

Omicron SARS-CoV-2 Variant: What We Do Know so Far?

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On 26th of November 2021, World Health Organization (WHO) declared a new coronavirus variant Omicron, B.1.1.529, as a variant of concern (VOC) [1]. Omicron variant was first reported in South Africa and Botswana in November 2021 and has rapidly become the dominant variant after less than four weeks. As of January 12, 2022, more than 20 countries across four continents have reported their highest daily rises, highlighting speed with which Omicron has spread. It has expected also that, at this rate, approximately 50% of the population in Europe will be infected with Omicron in the next six to eight weeks [2].

Viral characteristics of Omicron variant

Scientists revealed that the infectivity of the Omicron variant is 3-5 times higher than that of the Delta variant. It is known that at least 30 amino acid substitutions of the Omicron variant spike protein underwent genetic shifts and also three small deletions have occurred. Numerous analysis indicated mainly that N501Y, Q498R, H655Y, N679K and P681H point mutations had been shown to increase binding ability to the SARS-CoV-2 receptor ACE2 and enhance spike cleavage [3]. This is why Omicron variant is easily invades human cells and is more contagious than the delta variant.

What are Omicron symptoms like?

According to the medical data, breathing difficulties are less likely than other variants, which means that it may cause less damage to the lungs. Research team from the University of Hong Kong found also that the Omicron variant grew 10 times slower in lung tissue, however it can multiply 70 times faster in bronchial tubes [4]. Sore throat, similar to those of influenza, is one of the main symptoms reported by Omicron patients as well as headaches, runny or stuffy nose, sneezing and coughing are also extremely common [5].

Can Omicron re-infect people who have already been infected with COVID-19?

Retrospective analysis of routine epidemiological surveillance data by Pulliam et al. revealed that Omicron variant may be associated with an increase in the risk of reinfection after a primary infection. Among 2,796,982 individuals with laboratory-confirmed SARS-CoV-2 who had a positive test result at least 90 days prior to 27 November 2021, there were 35,670 individuals suspected of reinfection. The authors concluded that there is no evidence of increased reinfection

risk associated with circulation of Beta or Delta variants, while the Omicron variant has an ability to evade immunity from prior infection [6]. Another report from the Imperial College London COVID-19 response team demonstrated also that, controlling for vaccine status, age, sex, ethnicity, asymptomatic status, region and specimen date, Omicron was associated with a 5.40 (95% CI: 4.38-6.63) fold higher risk of reinfection compared with Delta. One important detail of this study that should be taken seriously is the protection of the healthcare workers against a second COVID infection over 6 months. It has been suggested that this estimated protection has fallen from 85% to 19% (95%CI: 0-27%) [7].

Omicron vs vaccines

Studies have found that vaccines against COVID-19 may protect us only partially from the highly mutated Omicron variant. Billy Gardner and Marm Kilpatrick from the University of California, Santa Cruz developed computer models incorporating data on COVID-19 vaccines' efficacy against earlier variants and initial data on the Pfizer/BioNTech vaccine against Omicron. By this model, after a two-dose series of the mRNA vaccine from Pfizer/BioNTech, the protection against Omicron variant is only 30%, down from about 87% effectiveness against the Delta variant. Moreover, according to this analysis, booster vaccination can restore the protection to about 48% [8]. On the other hand, according to the study conducted by Shanghai Jiao Tong University and a Shanghai-based lab specializing in respiratory infectious diseases, the booster shots produced by Sinopharm had significantly lower effectiveness against Omicron variant. The neutralising antibody activity of the Sinopharm BBIBP-CorV booster vaccine showed a 20.1-fold decrease in the effectiveness, compared with its activity against a Wuhan strain [9]. Due to these facts, countries around the world are pushing to accelerate booster vaccination programs as the Omicron variant continues to spread globally.

Efficacy of antiviral drugs vs Omicron variant

Pharmaceutical companies and laboratories worldwide are working to develop medicines for COVID-19. Especially, monoclonal antibodies (MAbs) show the most effect in COVID-19 patients. Most of the MAbs, approved by FDA, are targeting the receptor binding domain of the SARS-CoV-2 spike protein, which is mutated highly in the Omicron variant.

Recent study by Dabrowska et al revealed that IC50 of paxlovid (PF-07321332, Pfizer), molnupiravir (MK-4482, Merck), and remdesivir (GS-5734, Gilead Sciences) was similar as described previously, and effective against Omicron variant [10]. Another report by Cao et al. also demonstrated that sotrovimab (VIR-7831, GlaxoSmithKline and Vir Biotechnology) may retain its activity against the Omicron variant [11].

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