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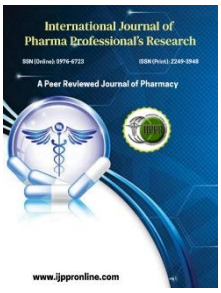

A Comprehensive review on COVID-19 Variant: Delta plus and Omicron Variant

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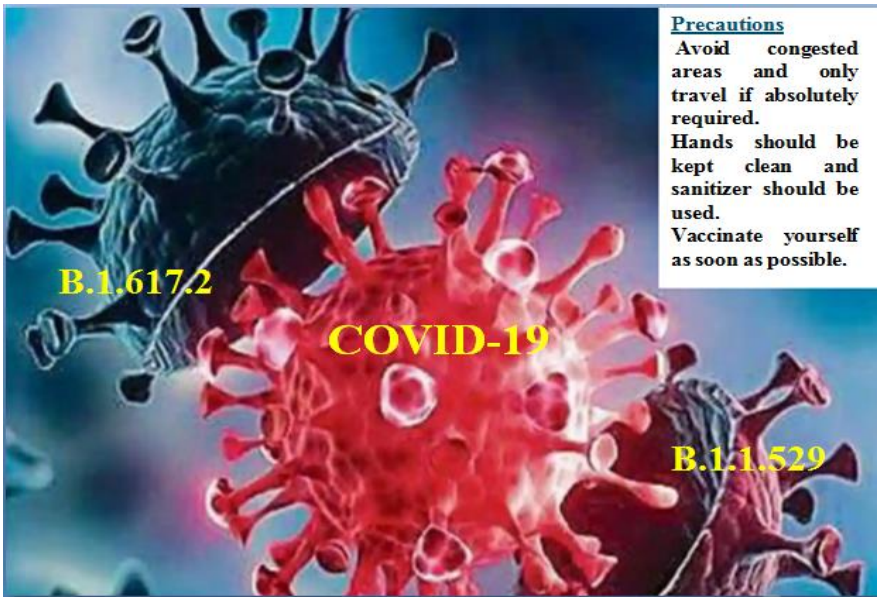
ABSTRACT:

The Delta plus variant, often known as the K417N mutation and B.1.1.529 is known as Omicron, K417N was initially discovered in India in April 2021 and was first announced in the public health England bulletin on June 11th 2021, and the report was released in order to continue sharing detailed Delta surveillance information (VOC-21APR-02, B.1.617.2). On November the 1st Omicron case was reported by South Africa. Delta plus has also been discovered in nine other nations, including the United States, the United Kingdom, Portugal, Switzerland, Japan, Poland, Nepal, Russia, and China. Delta plus may have a modest advantage in infecting and propagating among those who have already been infected. The Indian variety of SARS CoV-2, also known as B.1.617, is a Coronavirus variant that had a key role in India's second wave of infection. B.1.617 has three noteworthy sub-variants. B.1.617.2, which was detected in India in December 2020, is the most concerning. In December 2020, a new sub-variant known as B.1.617.1 was discovered for the first time in India. B.1.617.1 was found in 50% of all reported sequences by late March, but the proportion dropped in April. B.1.617.1 is known as the "Indian double mutant," although this label is misleading because it has about 15 mutations when compared to older variants." The term "double mutant" refers to the presence of two mutations in the outer spike protein of the bacterium. Omicron is the 3rd wave of mutated variant stated by W.H.O during November.

GRAPHICAL ABSTRACT



Introduction:

Coronaviruses are a genus of viruses that can infect a variety of animals and cause mild to severe respiratory infections in humans [1]. Two highly pathogenic coronaviruses with zoonotic origin, the severe acute respiratory syndrome coronavirus (SARS-CoV) and the Middle East respiratory syndrome coronavirus (MERS-CoV), respectively, emerged in humans and caused fatal respiratory illness in 2002 and 2012, bringing emerging coronaviruses into the twenty-first century as a new public health concern. SARS-CoV-2 developed in the Chinese city of Wuhan, Hubei, at the end of 2019 and triggered an outbreak of a typical viral pneumonia. A modified version of the B.1.617.2 variety or strain, the Delta Plus, or Delta-AY.1 variant, is a sub-lineage of the Delta variant. The K417N mutation in the spike protein of the SARS-CoV2 virus, which causes Covid-19 illness, distinguishes this strain. Dry cough, Shortness of breath, abdominal pain, diarrhea, fever, headache, skin rash, discoloration of fingers and toes, chest pain, and shortness of breath are just few of the symptoms associated with this variety [2]. On June 11, the variant, known in India as "Delta Plus," was first disclosed in a Public Health England alert. It is a sub-lineage of the Delta variant, which was first discovered in India, and has acquired the spike protein mutation K417N, which is also seen in the Beta variant, which was discovered in South Africa [3]. On November 2021 the 3rd wave was reported by SARS-CoV-2, the virus that causes COVID-19, has a variation called Omicron [4]. Due to a considerable number of mutations in the SARS-CoV-2 receptor-binding domain (RBD), the Omicron variation displayed a higher affinity for human angiotensin-converting enzyme 2 (ACE2) than the Delta variant in this investigation, indicating a higher potential for transmission. The Q493R, N501Y, S371L, S373P, S375F, Q498R, and T478K mutations all contribute considerably to high binding affinity with human ACE2, according to docking studies. In comparison to the Delta version, Omicron has a higher amount of hydrophobic amino acids like leucine and phenylalanine in both the whole spike protein and the RBD. These amino acids are found in the core of the protein and are necessary for structural stability [5].

Delta-AY.1 (Delta with K417N)

A modest number of sequences having the spike protein mutation K417N were discovered by routine Delta variation analysis. As table 1, the reported data, there are at least two Delta clades in K417N. One clade with the PANGO lineage name AY.1 is broad and widely spread. Sequences submitted to GISAIDS from the United States revealed a second clade [6]. On GISAID as of 7 June 2021, 63 Delta with K417N genomes had been found from Canada (1), Germany (1), Russia (1), Nepal (2), Switzerland (4), India (6), Poland (9), Portugal (12), Japan (13), and the United States (14) [4]. We looked at the prevalence of six important mutations (T95I, G142D, R158G, L452R, T478K, and K417N) at various time points to see how Delta Plus differed from Delta [7]. The mutations were

chosen because they were either unique (e.g., K417N) or substantially connected with another mutation in other variations (e.g., T95I being variably associated with other Spike protein mutations). As per table 2, when compared to Wuhan-related virus, monoclonal antibodies, convalescent, and vaccination sera lower the neutralization of the Delta variant harbouring T478K or L452R/T478K mutations. R452 inhibited antibody binding by contacting a 6-residue-long heavy chain (HC) complementarity determining region 3, while K478 disrupted Fab 253 antibody interaction due to longer sidechains than leucine and threonine, according to structural data [8]. The table 3 shows the VOC, the atomic basis for improved Delta variant transmission was given by these structures. T95I, G142D, and W258L do not have structural data similar to T95I. As per figure1, the result, we investigated accessible structures in the Protein Data Bank to get insight into the impact of mutations (such as D142G, R158G, W258L, and K417N).

SARS-CoV-2 Immunity and Reinfection monitoring [SIREN Study]

The cohort study including 135 sites and 44,549 participants across the UK, 35,714* in England, who remain under active follow-up with PCR testing every 2 weeks for COVID-19 by PCR [12].

PRECAUTIONS FOR DELTA PLUS VARIANT

- Don't leave the house unless absolutely necessary.
- Before meeting somebody, sanitize your hands.
- Make sure everything is clean and sanitized.
- Several times a day, wash your hands for 20 seconds with soap.
- The most important thing to remember is to obtain your vaccine as soon as possible.

Omicron - B.1.1.529

On Nov 11, 2021, Botswana reported the first sequenced B.1.1.529, omicron case, and a few days later, Hong Kong reported another sequenced case in a tourist from South Africa [13]. It is unknown whether Omicron infection causes more severe disease than other forms, such as Delta. Following the discovery that the novel variant was linked to an S-gene target failure on a specific PCR assay due to a 69–70del deletion, similar to the alpha version, many sequences from South Africa were produced [14]. Preliminary evidence suggests that, as compared to other variations of concern, Omicron may pose a higher risk of reinfection (i.e., those who have previously had COVID-19 may be more easily reinfected with Omicron), although data is limited [15]. As per table 4, Omicron has a few deletions and over 30 mutations, some of which (for example, 69–70del, T95I, G142D/143–145del, K417N, T478K, N501Y, N655Y, N679K, and P681H) overlap with those in the alpha, beta, gamma, or delta VoCs [16-20]. An individual who travelled in from the United Kingdom to Kochi has been confirmed as the first documented case of COVID-19 caused by an Omicron virus strain in Kerala [21-27]. On December 2, 2021, the first cases of Omicron in India were confirmed in Karnataka. A 40-year-old Nagpur man who recently travelled to South Africa tested positive for the Covid-19 variant Omicron, bringing Maharashtra's total to 18 cases on 5 December 2021, A 37-year-old Tanzanian man who arrived in Delhi fully vaccinated became the first Omicron patient in the national capital on 5 December 2021, On the 10th of December, two Omicron cases were verified in Jamnagar, Gujarat, after two contacts of the NRI who was the state's first Omicron case tested positive and the novel variation was discovered [28-33]. Omicron infection is detected using two types of tests Antigen tests and nucleic acid amplification tests (NAATs). Weakness, weariness, headaches, low temperature, throat soreness, loss of taste, and other symptoms are common in Omicron. Shortness of breath and organ failure is serious symptoms.

PRECAUTIONS FOR OMICRON

1. Maintain a physical distance of at least 1 metre between yourself and others.
2. Wear a mask that is well-fitting.
3. Avoid congested areas and only travel if absolutely required.
4. Hands should be kept clean and sanitizer should be used.
5. Sneeze into a tissue or a bent elbow.
6. Vaccinate yourself.
7. To boost your immunity, eat a nutritious diet.
8. Take Booster dose.

TREATMENT

Antibiotics are commonly used by doctors in the treatment of B.1.617.2 and B.1.1.529; however there is no clear information available. For fever use

antipyretic dosage form, Getting vaccinated as soon as possible is the only method to prevent this.

CONCLUSION

These two variant concludes that people should avoid gatherings, wear a mask and use sanitizer, and get vaccinated as soon as feasible. If you experience symptoms, see a doctor as soon as possible and self quarantine.

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CONFLICT OF INTEREST

The authors declare no conflict of interest. The authors alone are responsible for the content and writing of this article.

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