



Double Mutant Coronavirus Variant

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Why in News

A unique “**double mutant**” coronavirus variant with a combination of mutations, not seen anywhere else in the world, has been found in India.

Key Points

- **Meaning of Mutation:**
 - **Mutation** is an **alteration in the genetic material (the genome)** of a cell of a living organism or of a virus that is more or less permanent and that can be transmitted to the cell’s or the virus’s descendants.
 - The genomes of organisms are all composed of **Deoxyribonucleic Acid (DNA)**, whereas viral genomes can be of **DNA or Ribo Nucleic Acid (RNA)**.
- **Double Mutant:**
 - **Genome sequencing** of a section of virus samples by the **Indian SARS-CoV-2 Consortium on Genomics (INSACOG)**, revealed the presence of **two mutations, E484Q and L452R** together, in virus samples from states such as Maharashtra, Delhi, Punjab and Gujarat.
 - The INSACOG will submit details of this variant to a global repository called **Global Initiative on Sharing Avian Influenza Data (GISAID)** and, if it merits, classify it as a **Variant of Concern (VOC)**.
 - So far, only three global VOCs have been identified: the **U.K. variant** (B.1.1.7), **the South African** (B.1.351) and the Brazilian (P.1) lineage.

Variant of Concern

These are variants for which there is evidence of an increase in transmissibility, more severe disease (increased hospitalizations or deaths), significant reduction in neutralization by antibodies generated during previous infection or vaccination, reduced effectiveness of treatments or vaccines, or diagnostic detection failures.

- **Challenges of Double Mutant:**

- The double mutation in key areas of the **virus' spike protein** may increase the risks and allow the virus to escape the immune system.
The spike protein is the part of the virus that it uses to penetrate human cells.
- Presence of a VOC or suspected VOC does not automatically mean that they are causing the outbreak, but rather suggests challenges to **public health measures for containment**.
- While the double mutants have been associated with a **reduction in vaccine efficacy as well as infectivity**, their combined effect and biological implication has not yet been understood.

- **Other Variant:**

- Also genome variation studies from Kerala have **revealed the presence of other mutations**.
It is associated with the ability to help the **coronavirus evade antibodies**.
- The **N440K mutation** that is associated with immune escape has also been reported from 16 other countries, including the UK, Denmark, Singapore, Japan and Australia.

- **Solution:**

It would require the same epidemiological and public health response of increased testing, comprehensive tracking of close contacts, prompt isolation of positive cases & contacts as well as treatment as per “National Treatment Protocol” by the States/UTs.

- **Indian SARS-CoV-2 Consortium on Genomics (INSACOG):**

- INSACOG is a multi-laboratory, multi-agency, pan-India network to monitor genomic variations in the SARS-CoV-2.
- It helps in the understanding of how the virus spreads and evolves.
- Genomic surveillance can generate a rich source of information for tracking pathogen transmission and evolution on both national and international levels.

Genomic Sequencing

- It is a testing process to map the entire genetic code of an organism, in this case, the virus.
- The genetic code of the virus works like its instruction manual.
- Mutations in viruses are common but most of them are insignificant and do not cause any change in their ability to transmit or cause serious infection.
- But some mutations, like the ones in the UK or South Africa variant lineages, can make the virus more infectious and in some cases even deadlier.

Global Initiative on Sharing Avian Influenza Data

- The Global Initiative on Sharing Avian Influenza Data (GISAID) Initiative promotes the rapid sharing of data from **all influenza viruses and the coronavirus causing Covid-19**
- The fast and open sharing of genetic sequences has allowed researchers to continuously track the spread of the virus.
- GISAID has also catalysed the development of diagnostic kits, prototype viruses for research, and medical countermeasures like vaccines and antibodies.
- The GISAID platform was launched on the occasion of the Sixty-first **World Health Assembly** in May 2008.

Since its launch, GISAID has played an essential role in the sharing of data among the **World Health Organization (WHO) Collaborating Centers and National Influenza Centers** for the bi-annual influenza vaccine virus recommendations by the **WHO Global Influenza Surveillance and Response System (GISRS)**.

Source:TH