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NEWS FLASH

Are the currently available vaccines effective against the Omicron variant?

The SARS-CoV-2 Omicron (B1.1.529) variant was first identified in South Africa in early November 2021, and was designated as a variant of concern by the WHO on November 26, 2021. Since then, the Omicron variant has been identified in more than 100 countries worldwide. As public health experts continue initiatives to deal with this surge, there is still incomplete data on another key question: *"Are the currently available vaccines effective against the Omicron variant?"* Definitive answers may only be known in several weeks' time.

Initial *in vitro* studies indicated reduced neutralisation of the Omicron variant by sera from previously vaccinated people and also monoclonal antibodies. In a study by Wilhelm et al. there was between an 11.4-fold and 20-fold reduction in neutralisation of the Omicron variant when compared to the Delta variant in sera from patients who received either the 2-dose BNT162b2 (Pfizer/BioNTech) or the 2-dose mRNA1273 (Moderna) vaccine.[1] In the same study the Omicron variant was also resistant to the two monoclonal antibodies (casirivimab and imdevimab) included in the medication REGN-COV2, which is widely used for the treatment and prevention of COVID-19 in the USA. In an *in vitro* study conducted in South Africa, there was a 41-fold reduction in neutralisation of the Omicron variant in comparison to the ancestral virus in sera from 12 patients who were vaccinated with BNT162b2. In 6 vaccinated participants who were infected during the first wave, the escape was incomplete.[2]

Vaccine effectiveness against the Omicron variant also seems to depend on time elapsed since completion of the initial vaccination. Hansen et al. found the 2-dose BNT162b2 vaccine 55.2% effective against the Omicron variant for the first month after receiving the second dose, compared to 86.7% effectiveness against the Delta variant. Effectiveness against the Omicron variant decreased to 9.8% by month 3.[3] Similar results were observed in a test-negative case-control study conducted in England. Effectiveness against symptomatic infection with the BNT162b2 vaccine was 88.0% 2 – 9 weeks after the second dose, and fell to between 34.1% and 36.6% from week 15 onwards.[4] In both studies, effectiveness was re-established after receipt of a third BNT162b2 booster dose. Unfortunately, neither of these studies gave an indication of patient disease severity or prevention of hospitalisation and death.

Two recent publications from South Africa indicated that vaccination remains effective against hospitalisation and death due to the Omicron variant. Vaccination with 2 doses of BNT162b2 was 70% effective against hospitalisation with COVID-19 due to the Omicron variant, compared to 93% effectiveness during the 3rd wave which was dominated by the Delta variant.[5] In the second study the death rate decreased from 29.1% during the third wave to 2.7% during the first three weeks of the fourth wave, but the full extent of disease during this wave has not been determined.[6]

In conclusion, even though neutralising antibodies appear to be less effective against the Omicron variant in *in vitro* studies, vaccination appears to remain largely effective against hospitalisation and death. This suggests that the other arms of the immune system, both innate and cellular, and perhaps even non-neutralising antibodies, also contribute to protection from severe COVID-19.

References

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