



Omicron: The 5th variant of concern

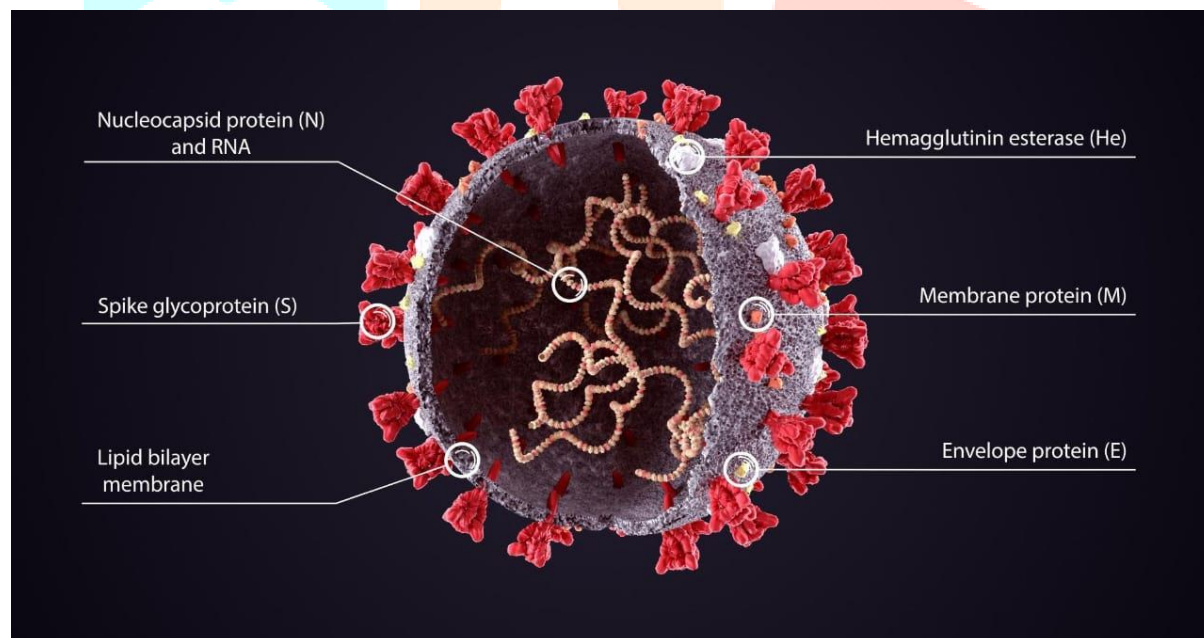
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Abstract:

The discovery of the SARS-COV-2 Omicron strain, which is severely modified, has caused concern all across the world. Healthcare systems are seriously threatened by the virus's growing virulence and transmissibility. The numerous mutations in its spike proteins allow it to evade antibodies, casting doubt on the efficacy of the existing vaccinations.

Keywords:

Omicron, mutation, spike protein, transmissibility variant of concern, diagnosis.



A novel SARS COV-2 B 1.1.529 variant was identified by WHO on November 24, 2021. In samples taken on November 11, 2021, in Botswana, and November 14, 2021, in South Africa, this novel variation was found. Less than a month later, numerous publications in the magazines nature and cell describe the extensively altered variant's immune evasion traits.

Omicron has more than 30 changes in its spike protein compared to the original Wuhan HU-1 strain, 15 of which are in the receptor, binding domain (RBD), one of the primary targets of neutralising antibodies (n Abs).

On November 26, 2021, WHO identified this variation as a "variant OF Concern" (voc) and gave it the Greek letter "omicron" as its designation. Virus variations that have increased virulence, increased transmissibility, decreased public health effectiveness, and therapeutic vaccine availability are considered to be variants of concern.

Since the "S" gene is one of the targets of the PCR diagnostic procedure, the absence of this gene may result in false negative findings. The total number of omicron variants in the genome is approximately, and there are around so many mutations, including more than 30 in the spike protein.

Omicron BA.2 Variant to Become Dominant in the U.S.

Viral lineage of newly detected Covid-19 infections in the U.S. per week (in percent)



Rest= others
 * Includes subvariant B.1.1.529 ** CDC prediction
 Source: CDC



WHO label	Pango Lineage	GISAID clodp	Next strain clade	Additional amino acid changes monitored	Earliest document sample	Date of designation
Alpha	B.1.1.7	GRY	20I (V1)	+5:484K +5:452R	UK Sep-2020	18 Dec 2020
Beta	B.1.351	GH/SolY N2	20H(V2)	+5:118F	SA May-2020	18 Dec 2020
Gamma	P.1	GR/SolY V3	20J(V3)	+5:618H	BRAZIL Nov-2020	11 Jan 2021
Delta	B.1.617.2	G/478k V1	21A,21I, 21J	+5:417N +5:484K	INDIA Oct-2020	VOT.4 April 2021 VOC.11 May 2021
Omicron	B.1.1.529	GR/8484A	21K	-	Multiple countries in 2021	VUM.24 Nov 2021 VOC.26 Nov 2021

Omicron spike containing pseudo virus with was twice as efficient at infecting cells as delta, while other mutations drive Immune escape.

Overall, the investigations concur that very low undetectable amounts of nAbs against omicron are present in sera from convalescent as well as fully immunised Peoples (BNT 1.62b2, mRNA-1273, Ad 26 COV 2.5 or chAdox- 1-n COV 19, sputnik -V or BBIBP-Cor V). Sukhulile Moyo, director of Horward HIV, Reference Laboratory, finds it extremely concerning how quickly the omicron Variant has amassed so many mutations. We are attempting to understand why omicron experiences so many mutations so quickly, he added. One idea holds that the strain originated in an immunocompromised person who was exposed to the virus for a considerably longer period of time than usual. Another notion is that the omicron variety evolved as a result of a reverse-zoonotic event, according to immunologist "kristion Andersen" of the Scripps Research Institute. meaning that a zoonotic virus has been transmitted from humans to animals.

Omicron version is extremely transmissible, spreading many times quicker than delta variant, and can reinfect those who have already been infected, according to preliminary evidence from South Africa and other nations. The other Variants, spike proteins, are the main targets of vaccines, however this Variant can evade the vaccine-induced immunity due to the high frequency of mutations in spike proteins.

A study led by virologist Alex Sigal at "Africa to Health Research Institute in Durban", South Africa found that people who received Pfizer-Biotech Vaccine showed 40 times less effectiveness against omicron Variant Compared to other strains of SARS Cov-2 Study also found that people, who already been infected before had more neutralizing antibodies than vaccinated people who never got infected.

The omicron Variant is exceedingly difficult to identify with earlier diagnostic methods because of severe mutations. Companies are creating diagnostic kits for this variation using innovative methods for detecting it. Three new test kits have been created by TIB Molbial, a subsidiary of Roche, to identify the omicron variant.

According to Pfizer and Biotech, who developed the vaccine, it neutralises the omicron version. The risk of hospitalisation is greatly decreased after two doses, and the third dose significantly raises the body's neutralising titers against the omicron spike by 25 times.

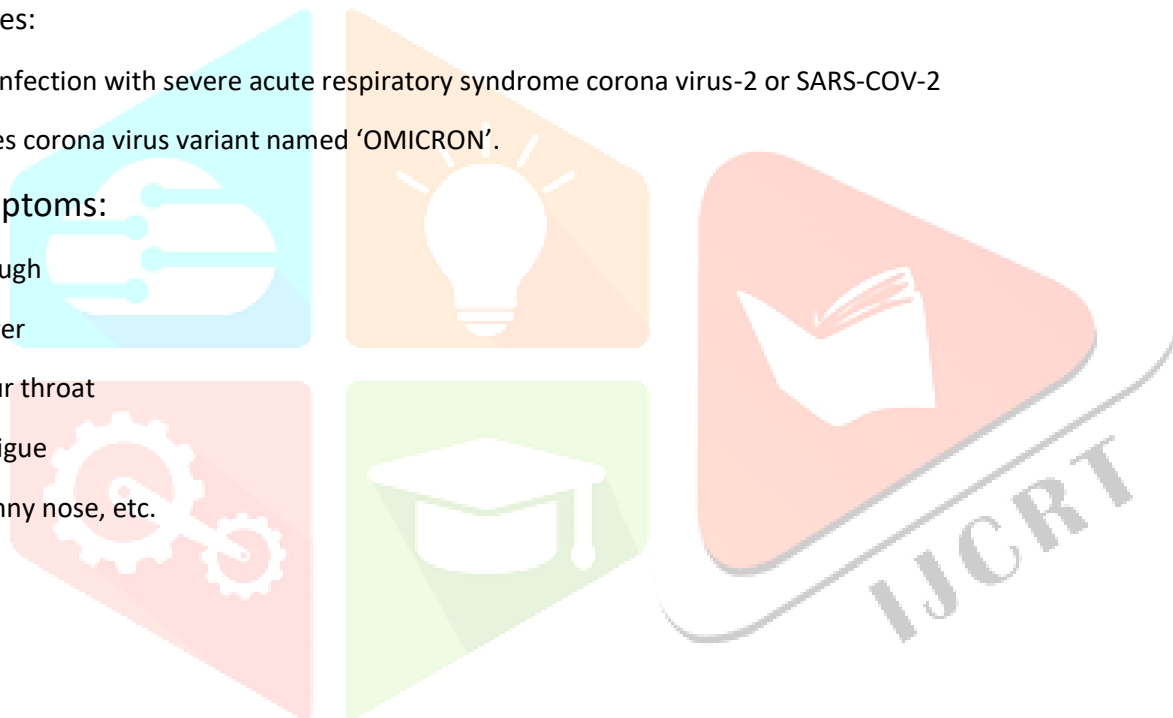
Causes:

- Infection with severe acute respiratory syndrome corona virus-2 or SARS-COV-2

causes corona virus variant named 'OMICRON'.

Symptoms:

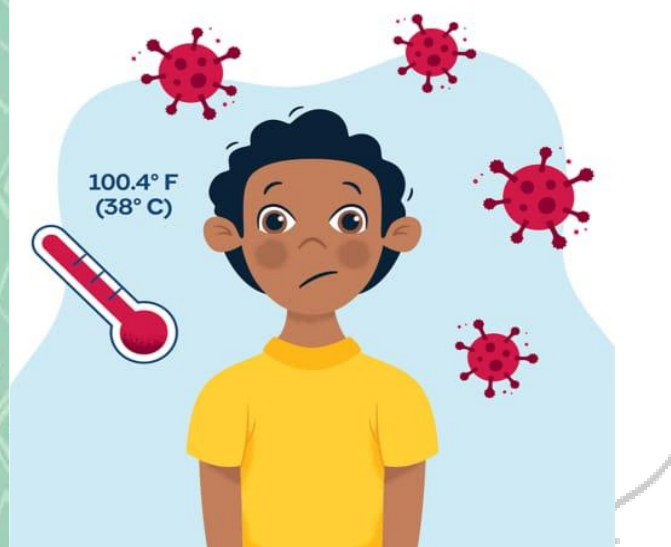
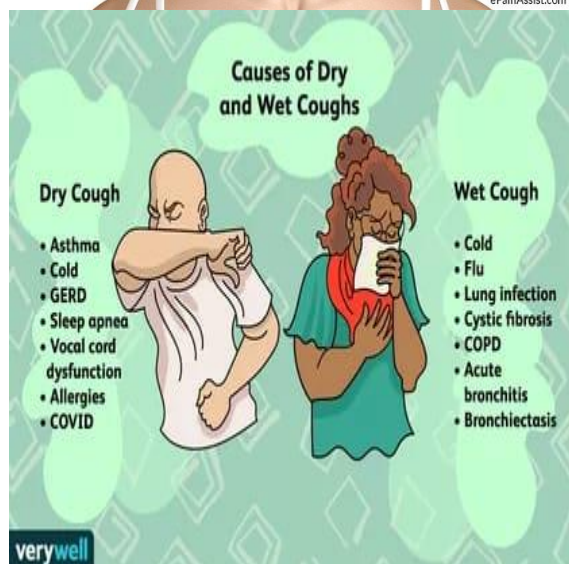
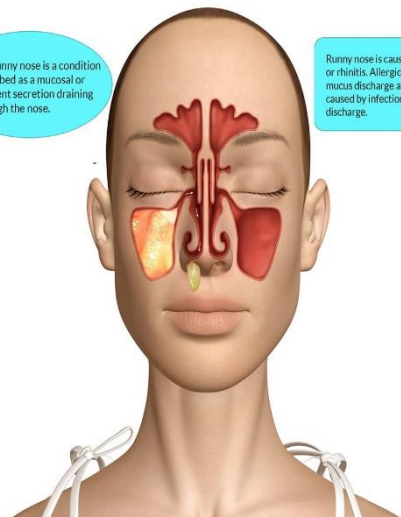
1. Cough
2. Fever
3. Sour throat
4. Fatigue
5. Runny nose, etc.



What is Runny Nose?

The runny nose is a condition described as a mucosal or purulent secretion draining through the nose.

Runny nose is caused by rhinorrhea or rhinitis. Allergic runny nose causes mucus discharge and runny nose caused by infection causes purulent discharge.



Omicron cases in India:

11 Dec 2021, 33 omicron cases identified in India alone 10 cases reported in Mumbai.

Diagnosis:

1. RT-PCR test
2. Antigen test

Incubation Period:

2-4 days

Side Effect:

1. Black Fungus
2. Kidney Failure
3. Blood clots and blood clots issues
4. Digestive symptoms including diarrhea
5. Chest pain or fast pounding heartbeat etc.

Recent News:

- 1.DCGI approved desi mRNA covid vaccine from gennova for 18 years and above peoples.
- 2.Children vaccination: 5 year children's give Corbevax, while 6-12 years children's give Covaxin.
- 3.'Incredibly Immune-Evasive' COVID Variant Fuels NY Reinfections, Hospitalisation Rate up 35% in Month
- 4.WHO chief scientist hinted that new Omicron subvariant BA.2.75 looks different from the previous variants.
- 5.Covid -19 cases are rising in the Northern Territory as Australia approaches a new Omicron wave 19 Jul 2022
- 6.Covid -19 Omicron outbreak:9953 new cases of covid-19, 32 deaths, 20 in ICU
- 7.Omicron BA.5 COVID subvariant spreading at 'very intense level', WHO warns
- 8.Arthritis drug Baricitinib used with corticosteroids to treat severe or critical Covid-19 patients led to better survival rates and reduced need for ventilators, the WHO experts said in their recommendation in British medical Journal the BMJ.
- 9.The Omicron Subvariant now dominating the U.S. is 'the worst version of the virus that we've seen'
- 10.Nasal vaccines for Covid-19:A needle less method of immunisation.27 Jun 2022

References:

1. CDC. gov. "Omicron variant what you need to know?" 11 Dec 2021
2. W.W.W. WHO. int. "Tracking SARS-COV-2 Variants"6 Dec 2021
3. WWW.bmj.com" Omicron may be more transmissible than other variants and partly resistant to existing Vaccines scientist Fear. 29 Nov 2021 By Ingrid Torjesen
4. WWW bloomberg.com "Scientist who first sequenced omicron worried by speed of change 4 Dec 2021 By Janice kew
5. WWW statenews com "Some experts suggest omicron variant may have evolved in an animal host" 2 Dec 2021 by Helen Branswell
6. Www.nature.com "Omicron likely to weaken COVID Vaccine protection 8 Dec 2021 by Ewen collaway
7. WWW. technology review. comseob "We won't know how bad omicron is For another month" 1 Dec 2021 by Antonio Regalado.
8. WWW.Pfizer.com"Prizer & BioNtech provide update an° Omicron variant" 8 Dec 2021.
- 9.nzherald.co.nz

ORIGINAL ARTICLES:

Cao, Y. et al. Omicron escapes the majority of existing SARS-CoV-2 neutralizing antibodies. Nature [https://doi.org/10.1038/d41586-021-03796-6\(2021\)](https://doi.org/10.1038/d41586-021-03796-6(2021)) | Cameroni, E. et al. Broadly neutralizing antibodies overcome SARS-CoV-2 Omicron antigenic shift. Nature [https://doi.org/10.1038/d41586-021-03825-4\(2021\)](https://doi.org/10.1038/d41586-021-03825-4(2021)) | Planas, D. et al. Considerable escape of SARS-CoV-2 Omicron to antibody neutralization. Nature [https://doi.org/10.1038/d41586-021-03827-7\(2021\)](https://doi.org/10.1038/d41586-021-03827-7(2021)) | Liu, L. et al. Striking antibody evasion manifested by the Omicron variant of SARS CoV-2. Nature [https://doi.org/10.1038/d41586-021-03826-3\(2021\)](https://doi.org/10.1038/d41586-021-03826-3(2021)) | Cele. S. et al. Omicron extensively but incompletely escapes Pfizer BNT 162b2 neutralization. Nature [https://doi.org/10.1038/d41586-021-03824-5\(2021\)](https://doi.org/10.1038/d41586-021-03824-5(2021)) | Garcia-Beltran, W. et al. mRNA-based COVID-19 vaccine boosters induce neutralizing immunity against SARS-CoV-2 Omicron variant. Cell [https://doi.org/10.1016/j.cell.2021.12.033\(2021\)](https://doi.org/10.1016/j.cell.2021.12.033(2021)) | Hoffmann, M. et al. The Omicron variant is highly resistant against antibody-mediated neutralization-implications for control of the COVID-19 pandemic. Cell [https://doi.org/10.1016/j.cell.2021.12.032\(2021\)](https://doi.org/10.1016/j.cell.2021.12.032(2021)) | Carreño, J. M. et al. Activity of convalescent and vaccine serum against SARS-CoV-2 Omicron. Nature [https://doi.org/10.1038/d41586-021-03846-z\(2021\)](https://doi.org/10.1038/d41586-021-03846-z(2021)) | Dejnirattisai, W. et al. SARS-CoV-2 Omicron-B.1.1.529 leads to widespread escape from neutralizing antibody responses. Cell [https://doi.org/10.1016/j.cell.2021.12.046\(2021\)](https://doi.org/10.1016/j.cell.2021.12.046(2021))

