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Mix and Match of COVID-19 Vaccines and the Importance of Protein-Based Boosters

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Dear Editor

Coronavirus disease 2019 (COVID-19) is a highly viral infectious disease caused by the severe acute respiratory syndrome 2 (SARS-CoV-2) virus **(1)**. As of 5 August 2022, more than 587 million people *had* already *been infected* with around 6.4 million deaths **(2)**. After the alpha, beta, gamma, and delta variants, the omicron (B.1.1.529) emerged in Botswana. The original variant of omicron was named B.1 and following the original BA.1 variant, several subvariants of Omicron have been detected: BA.2, BA.3, BA.4, and BA.5 **(3)**. Although the data related to the sub-variants before BA.5 show that the percentage of hospitalization due to Omicron has decreased compared to the previous variants (alpha, beta, gamma, and delta), the coronavirus is still considered a serious threat to humans.

Vaccination is the most preventive method during the pandemic. There are several COVID-19 vaccines produced in inactivated, vector-based, mRNA, and protein platforms. The effectiveness of vaccines against COVID-19 is significantly reduced after a few months. For example, the result of the Pfizer study showed that effectiveness against infections declined from 88% during the first month after full vaccination to 47% after 5 months **(4)**. Since new Covid-19 subvariants BA.4 and BA.5 are the most contagious (an R0 of 18.), the booster shot can be a lifesaver. The results obtained from Sinopharm showed that the injection of a booster dose of the vaccine produced with the protein platform (s NVSI-06-07) of this company for people who received two doses of BBIBP-CorV (inactivated vaccine) caused a better stimulation of the immune system and a significant increase in antibody level **(5)**. In another study, the researchers found that one booster dose of CoV2 preS dTM-AS03 (monovalent D614 or B.1.351, or bivalent D614 + B.1.351 formulations) (protein-based vaccine from GlaxoSmithKline), significantly boosts the pre-existing neutralizing antibodies against the parental strain from 177- to 370-fold. The result showed that these vaccine candidates, when used as a booster, have the potential to offer cross-protection against a broad spectrum of variants **(6)**. A similar result reported by Tabarsi et al. showed that Booster dose injection of SpikoGen (vaccine with protein platform) neutralizes different strains of Covid-19. Regardless of the primary vaccine received, SpikoGen results showed favorable effects as both a homologous and heterologous booster dose **(7)**. A study conducted in connection with the Sinopharm vaccine proved that the antibody level of people who received it

(inactivated platform) decreases after six months, and the booster shot of the fourth dose of this vaccine cannot compensate for the reduction **(8)**.

The results obtained from various studies show that the mix and match of vaccines can be helpful in the current situation, and besides that, protein-based vaccines are more effective when they are used as a booster. Considering these studies, my way of thinking, the use of protein-based vaccines as boosters may be more beneficial.

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Conflict of Interest

None.

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