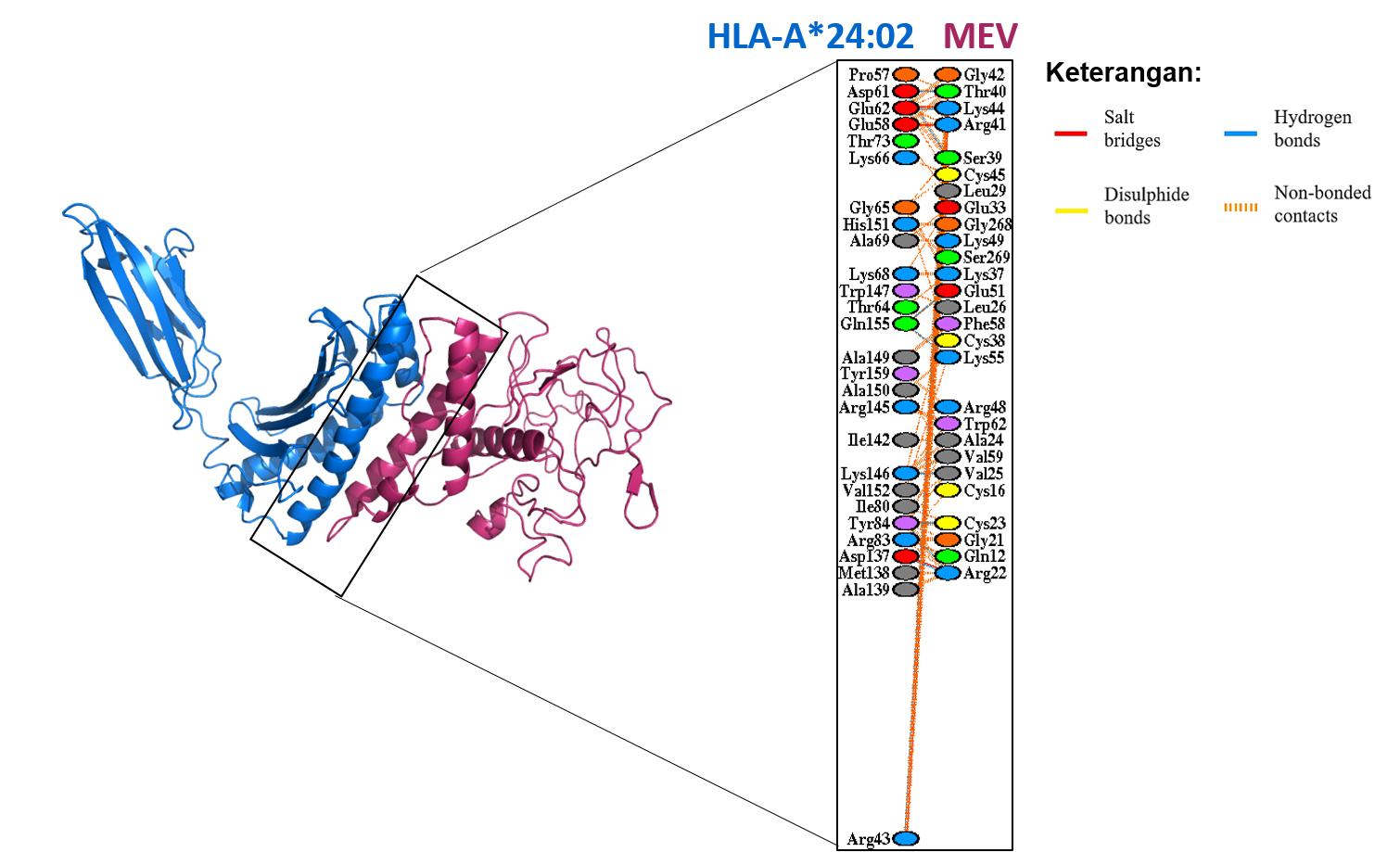
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**Legend:**

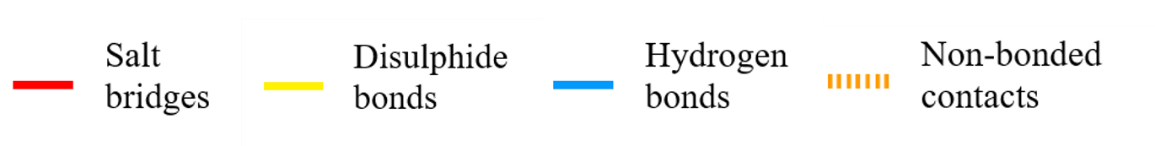


|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chain** | **Number of interface residue(s)** | **Area of interface (Å2)** | **Total of salt bridges** | **Total of disulfide bond(s)** | **The sum of hydrogen bond(s)** | **Total of non-bonded contact(s)** |
| TLR-8 (PDB ID: 3W3J) | 35 | 1602 | 3 | - | 14 | 366 |
| KV-1 | 27 | 1657 |

(b)

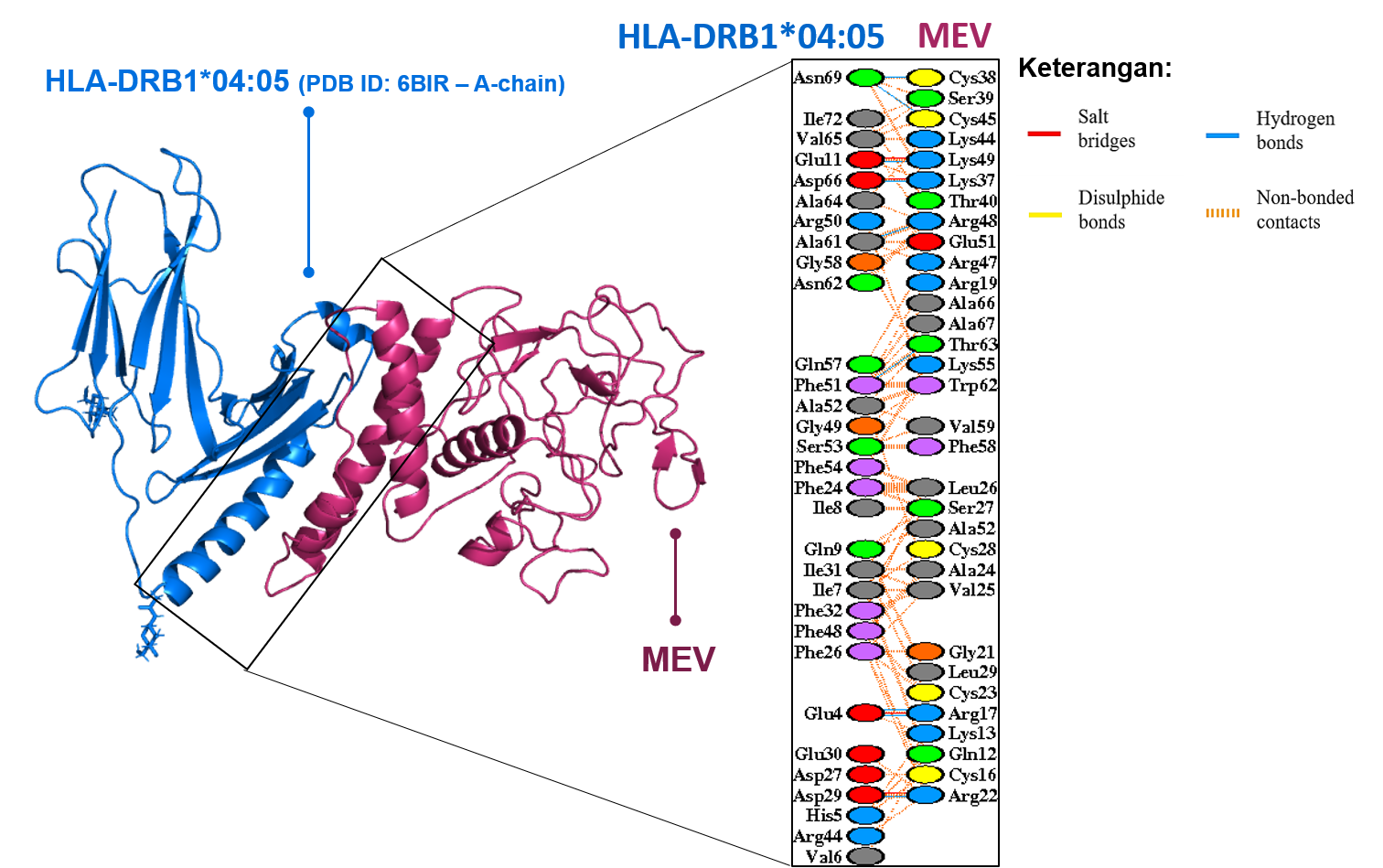
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**Legend:**

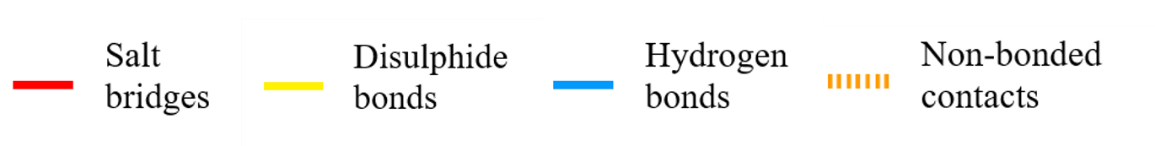


|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chain** | **Number of interface residue(s)** | **Area of interface (Å2)** | **Total of salt bridges** | **Total of disulfide bond(s)** | **The sum of hydrogen bond(s)** | **Total of non-bonded contact(s)** |
| HLA-A24 (PDB ID: 3WLB) | 26 | 1399 | 3 | - | 10 | 288 |
| KV-1 | 28 | 1388 |

(c)

****

**Legend:**



|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Chain** | **Number of interface residue(s)** | **Area of interface (Å2)** | **Total of salt bridges** | **Total of disulfide bond(s)** | **The sum of hydrogen bond(s)** | **Total of non-bonded contact(s)** |
| HLA-DRB1\*04:05 (PDB ID: 6BIR) | 31 | 1544 | 4 | - | 9 | 348 |
| KV-1 | 32 | 1512 |

(d)

**Supplementary Figure 1.** Interacting binding residue between MEV and (a)TLR-4 (B-chain) [PDB ID: 3FXI]; (b) TLR-8 (A-chain) [PDB ID: 3W3J]; (c) HLA-A\*24:02 (A-chain) [PDB ID: 3WLB]; and (d) HLA-DRB1\*04:05 (A-chain) [PDB ID: 6BIR]