

Booster Shot Is Still Effective Against Omicron Ba.4 and Ba.5 Subvariants

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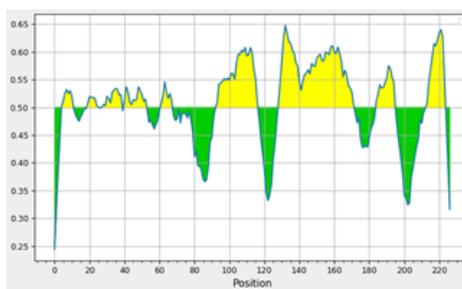
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Dear Editor

Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is a strain of coronavirus that causes COVID-19 that was first identified in Wuhan of, China, on 2019 (Coronaviridae Study Group of the International Committee on Taxonomy of Viruses, 2020). Omicron variant is one of the SARS-CoV-2 variants that was first informed to WHO (World Health Organization) via South Africa (Network for Genomics Surveillance) on 24 November 2021 (1). The omicron was first detected in Botswana, and then the variant has spread to become omicron's predominant variant in circulation worldwide (2). Behind the original BA.1 variant (the first dominant omicron variant), several subvariants of omicron, such as BA.2, BA.3, BA.4, and BA.5 (3). Omicron subvariants BA.4 and BA.5 were

classified as V-22APR-03 and V-22APR-04 by the VTG. BA.4 was designated based on potentially biologically significant mutations in spike. The BA.4 mutations are NSP4: L438 (WT, wild type); S: 69/70 deletion, L452R, F486V, Q493 (WT); ORF 7b: L11F; N: P151S and the S gene 69/70 deletion. The BA.5 has similar mutations/deletions with BA.4 except M: D3N; ORF 6: D61 (WT); ORF 7b: L11 (WT); N: P151 (WT); synonymous SNPs: A27038G, and C27889T (UK health security agency, 2022) (4). Some people believe that the currently used vaccines are ineffective against new subvariants (Ba.4 and BA.5), which is why they do not get vaccinated. This study aimed to investigate the Ba.4 and BA.5 mutations by Bioinformatic analysis.



No.	Start	End	Peptide
2	8	14	FRVQFTE
3	72	75	VSPT
5	113	118	YKLPDD
6	129	139	NNLDSKVGNGY
12	213	223	TVCGPKKSINL

Figure 1. B cells epitopes of RBD.

Since some currently used vaccines target the RBD (Receptor Binding Domain) of the S protein of SARS-CoV-2, in this research, the mutations of RBD have been investigated. The results obtained from the IEDB analyzer showed that there are a minimum of five highest score B cell epitopes that remained unchanged (**Figure 1**) (5). T-Cell epitopes analysis indicated that there are still a lot of unchanged (lots of HLA-A, HLA-B, and HLA-C) and common epitopes (for different MHC) between the original variant (Wuhan)

and BA. 4/5 variants. The result of our analysis indicates that the currently used vaccine can stimulate humoral and cellular immunity and the vaccines help protect against *severe illness*, hospitalization, and death.

Conflict of Interest

The authors declare no conflict of interest.

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