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Why Omicron (B.1.1.529) variant is a worry?

Becoming dominant COVID-19 variant worldwide

Transcript:
History
The coronavirus outbreak began in Wuhan, China, in December 2019.

- Known as SARS-CoV-2, the virus has resulted in more than 265 million infections and more than 5.2 million deaths.
- The World Health Organization (WHO) is currently monitoring five variants of concern: Alpha, Beta, Gamma, Delta, and Omicron.

The variant detected by scientists recently in Gauteng, South Africa, a new mutant of SARS-CoV-2, labelled Omicron B.1.1.529, is a concern, because of the unprecedented large number of mutations or copies of the variant genome, that is spreading faster than the previous variants and infecting humen cells.
SARS is the term defined as severe acute respiratory syndrome or (SARS)-CoV-2.
We must live with Covid and the Omicron scare, and why?
This is supposed to be a cluster outbreak and a real resurgence and starting of a 4th wave.
The fear is also there that these mutant variations can evade some of the immune protection afforded by vaccines, based on the original spike proteins like Pfizer and Moderna mRNA vaccines.
On November 16, 2021, there were 136 daily recorded cases of COVID-19 infections from this variant in South Africa and by 25th of same month the numbers had increased to 1,200.
This variant is now spread to Hongkong, Europe, Canada, Israel, Japan, and the United States and Australia.
Let us discuss the basics of the spike protein that is causing havoc within our body cells, resulting in multiple copies through a process of mutation.

A particular part of the spike called receptor-binding domain (RBD) binds to a receptor called ACE2in the membrane of human cells. The spike receptor-binding domain is composed of a glycoprotein to enter cells in our body.
So, the coronavirus SARS-CoV-2 entry into host cells is mediated by its spike glycoprotein or S-glycoprotein and the cellular receptor in the body is recognized as the angiotensin-converting enzyme 2 or ACE2

As you are aware it is the spike glycoproteins- a slippery sugar molecule, which plays an important role in virus attachments and entry into a human cell and interlocks with the receptors in the mucosal surfaces of the respiratory tissue.
On the surface of our cells is a protein called Angiotensin Converting Enzyme-2 receptor (ACE2), triggers the uptake of the virus particles that enters the cells.
SARS-CoV-2 uses ACE2 to enter target cells
In mutations in the variants there is a change in the structure of this spike protein.
The new variants carry several peculiar changes to the spike protein, and in mutating alters the biochemistry of the spike and could affect how transmissible the virus is.

You can see these flowers waving with all kinds of bending angles, a long, slender stalk with so much flexibility."
Flexibility of the spike is important to the virus's success of getting into our bodies. By sweeping around, the spike increases its odds of encountering the protein on the surface of our cells it uses to attach.
One of the most concerning features of the spike protein of SARS-CoV-2 is how it moves or changes over time during the evolution of the virus. Encoded within the viral genome, the protein can mutate and changes its biochemical properties as the virus evolves.
Most mutations will not be beneficial and either stop the spike protein from working or have no effect on its function. But some may cause changes that give the new version of the virus a selective advantage by making it more transmissible or infectious.
The spike protein is also the basis of current COVID-19 vaccines, which seek to generate an immune response against it.

For SARS-CoV-2, the vaccines produced by Pfizer/BioNTech and Moderna give instructions to our immune system to make our own version of the spike protein, which happens shortly following immunization. Production of the spike inside our cells then starts the process of protective antibody and T cell production.
Now let us talk about the antibodies that are formed to attack the spike proteins formed in our body from the spike proteins of the SARS-CoV-2
The antibodies are called immunoglobulin G or IgG antibodies.
These antibodies are formed in our body after 7-14 days after the infection and remain in the blood for months or years.

When a person gets infected with the Coronavirus infection, the body produces distinct IgG antibodies, whether they have symptoms or not.
The IgG antibodies formed in our body from the vaccine targets the receptor domain of the spike protein and is the key to the immune response in our body.

Coronavirus in our body cells starts mutating, that is more viruses are formed as copies of the RNA.
mRNA Vaccines hopefully according to the researchers will destroy the mutated variants too through the IgG antibodies.
..According to a Moderna press release, their COVID-19 vaccine is still effective against the variants, SARS-CoV-2 - B.1.1.7 and B.1.351, which scientists first identified in the United Kingdom and South Africa, respectively. However, the vaccine had a significantly reduced antibody response to the variants.
Dr Richard Lessells Ph.D an infectious disease specialist based at the Africa Centre for Health and Population Studies, told the news briefing that Omicron's genome has several mutations associated with resistance to neutralizing antibodies.
The current variant belongs to Pango lineage B.1.1.529, with a high number of S-gene mutations compared to delta and other previous variants, detected at the beginning of November 2021.
On 26 November 2021 the variant was designated a variant of concern (VOC) and assigned the label Omicron by the World Health Organization (WHO).
This variant is characterized by 30 changes, three deletions and one small insertion in the spike protein, of these 15 are in the receptor binding domain. This variant was first detected in samples collected on 11 November 2021 in Botswana and on 14 November 2021 in South Africa.
As of 26 November 2021, travel-related cases have also been detected in Belgium, Hong Kong, and Israel. The Omicron variant is the most divergent variant that has been detected in significant numbers during the pandemic so far, which raises concerns that it may be associated with increased transmissibility, significant reduction in vaccine effectiveness and increased risk for reinfections. As of 26 November 2021, ECDC has classified this variant as a variant of concern (VOC) due to concerns regarding immune escape and potentially increased transmissibility compared to the Delta variant.
This variant has spread into the EU/EEA countries and the spread is considered to be high..
The EEA includes EUropean countries and also Iceland, Liechtenstein and Norway.
The concern today is that the changes in the rapid mutations in this present variant may prevent antibodies that are in the body from previous vaccinations, neutralizing these variants in the body.
Dr. Richard Lessells, Ph.D., an infectious disease specialist based at the Africa Centre for Health and Population Studies, told the news briefing that Omicron's genome has several mutations associated with resistance to neutralizing antibodies.
These include not only antibodies generated through vaccination or natural infection but also therapeutic monoclonal antibodies.
Dr. Lessells said that the Omicron genome also has a cluster of mutations associated with more efficient entry into host cells and enhanced transmissibility.
In addition, it has a mutation associated with resistance to the body's first line of defense against newly encountered pathogens, known as the innate immune system.
These are matters of concern that this variant may have not just enhanced transmissibility to spread more efficiently, but also be able to get round our immune system that protects us.
It is observed that omicron is more virulent, but yet causing more mild symptoms that need no hospitalization.

Dr. Daniel Griffin, Ph.D., a virologist at Columbia University in New York City, told Medical News Today that the number of changes in the Omicron variant is very high compared with previous variants of SARS-CoV-2.
He speculates that the new variant may have evolved in an unvaccinated individual with a compromised immune system. This would have given the virus an unusually long time to develop adaptations to the human immune system.
Will this variant cause more issues than the previous variants, we have to wait and see, but hopefully does not seem to be so far?
Hope this video presentation was useful.
Stay safe and goodbye for now.