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Vacunas

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Letter to the Editor

SARS CoV2 mRNA vaccines: Prolonged dosing intervals and anti-SARS-CoV-2 immunity status

Vacunas de ARNm del CoV2 del SRAS: Intervalos de dosificación prolongados y la inmunidad anti-SARS-CoV-2 status

Dear Editor,

The global number of cases infected with SARS-CoV-2 surpassed 433 million as well as 5.94 million deaths on 26 February 2022 (http://covid19.who.int). The mass vaccination is considered as the best strategy to fight with COVID-19 pandemic. However, immune system responses wane after vaccination. Furthermore, the durability of effective immune responses was varied among immunized individuals. Recent evidences suggested the effectiveness of ChAdOx1 (AstraZeneca) adenoviral as well as other non-replicating vaccines by increasing dosing intervals.[1] However, the magnitude and resilience of vaccine-induced immunity remains unclear particularly among mRNA vaccines.[2] Currently, regular schedule dosing intervals for BNT162b2 (Pfizer) and mRNA-1273 (Moderna) vaccines are 21 and 28 days, respectively.[3] We provide a comprehensive literature search by ISI Web of Science, PubMed, and Scopus to demonstrate the SARS-CoV-2 antibody status after extended mRNA vaccine dosing intervals.

Firstly, Brockman et al. investigated humoral immune responses after one-month following one dose of the BNT162b2 mRNA COVID-19 vaccine in healthcare facilities. They found that after 30 days, the spike protein receptor binding domain (S/RBD) antibody titers were 4-fold lower than seronegative healthcare workers (HCW); However, convalescent HCW exhibited 7- to 20-fold higher levels of binding antibodies to neutralize live virus.[4] Grunau et al. revealed the BNT162b2 and mRNA-1273 vaccines at dosing intervals of 6–7 weeks compared with a standard dosing interval of <4 weeks, could result in a significant increase of anti-spike antibodies concentrations (MSD ($t = 2.211$, $p = .028$); Roche ($t = 7.703$, $p < .0001$)) in vaccinated subjects.[5]

Recent studies suggested the role of extended dosing intervals in enhancing both humoral and cellular immunity against SARS-CoV-2 variants. Payne et al. declare extended dosing interval (6–14 weeks) for the BNT162b2 mRNA vaccine can provide robust neutralizing antibody (NAb) responses to the spike protein, and augmentation of CD4+ T cells expressing interleukin-2 in peripheral blood samples of healthcare workers. They observed a reduction of SARS-CoV-2 infection in the extended dosing schedule (6–14 weeks) compared to the short dosing schedule (2–5 weeks) [55% *vs.* 66%, respectively].[6] Tauzin et al. evaluated longitudinal humoral responses against the D614G strain and other variants of concern including B.1.1.7, B.1.351, P.1, and B.1.612.2, and B.1.526 in individuals who received the BNT162b2 mRNA vaccine at a 16-week interval between doses. Humoral immune responses significantly increased in naive individuals after a 16-week interval to the second dose, accomplishing analogous ranks as in previously infected patients. In addition, a 16-week interval induced more robust immune responses among vaccinated naïve populations.[7]

This fact was assessed by Robinson et al., who compared the anti-spike protein neutralizing antibody concentration in healthy individuals as well as in cancer patients following BNT162b2, AZD1222, and mRNA-1273 administered at extended dosing intervals. The results showed a mean serum anti-spike protein antibody level was 382.4 BAU/ml (binding antibody unit) for control patients, 265.8 BAU/ml for solid cancer patients, and 168.2 BAU/mL in hematological cancer patients.[8] Regarding effectiveness of extended mRNAvaccine dosing intervals with respect to various SARS-CoV-2 variants, another study, Grunau et al. revealed that a 100–120 days mRNA SARS-CoV-2 vaccine dosing intervals using BNT162b2 and mRNA-1273 can induce a significant immune response against the Wuhan, Beta, Gamma and Delta variants.[9]

In summary, extended mRNA-vaccine dosing intervals could better stimulate a robust immune response against circulating SARS-CoV-2 variants. The second dosage intervals of the Pfizer/BioNTech BNT162b2 and Oxford/AstraZeneca

was changed in the United Kingdom on December 31, 2020. Thus, optimizing mRNA vaccine dosage intervals can have influenced mRNA based-vaccine effectiveness against SARS-CoV-2 infection.

Conflict of interest statement

The authors have no conflict of interest.

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