THE BEST OF THE WEEK (16 gen – 22 gen 2023)

Malato J. et al.

Stability of hybrid versus vaccine immunity against BA.5 infection over 8 months

Lancet, January 2023; doi.org/10.1016/S1473-3099(22)00833-7

Abstract

The coverage of SARS-CoV-2 vaccination in large parts of the world, together with the high number of breakthrough infections, especially following the emergence of Omicron subvariants, makes hybrid immunity (resulting from vaccine and infection) common. Hybrid immunity, particularly after BA.1 or BA.2 infection, confers substantial protection against the BA.5 infection.1, 2, 3 However, although the waning of protection afforded by natural infection in non-vaccinated individuals or by vaccination has been well documented,4, 5 the stability of hybrid immunity, specifically against the BA.5 subvariant, now dominant in many countries, has not been thoroughly addressed.

However, our results of increased protection with hybrid immunity versus vaccine immunity, agrees with the overall conclusion of that study that "imprinting effects are unlikely to negate the overall public health value of booster vaccinations".7

This study shows that hybrid immunity following infection with Omicron BA.1 or BA.2 when compared with vaccine-only immunity leads to substantially increased protection against BA.5 reinfection for up to 8 months.

Andreano E. et al.

B cell analyses after SARS-CoV-2 mRNA third vaccination reveals a hybrid immunity like antibody response

Nature, January 2023; doi.org/10.1038/s41467-022-35781-6

Abstract

The continuous evolution of SARS-CoV-2 generated highly mutated variants able to escape natural and vaccine-induced primary immunity. The administration of a third mRNA vaccine dose induces a secondary response with increased protection. Here we investigate the longitudinal evolution of the neutralizing antibody response in four donors after three mRNA doses at single-cell level. We sorted 4100 spike protein specific memory B cells identifying 350 neutralizing antibodies. The third dose increases the antibody neutralization potency and breadth against all SARS-CoV-2 variants as observed with hybrid immunity. However, the B cell repertoire generating this response is different. The increases of neutralizing antibody responses is largely due to the expansion of B cell germlines poorly represented after two doses, and the reduction of germlines predominant after primary immunization. Our data show that different immunization regimens induce specific molecular signatures which should be considered while designing new vaccines and immunization strategies.

MasakiImai et al.

Efficacy of Antiviral Agents against Omicron Subvariants BQ.1.1 and XBB

NEJM, January 2023; DOI: 10.1056/NEJMc2214302

Abstract

Three sublineages of the B.1.1.529 (omicron) variant of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have serially transitioned into globally dominant forms — first BA.1, then BA.2, and then BA.5. As of October 2022, most circulating omicron variants belong to BA.5. However, the prevalence of BQ.1.1 (a BA.5 subvariant) and XBB (a BA.2 subvariant) is increasing rapidly in several countries, including the United States and India. BA.2 and BA.5 variants have been shown to have less sensitivity to certain monoclonal antibodies than previously circulating variants of concern.1-5 Notably, as compared with BA.5 and BA.2, BQ.1.1 and XBB carry additional substitutions in the receptor-binding domain of the spike (S) protein, which is the major target for vaccines and therapeutic monoclonal antibodies for coronavirus disease 2019 (Covid-19). These subvariants may, therefore, be more immune-evasive than BA.5 and BA.2.

In Vitro Efficacy of Therapeutic Monoclonal Antibodies and Antiviral Drugs against Omicron Subvariants.

We assessed the efficacy of therapeutic monoclonal antibodies against omicron BQ.1.1 (hCoV-19/Japan/TY41-796/2022; TY41-796) and XBB (hCoV-19/Japan/TY41-795/2022; TY41-795), which were isolated from patients.

Our data suggest that the omicron sublineages BQ.1.1 and XBB have immune-evasion capabilities that are greater than those of earlier omicron variants, including BA.5 and BA.2. The continued evolution of omicron variants reinforces the need for new therapeutic monoclonal antibodies for Covid-19.