

Commentary: SARS-CoV-2 new variants: Characteristic features and impact on the efficacy of different vaccines

Ji Yun Zhou¹, Abbas Khan², Dong-Qing Wei^{2,3,4*}

¹Zhengyang Maternity and Child Health Hospital, Zhengyang, Henan, China

²Department of Bioinformatics and Biological Statistics, School of Life Sciences and Biotechnology, Shanghai Jiao Tong University, Shanghai, 200240, P.R. China

³Peng Cheng Laboratory, Vanke Cloud City Phase I Building 8, Xili Street, Nanshan District, Shenzhen, Guangdong, 518055, P.R. China

⁴State Key Laboratory of Microbial Metabolism, Shanghai-Islamabad-Belgrade Joint Innovation Center on Antibacterial Resistances, Joint Laboratory of International Cooperation in Metabolic and Developmental Sciences, Ministry of Education and School of Life Sciences and Biotechnology, Shanghai Jiao Tong University, Shanghai 200030, P.R. China

*Author for correspondence:
Email: dqei@sjtu.edu.cn

Received date: October 05, 2021
Accepted date: November 03, 2021

Copyright: © 2021 Ju X, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Zhou J, Khan A, Wei D-Q. Commentary: SARS-CoV-2 new variants: Characteristic features and impact on the efficacy of different vaccines. J Biomed Res 2021;2(2):45-46.

Introduction

A recent article published by Abbas et al. in the Journal of Biomedicine and Pharmacotherapy systematically revealed about the vaccines developed against the recent pandemic agents SARS-CoV-2 and its variants [1]. The authors insightfully provided an overview on the distinct features of the SARS-CoV-2 new variants, the associated mortality rate, hospitalization, re-infection and finally the efficacy of different vaccines. The summary of the manuscript revealed that though it is not possible to completely evade the vaccine response but the reports of re-infection is worrisome and may have long term effects in the future. The authors stressed on the development of effective therapeutic means to overcome the problem of effective vaccination and the challenges of new variants can be addressed. The authors fell fairly short in suggesting larger policies or alternate therapeutic options that can lead to triumphant end of this pandemic. Thus, this commentary focuses to generate further discussion and debate and give generous recommendation for alternate COVID-19 therapeutic interventions.

Challenges and Suggestions for Alternate Therapeutic Interventions

1. The challenge of new emerging variants and the efficacy of different vaccines is a prime focus of the current pandemic. The authors in the article did not focus on the intranasal vaccines against SARS-CoV-2. Intranasal vaccination is an effective, safe and robust approach than the intramuscular. For instance, the effectiveness of intranasal vaccine is reported by different studies, where they reported that upon the administration of intranasal vaccine the nasal passages and bloodstreams were loaded with high level of antibodies against SARS-CoV-2 [2,3]. In particular when compared with the intramuscular vaccine no or less antibodies in the bloodstreams were reported. Thus, it says that the problem of blood clotting can also be overcome with the intranasal vaccination. Moreover, testing in different animal models also revealed that the intranasal vaccination is the first point of stopping the virus at doorstep which also helps in the effective clearance of the virus without reaching the lower and upper respiratory tracts. In addition, the clearance of the virus by the intranasal vaccine reduces the exposure of the virus to different immune systems thus minimizing the pressure on virus and acquiring new mutations. Decisively the practice of intranasal vaccination should be increased exponentially so that the virus is contained at entry point.
2. The challenge of unwillingness to take vaccines or the reasons of comorbidities further increases the risk of COVID-19 eradication. Though the vaccines are available but alternate therapeutic options should be the key focus to overcome the challenge of unacceptance of COVID-19 vaccine. Thus, alternatively synthetic nanobodies can be of great interest. Nanobodies are single domain antibodies of nano size, more stable and soluble. It offers a new choice, for COVID-19 prevention and treatment aside from injected vaccines. Testing of inhalable nanobodies, Nb3, against SARS-COV-2 has shown promising results and reported neutralization of the virus at very low concentration. In addition, Sb23 also showed to bind to spike RBD at multiple sites and neutralizes the virus. Nb91-hFc and Nb3-hFc are also reported to have stronger antiviral activity against the COVID-19. More importantly these nanobodies have shown promising results against the variants of concerns (VOCs) thus increases the choice of being used against

COVID-19 [4-6]. Consequently, the practice of developing and using nanobodies should be focused and incorporated in the COVID-19 eradication drive potentially contain the pandemic. These findings stress on the development inhalable natural and synthetic nanobodies are of great interest in the public health safety.

3. A nanomedicine-based treatments for the management of COVID-19 is the best choice that can be exercised for therapeutic purposes. For instance, testing of nanoparticle loaded vaccines produced robust immune response against multiple coronaviruses not only SARS-COV-2 [7]. This shows that the promising results of nanoparticles induced prophylactic properties against the coronaviruses. The use of nano-particles would also successfully increase the development of pan-vaccines against wide range of respiratory viruses. Alternatively, the testing and practice of nanoparticles loaded vaccines should be exercised.
4. Finally, and important genomic sequencing, tracing and the use of artificial intelligence methods to foresee the viral dynamics, prediction of emerging variants, characterization of host-pathogen attributes and the issues of climate change should be focused to put long-term end to such pandemics. Research collaborations and data sharing platforms are further needed to understand the geographic variations and specific treatment options.

We appreciate the efforts of Abbas et al., but COVID-19 pandemic can be eradicated with consensus health approaches but not only with vaccination. Thus, the aforementioned points on the alternate therapeutic routes particularly the development of inhalable (intranasal) vaccines and nanobodies will results in safe, effective

and long-term eradication of COVID-19. Therefore, integrated therapeutics response to control COVID-19 is in the best interest of the public health and safety.

References

1. Khan A, Khan T, Ali S, Aftab S, Wang Y, Qiankun W, et al. SARS-CoV-2 new variants: characteristic features and impact on the efficacy of different vaccines. *Biomedicine & Pharmacotherapy*. 2021 Sep 11:112176.
2. Park JG, Oladunni FS, Rohaim MA, Whittingham-Dowd J, Tollitt J, Hodges MD, et al. Immunogenicity and protective efficacy of an Intranasal Live-Attenuated Vaccine Against SARS-CoV-2. *Iscience*. 2021 Sep 24;24(9):102941.
3. Hassan AO, Kafai NM, Dmitriev IP, Fox JM, Smith BK, Harvey IB, et al. A single-dose intranasal ChAd vaccine protects upper and Lower Respiratory Tracts Against SARS-CoV-2. *Cell*. 2020 Oct 1;183(1):169-84.
4. Schoof M, Faust B, Saunders RA, Sangwan S, Rezelj V, Hoppe N, et al. An ultrapotent synthetic nanobody neutralizes SARS-CoV-2 by Stabilizing Inactive Spike. *Science*. 2020 Dec 18;370(6523):1473-9.
5. Custódio TF, Das H, Sheward DJ, Hanke L, Pazicky S, Pieprzyk J, et al. Selection, biophysical and structural analysis of synthetic nanobodies that Effectively Neutralize SARS-CoV-2. *Nature Communications*. 2020 Nov 4;11(1):1-1.
6. Lu Q, Zhang Z, Li H, Zhong K, Zhao Q, Wang Z, et al. Development of multivalent nanobodies blocking SARS-CoV-2 infection by targeting RBD of spike protein. *Journal of Nanobiotechnology*. 2021 Dec;19(1):1-2.
7. Saunders KO, Lee E, Parks R, Martinez DR, Li D, Chen H, et al. Neutralizing antibody vaccine for pandemic and Pre-Emergent Coronaviruses. *Nature*. 2021 May 10:1-7.