



## Sequencing Novel Coronavirus

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### Why in News

**India** has shared **nine whole genome sequences of the novel coronavirus (SARS-CoV-2)** with the Global Initiative on Sharing All Influenza Data (GISAID).

The **Indian Council of Medical Research (ICMR)** has allowed all national research laboratories to conduct testing for the novel coronavirus.

### Global Initiative on Sharing All Influenza Data

- **GISAID is a public platform** started by the **World Health Organization (WHO)** in **2008** for countries to **share genome sequences**.
- The GISAID Initiative **promotes the international sharing** of all influenza virus sequences, related clinical and epidemiological data associated with human viruses, and geographical as well as species-specific data associated with avian and other animal viruses
  - This helps researchers understand **how the viruses evolve, spread and potentially become pandemics**.
- It actively **promotes the development of novel research tools** for the analysis of influenza data by helping developers to facilitate the integration or connection of their tools to analyze GISAID data.

### Key Points

- So far, 3,086 sequences of the virus isolated from humans have been shared by **57 countries**.
  - With 621, the U.S. has shared the most number of sequences, followed by the U.K. (350), Belgium (253) and China (242).
- It has been found that **a spike protein of SARS-CoV-2** also known as 2019-nCoV, enables the virus to **enter and infect human cells**.

- **Sequencing the genome** of SARS-CoV-2 will help understand
  - where the virus came from.
  - if there are different strains circulating in India.
  - how the virus has spread.
- **Genome sequencing is figuring out the order of Deoxyribonucleic acid (DNA) nucleotides, or bases**, in a genome—the order of Adenine, Cytosine, Guanine, and Thymine that make up an organism's DNA.
- On April 2, 2020, the **Indian Council of Medical Research (ICMR)** allowed all national research laboratories including those under the Council of Scientific and Industrial Research (CSIR) to conduct testing for the novel coronavirus.
- According to CSIR
  - Both the Centre for **Cellular and Molecular Biology (CSIR-CCMB, Telangana)** and the **Institute of Genomics and Integrative Biology (CSIR-IGIB, New Delhi)** have already started sequencing the virus.
  - The CCMB has both **Biosafety Level (BSL)-2 and BSL-3 labs**.
  - The virus is isolated and deactivated in BSL-3 facility and sequenced in BSL-2 facility.
  - Besides sequencing, the virus will also be cultured (grown in cells).
    - Cell culture is the **maintenance and growth of the cells** in specially designed containers and under precise conditions of temperature, humidity, nutrition, and freedom from contamination.
    - This will help in studying the virus and will be useful while **testing vaccines and drugs**.

## Biosafety levels

- BSL is used to identify the **protective measures needed in a laboratory setting** to protect workers, the environment, and the public.
- **Activities and projects conducted in biological laboratories** are categorized by biosafety level.
- The four biosafety levels are **BSL-1, BSL-2, BSL-3, and BSL-4, with BSL-4 being the highest (maximum) level of containment**.

## The Council of Scientific and Industrial Research

- CSIR was established by the Government of India in **September 1942 as an autonomous body**.
- It is known for its cutting edge R&D knowledge base in diverse S&T areas.
- Council of Scientific and Industrial Research (CSIR) has been ranked first in **the Nature Ranking Index-2020**.

The Nature Index provides a close to real-time proxy of high-quality research output and collaboration at the institutional, national and regional level.

## **Indian Council of Medical Research**

- ICMR is the apex body in India for the **formulation, coordination and promotion of biomedical research.**
- Its mandate is **to conduct, coordinate and implement medical research** for the benefit of the Society; translating medical innovations into products/processes and introducing them into the public health system.
- It is funded by the Government of India through the **Department of Health Research, Ministry of Health & Family Welfare.**

**Source: TH**