

# THE BEST OF THE WEEK (02 gen – 08 gen 2023)

Ryuta Uraki et al

## **Humoral immune evasion of the omicron subvariants BQ.1.1 and XBB**

Lancet, December 2022; doi.org/10.1016/S1473-3099(22)00816-7

### **Abstract**

The omicron (B.1.1.529) variant of SARS-CoV-2 evolved into several sublineages, three of which (BA.1, BA.2, and BA.5) became globally dominant. Currently, the prevalence of omicron subvariants BQ.1 (a subvariant of BA.5), its sublineage BQ.1.1, and XBB (a recombinant of two different BA.2 subvariants) is increasing rapidly in the USA, France, Singapore, India, and elsewhere. BQ.1.1 and XBB possess substitutions relative to BA.5 and BA.2, respectively, in the receptor-binding domain of their spike protein (appendix p 4), which is the major target for vaccines and therapeutic monoclonal antibodies (mAbs) for COVID-19. Both variants have the substitution R346T, which confers resistance to certain therapeutic antibodies,<sup>1</sup> raising concerns that mAbs or vaccines might be less effective against BQ.1.1 and XBB than against other omicron strains. We showed that BQ.1.1 and XBB have enhanced immune evasion capabilities compared with earlier omicron variants, including BA.5 and BA.2, by evaluating the efficacy of therapeutic mAbs against BQ.1.1 and XBB.<sup>2</sup> However, the neutralising ability of plasma from convalescent individuals and COVID-19 vaccinees against BQ.1.1 and XBB clinical isolates remained unknown. The mRNA vaccine, 17 (85%) of 20 samples or 18 (90%) of 20 samples had FRNT50 values that were below the limit of detection (<10-fold dilution) against BQ.1.1 or XBB, respectively. To calculate Our data suggest that the omicron sublineages BQ.1.1 and XBB effectively evade current humoral immunity induced by mRNA vaccines or natural infection. A previous study using pseudotyped viruses reported that BQ.1.1 and XBB were less well recognised than BA.2 and BA.4/5 by plasma from convalescent individuals and mRNA vaccinees.<sup>3</sup> These findings show that BQ.1.1 and XBB clinical isolates have higher immune evasion abilities than earlier omicron variants, including BA.5 and BA.2.

Howard Larkin

## **Dogs May Reliably Detect SARS-CoV-2 Infections at Mass Events**

JAMA, December 2022; doi:10.1001/jama.2022.20040

### **Abstract**

Dogs trained to detect SARS-CoV-2 infection by smell correctly identified individuals with active infections at concerts with a specificity of nearly 100% and a sensitivity of 82%, researchers reported in BMJ Global Health. The results suggest that dogs may provide a fast and reliable screening option for public events at which mass screening is required.

Eight trained dogs of various breeds were presented with sweat samples from 2802 concertgoers at 4 events in Germany organized for the study. Each person underwent SARS-CoV-2 antigen and polymerase chain reaction (PCR) testing at the concert, but the investigators, dog handlers, and dogs did not know the results. Most of the human participants were vaccinated against COVID-19 but this did not affect the dogs' ability to detect active infections.

Sweat samples collected previously from 38 patients with SARS-CoV-2 infections were randomly introduced into the test lineup, raising the total sample prevalence to 1.34% from a background rate of 0.2%. A positive finding was confirmed by a second dog sniffing the same sample. It took about 1 to 2 seconds for the dogs to smell each sample.

The dogs turned up only 2 false-positive results and 1 false-negative result. Positive identification of SARS-CoV-2 infection by 2 dogs was confirmed for another patient by a PCR test 2 days later, suggesting that dogs may be able to detect an infection before virus shedding, the authors wrote. Overall, the canine test had a positive predictive value of 70% and a negative predictive value of 99.7% assuming a prevalence rate of 0.2%.

Previous studies found that dogs can identify SARS-CoV-2 infections with high diagnostic accuracy, but the new research demonstrated it under real-world mass screening conditions, the authors wrote. Medical scent-detection dogs provide an additional opportunity to control the ongoing COVID-19 pandemic and possibly future pandemics, especially in areas or countries with limited test infrastructure or financial means, they concluded.