Editorial

COVID-19 vaccine induced t-cell immunity influenced by age and comorbidities

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Attapon Cheepsattayakorn,[1,2] Ruangrong Cheepsattayakorn,[3] Porntep Siriwanarangsun[1]

[1]Faculty of Medicine, Western University, Thailand
[2]10th Zonal Tuberculosis and Chest Disease Center, Thailand
[3]Department of Pathology, Faculty of Medicine, Chiang Mai University, Thailand

Correspondence: Attapon Cheepsattayakorn, 10th Zonal Tuberculosis and Chest Disease Center, 143 Sridornchai Road Changklan Muang Chiang Mai 50100, Thailand, Tel 6653140767, 6653276364, Fax 6653140773, 6653273590, Email Attapon1958@gmail.com

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Editorial

Severe acute respiratory syndrome-coronavirus type 2 (SARS-CoV-2) emerged in Wuhan, China in 2019 and caused coronavirus disease 2019 (COVID-19) and more than 1.4 million deaths, as of July 22, 2021.[1] Severe form of infection is associated with respiratory distress syndrome, pneumonia, myocarditis, renal injury, gastrointestinal, testicular, ophthalmic, central-nervous-system diseases, etc.[2] SARS-CoV-2, spherical form, diameter of 125 nm., and a single positive-strand-ribonucleic acid (RNA) is rapidly spread in animals and humans.[3] S-protein of the surface of virus is most important for virus-host cell binding, fusion and host cell entry through the cellular Angiotensin Converting Enzyme 2 (ACE2) and finally infect the host cell,[4] in addition to the sixteen non-structural proteins, and eight accessory proteins.[5]

In previous animal studies, protection from SAR-CoV-2 (COVID-19) infection contributed from both cellular and humoral immune responses. Most COVID-19 mRNA vaccine studies have concentrated on post-immunization-humoral-response characterization.[6–10] Alpha, Delta variant strains, and original Wuhan strain contributes an association between protection against COVID-19 and antibody (humoral) level, detected by previous studies.[11–13] With greater magnitude of CD4+ cells, compared with CD8+ T cells, persist-at-least-6-month-post-immunization-SARS-CoV-2-mRNA-vaccine-induced-cellular-immunity was evidenced by SARS-CoV-2-Spike-specific CD8+ and CD4+ T cells.[14–16] Both cellular and humoral SARS-CoV-2 Spike Specific immune responses of the adaptive immune system rises with each vaccine dose, whereas progressively reduce with higher comorbidity prevalence and older age (Figure 1).[17] A previous study demonstrated lower spike-protein antibody levels in individuals with medical conditions and those with 50 years of age and older in double Sino pharm vaccinated group, whereas a booster dose of Pfizer/BioNTechBNT162b2 vaccine critically increased spike-protein antibody levels.[18]

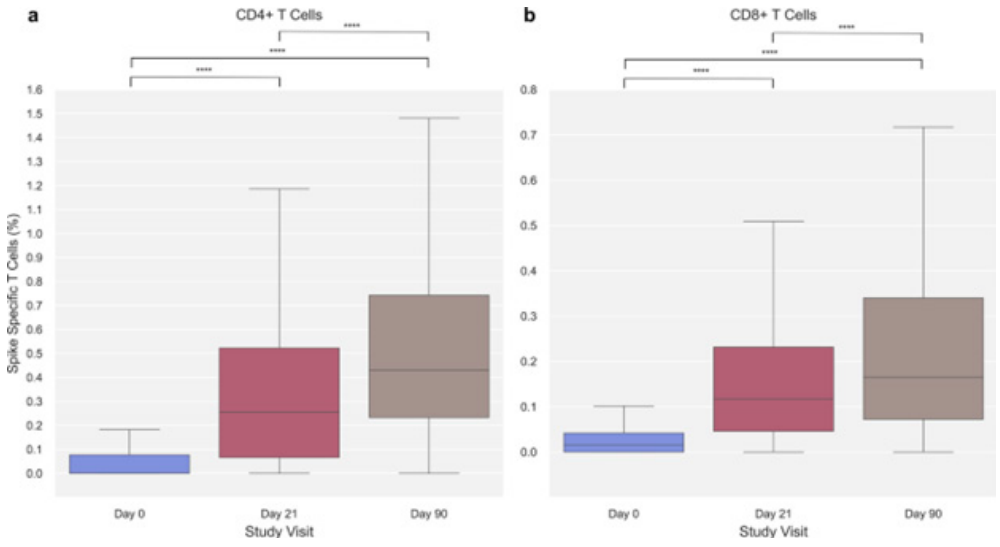

Figure 1

a) SARS-CoV-2 Spike-specific CD4+T cells at day 0 (blue), 21 (red), and 90 (brown) (n=286, 460, and 462, respectively).

b) SARS-CoV-2 Spike-specific CD8+T cells at day 0 (blue), 21 (red), and 90 (brown) (n=272, 444, and 449, respectively). Data was compared using unpaired, non-parametric Mann–Whitney U-test. Error bars show the distribution within 1.5 times IQR.[17]

Conclusion

In conclusion, overall cross-reactive T cell responses against different SARS-CoV-2-variants of concern (VOC) in both previously infected and infection-naïve HCWs. For different VOC, COVID-19 booster vaccinations induce neutralizing antibody and strong T cell responses and the presence of T cell responses against SARS-CoV-2 VOC indicate that vaccine-induced T cell immunity contributes cross-reactive protection.

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Conflicts of interests

Author declares that there is no conflict of interest.

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