

## CORRESPONDENCE

## COVID-19 Delta variation; more contagious or more pernicious?

*Fereshteh Yazdanpanah<sup>1</sup>, Shayan Yazdanpanah<sup>2</sup>, Nima Rezaei<sup>3, 4, 5</sup>*

<sup>1</sup>Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA), Universal Scientific Education and Research Network (USERN), Tabriz, Iran; <sup>2</sup>School of Medicine, Hamadan University of Medical Sciences, Hamadan, Iran; <sup>3</sup>Research Center for Immunodeficiencies, Children's Medical Center, Tehran University of Medical Sciences, Tehran, Iran; <sup>4</sup>Network of Immunity in Infection, Malignancy and Autoimmunity (NIIMA), Universal Scientific Education and Research Network (USERN), Tehran, Iran; <sup>5</sup>Department of Immunology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

To the Editor,

Among the advancement of the COVID-19 pandemic, the pathogenic virus proceeds to change genomic epidemiology and steadily whole-genome sequencing evolution. One of the latest variations, SARS-CoV-2 delta, B.1.617.2 variant of concern (VOC) formerly, has become the most prevalent type of SARS-CoV-2 in many countries (1). It was first classified in India in December 2020 and quickly established itself as the most common lineage within the country, leading to an ultimate increase in the number of cases and daily deaths and overburdening of health systems in April 2021. More detailed analysis disclosed that the prevailing lineage in distribution is a novel identified lineage B.1.617 holding in common signature mutations D111D, G142D, L452R, E484Q, D614G, and P681R, in the spike protein, containing within the receptor-binding domain (RBD) (2, 3).

Following the initial high mortality rate of this variation in India as its hostess, as the growing number of fatal reports from several countries regarding its transfer to most parts of world in recent months, Delta variation was known as the deadliest COVID-19 (4-6).

According to official statistics, the mortality rate in individuals in areas where the Delta variant has become dominant is much higher than the same period and the epidemic with previous COVID-19 lineages. The enigma here is, does this mean more lethality of this variant?

Based on new findings, strains that contain L452R mutation can evade host immune response by escaping both cell and humoral immune systems, so it can be concluded that this virus is more dangerous and deadly. On the other hand, the mutations of this new variant could point to increased ACE2 binding resulting in more transmissibility (2, 7, 8). This shift causes more people to get the disease on an equal footing compared to other variants. As some studies estimate, the probability of spreading the disease doubled.

Meanwhile, the efficiency of the vaccines available in the market against the Delta variant is controversial. There are pieces of evidence that the effectiveness of vaccines against this strain has diminished. However, recent studies have shown that two doses of vaccines are effective at preventing hospitalization and death, neutralization levels of vaccinated sera are lower against the Delta variant compared to the initial strain. This fact would highlight the dangerousness of this variant and partially explain its wide diffusion in the world population (9, 10).

Besides, due to the chronic and prolonged period of the pandemic and its psychosocial effects, the observance of health protocols, social distance, use of masks relative to the beginning of the pandemic have decreased, which incidentally, is significant in areas with higher mortality. All of the above-mentioned leads to an explosion in the patient's number and more extraordinary pressure on the health system of countries as a consequence. Due to the chronic involvement of the

medical staff during the pandemic, besides the high physical and mental pressures, along with the very high number of patients and people in need of care, it is possible that the health system collapsed and care not adequately available to everyone. In any case, it should be regarded in mind that medical facilities, both in terms of medical equipment and human resources, are a certain amount and are not defined for such conditions. Additionally, even the lack of drugs and oxygen is significant in some regions in that situation. As a result, the disproportionate number of people in need of care and available facilities will increase the casualties.

So it seems that conducting a comprehensive study considering all these aspects helps to clarify our initial question. Is Delta variation more lethal, or does it takes more victims for more transmissibility?

**Conflicts of interest:** Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

## References

1. Our World in Data. Share of COVID sequences that are the delta variant. 2021 July 20, 2021; Available from: <https://ourworldindata.org/grapher/covid-cases-delta>.
2. Cherian S, Potdar V, Jadhav S, et al. Convergent evolution of SARS-CoV-2 spike mutations, L452R, E484Q and P681R, in the second wave of COVID-19 in Maharashtra, India. *bioRxiv*, 2021.04.22.440932. doi: <https://doi.org/10.1101/2021.04.22.440932>.
3. Motozono C, Toyoda M, Zahradnik J, et al. An emerging SARS-CoV-2 mutant evading cellular immunity and increasing viral infectivity. *bioRxiv*, 2021.04.02.438288. doi: <https://doi.org/10.1101/2021.04.02.438288>.
4. Salvatore, M, Bhattacharyya, R, Purkayastha, S, et al. Resurgence of SARS-CoV-2 in India: Potential role of the B.1.617.2 (Delta) variant and delayed interventions. *medRxiv*, 2021.2006.2023.21259405.
5. Kumar, A, Dwivedi, P, Kumar, G, et al. Second wave of COVID-19 in India could be predicted with genomic surveillance of SARS-CoV-2 variants coupled with epidemiological data: A tool for future. *medRxiv*, 2021.2006.2009.21258612.
6. Shah SA, Moore E, Robertson C, et al. Predicted COVID-19 positive cases, hospitalisations, and deaths associated with the Delta variant of concern, June–July, 2021. *Lancet*, 2021.09.10. DOI: [https://doi.org/10.1016/S2589-7500\(21\)00175-8](https://doi.org/10.1016/S2589-7500(21)00175-8).
7. Wu K, Werner AP, Koch M, et al. Serum Neutralizing Activity Elicited by mRNA-1273 Vaccine. *N Engl J Med*, 2021,384(15):1468-1470.
8. Callaway E. Delta coronavirus variant: scientists brace for impact. (Accessed on 25/06/21). Available online from: <https://www.nature.com/articles/d41586-021-01696-3>.
9. Lopez Bernal, J, Gower C, Andrews N. Effectiveness of Covid-19 Vaccines against the B.1.617.2 (Delta) Variant. *New England Journal of Medicine*, 2021. 385(7): 585-594.
10. Yadav, P. D., et al. Neutralization of Beta and Delta variant with sera of COVID-19 recovered cases and vaccinees of inactivated COVID-19 vaccine BBV152/Covaxin. *Journal of Travel Medicine*, 2021 Oct 11;28(7):taab104. doi: 10.1093/jtm/taab104. PMID: 34230972; PMCID: PMC8344909.

## Correspondence:

Received: 10 August 2021

Accepted: 27 August 2021

Nima Rezaei, MD, Ph.D

Children's Medical Center,

Dr. Gharib St, Keshavarz Blvd,

Tehran, Iran

Phone: +982166929234

E-mail: [rezaei\\_nima@yahoo.com](mailto:rezaei_nima@yahoo.com)