Ad26.COV2.S vaccine significantly boosts pre-existing SARS-CoV-2 specific antibodies but not CD4 T cell immune responses

Neutralizing antibody responses to Ad26.COV2.S vaccination after prior infection. A. Neutralization of the SARS-CoV-2 D614G pseudovirus by plasma pre- and post-vaccination from participants with no prior infection (green, n=19) and those infected in the first (blue, n=20) and second waves (red, n=19). Neutralization is reflected as an ID50 titer. The threshold for positivity is indicated by a dotted line B. Cross-reactive neutralization post-vaccination against D614G, Beta and Delta variants. Pie charts show the proportion of vaccine non-responders (NR; grey), knock-out of neutralization of Beta or Delta (KO; black), titer of 20-400 (orange), or >400 (red). C. Fold change of post-vaccination D614G neutralization titers relative to Beta or Delta. The dotted line indicates a fold
change of 1 (no change). The horizontal black and red bars indicate geometric mean titers, with values indicated on the graphs. Statistical analyses were performed using the Mann-Whitney test between groups, and the Wilcoxon test for paired analyses. * denotes p<0.05, *** p<0.001, ns, non significant. Experiments were performed in duplicate with the average value shown. (Source: Keeton et al., Pre-print)

COVID-19 vaccines are provided to all individuals, regardless of previous SARS-CoV-2 infection. We have previously highlighted research findings that showed vaccination with BNT162b2 (Pfizer/BioNTech) significantly boosts pre-existing SARS-CoV-2 immunity induced by natural infection (Read more: Antibody response to vaccination post-COVID-19 infection). Is this boosting effect observed in individuals vaccinated with other COVID-19 vaccines?

Ad26.COV2.S vaccine, single-dose adenovirus 26 vectored vaccine expressing the SARS-CoV-2 Wuhan-1 stabilized spike (S) protein, is highly effective against the development of severe COVID-19 was the first vaccine to be rolled in South Africa. The single-dose regimen makes it one of the most ideal vaccines to facilitate rapid roll-out in Africa. In a recent Pre-print, Keeton et al., “examined the effect of prior infection with ancestral (D614G) or Beta variants on Ad26.COV2.S immunogenicity approximately 28 days post-vaccination.”
Researchers showed that Ad26.COV2.S vaccination boosted circulating S-protein specific antibodies (Abs), neutralizing Abs (nAbs) and antibody-dependent cellular cytotoxicity (ADCC) in individuals previously infected during the 1st and 2nd waves to levels much higher than naïve individuals. Surprisingly, despite the longer time interval between wave 1 infection and vaccination (7 months), compared to wave 2 (2 months) the overall magnitude of vaccine-induced boosting was similar. Interestingly, researchers observed no substantial vaccine-induced boosting of S-specific CD4 T cells responses in previous SARS-CoV-2 infected individuals.

In summary, “Ad26.COV2.S vaccination following prior infection, even >6 months previously, may result in substantially enhanced protection against COVID-19, of particular relevance in settings of high SARS-CoV-2 seroprevalence.” These results, also highlight the potential role of cellular immunity in maintaining long-lasting immunity against future variants as results suggest that T cell recognition is not largely affected by mutations present in variants of interest.


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