

COVID-19 Vaccine Boosters Inducing Neutralizing Immunity Against SARS-CoV-2 Omicron Variant

Attapon Cheepsattayakorn^{1,2*}, Ruangrong Cheepsattayakorn³ and Porntep Siriwanarangsun¹

¹Faculty of Medicine, Western University, Pathumtani Province, Thailand

²10th Zonal Tuberculosis and Chest Disease Center, Chiang Mai, Thailand

³Department of Pathology, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

*Corresponding Author: Attapon Cheepsattayakorn, 10th Zonal Tuberculosis and Chest Disease Center, Chiang Mai, Thailand.

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The Omicron variant (BA.1/B.1.1.529) is characterized by mutation of an unusually high number, with 26 to 32 changes (up to 36 mutations) in the spike (S) glycoprotein [1-3], the key epitopes (target) of neutralizing antibodies [2,3]. A recent study revealed that the Omicron variant is more likely to cause reinfection than previous SARS-CoV-2 variants, indicating some immune-escape levels [4]. Recently, neutralization potency of sera mRNA-1273, BNT162b2, and Ad26.COV2.S vaccine recipients against wild-type, Delta, and Omicron SARS-CoV-2 pseudoviruses was studied and demonstrated potent neutralization of Omicron variant and 4-6-fold lower than the wild type among mRNA vaccinated individuals, indicating enhanced cross-reactivity of neutralizing antibody responses [2,4]. Polyclonal sera from persons vaccinated with two doses of the BNT162b2 COVID-19 vaccine and from convalescent persons showed a near-complete lack of neutralizing activity against Omicron variant, as well as different monoclonal-antibodies resistance in clinical application [2,3].

In conclusion, the significance of additional mRNA-vaccine doses, at least two doses to promote neutralizing antibody (humoral immune) responses against divergent SARS-CoV-2 variants, particularly the Omicron variant.

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