Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Serum neutralisation of the SARS-CoV-2 omicron sublineage BA.2

The rapidly emerging SARS-CoV-2 omicron variant is associated with high transmissibility, compromised serum neutralising activity, and reduced vaccine effectiveness.[1–3] BA.1 is the dominant omicron sublineage, making up more than 97% of omicron variant sequences worldwide in November and December, 2021, whereas BA.2 and BA.3 were rare.[3] Hence, early studies of the omicron variant were mainly based on the BA.1 sublineage. Since early January, 2022, there has been a sudden upsurge of BA.2 in Europe and Asia, accounting for 15·6% of omicron variant sequences detected at the end of January, 2022.[3] In view of the increasing epidemiological importance, there is an urgent need to assess the serum neutralising activity against BA.2, which correlates with vaccine effectiveness.

We measured the serum neutralising antibody (NAb) activity against BA.1 and BA.2 with a live virus NAb assay,[1,2] and report the results here. We tested serum specimens collected from individuals who had received three doses of COVID-19 vaccine (three-dose vaccinated; n=21; appendix p 4),[4] patients who had COVID-19 in 2020 who received one dose of the Pfizer-BioNTech BNT162b2 vaccine after recovery (pre-variant of concern [VOC] convalescent, one-dose vaccinated; n=15),[5] patients who had COVID-19 in 2020 but had not been vaccinated (pre-VOC convalescent, non-vaccinated; n=9),[5] and patients recently infected by the omicron sublineage BA.2 (omicron BA.2 convalescent; n=10; appendix p 4). Overall (n=55), the geometric mean NAb titre (GMT) against BA.2 was 1·68 (CI 1·63–1·73) times higher than against BA.1 (73·2 against BA.2 *vs* 43·7 against BA.1; p<0·0001; appendix p 2). Subgroup analysis showed that the GMT against BA.2 was 2·0 times higher (95% CI 1·99–2·01) than the GMT against BA.1 in the pre-VOC convalescent, one-dose vaccinated group (422·2 against BA.2 *vs* 211·1 against BA.1; p=0·0005), 2·3 times higher (95% CI 2·12-2·56) in the pre-VOC convalescent, non-vaccinated group (29·4 against BA.2 *vs* 12·6 against BA.1; p=0·0078), and 2·0 times higher (95% CI 1·63–2·50) in the omicron BA.2 convalescent group (32·5 against BA.2 *vs* 16·3 against BA.1; p=0·031). However, the difference between BA.2 and BA.1 in the three-dose vaccinated group was not statistically significant (p=0·14).

To better understand the difference between BA.2 and BA.1, we calculated the ratio of BA.2 NAb titre to BA.1 NAb titre in each individual. All individuals in the pre-VOC convalescent, one-dose vaccinated group; the pre-VOC convalescent, non-vaccinated group; and the omicron BA.2 convalescent group had equal or higher NAb titres for BA.2 than BA.1. However, four (19%) of 21 individuals in the three-dose vaccinated group had a lower NAb titre for BA.2 than BA.1. The BA.2-to-BA.1 NAb titre ratio in the three-dose vaccinated group was numerically lower than in other groups, but was only significantly lower than in the pre-VOC convalescent, non-vaccinated group (p=0·041; appendix p 3).

Our data indicate that the immune escape from BA.2 is not as severe as from BA.1, suggesting that other viral or host factors are driving the rapid spread of BA.2. Since NAb titres correlate with vaccine effectiveness, our data suggest that currently available vaccines might be more effective against BA.2 than BA.1. This study was approved by the institutional review board of the University of Hong Kong/Hospital Authority Hong Kong West Cluster (UW 13–265 and UW 21–214) and the Hospital Authority Kowloon West Cluster (KW/EX-20–038[144–26]). Written informed consent was obtained from all study participants.

We declare no competing interests. L-LC and AW-HC contributed equally. This work was supported by Health and Medical Research Fund, the Food and Health Bureau, The Government of the Hong Kong Special Administrative Region (ref no. COVID190124 and COVID1903010 [Project 1]), the Emergency Collaborative Project (EKPG22-01) of Guangzhou Laboratory, and donations from Richard Yu and Carol Yu, Shaw Foundation Hong Kong, Michael Seak-Kan Tong, May Tam Mak Mei Yin, Lee Wan Keung Charity Foundation, Hong Kong Sanatorium and Hospital, Respiratory Viral Research Foundation, Hui Ming, Hui Hoy and Chow Sin Lan Charity Fund, Chan Yin Chuen Memorial Charitable Foundation, Marina Man-Wai Lee, the Hong Kong Hainan Commercial Association South China Microbiology Research Fund, the Jessie and George Ho Charitable Foundation, Kai Chong Tong, Tse Kam Ming Laurence, Foo Oi Foundation, Betty Hing-Chu Lee, and Ping Cham So. The funders had no role in study design, data collection, data analysis, data interpretation, or writing of the report. All authors had full access to all data in the study and had final responsibility for the decision to submit for publication. L-LC and KK-WT directly accessed and verified the underlying data. Data are available from the corresponding author upon reasonable request.

*Lin-Lei Chen, Allen Wing-Ho Chu, Ricky Rui-Qi Zhang, Ivan Fan-Ngai Hung, *Kelvin Kai-Wang To*
kelvinto@hku.hk

State Key Laboratory for Emerging Infectious Diseases (L-LC, AW-HC, KK-WT) and Department of Medicine (RR-QZ, IF-NH), School of Clinical Medicine, Li Ka Shing Faculty of Medicine, The University of Hong Kong, Hong Kong Special Administrative Region, China (L-LC, AW-HC, KK-WT); Department of Microbiology, Queen Mary Hospital, Hong Kong Special Administrative Region, China (KK-WT); Department of Clinical Microbiology and Infection Control, The University of Hong Kong-Shenzhen Hospital, Shenzhen, China (KK-WT); Centre for Virology, Vaccinology and Therapeutics, Hong Kong Science and Technology Park, Hong Kong Special Administrative Region, China (KK-WT)

1 Lu L, Mok BW, Chen LL, et al. Neutralization of SARS-CoV-2 Omicron variant by sera from BNT162b2 or Coronavac vaccine recipients. *Clin Infect Dis* 2021; published online Dec 16. https://doi.org/10.1093/cid/ciab1041.

2 Chen LL, Chua GT, Lu L, et al. Omicron variant susceptibility to neutralizing antibodies induced in children by natural SARS-CoV-2 infection or COVID-19 vaccine. *Emerg Microbes Infect* 2022; **11:** 543–47.

3 WHO. COVID-19 weekly epidemiological update. Feb 8, 2022. https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---8-february-2022 (accessed Feb 12, 2022).

4 Khong K-W, Liu D, Leung K-Y, et al. Antibody response of combination of BNT162b2 and CoronaVac platforms of COVID-19 vaccines against omicron variant. *Vaccines (Basel)* 2022; **10:** 160.

5 Lu L, Chen LL, Zhang RR, et al. Boosting of serum neutralizing activity against the omicron variant among recovered COVID-19 patients by BNT162b2 and Coronavac vaccines. *SSRN* 2022; published online Feb 8. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4029746 (preprint).

Published **Online** March 28, 2022 https://doi.org/10.1016/S2666-5247(22)00060-X

See **Online** for appendix