



Mega Covid Testing Lab

Why in News

The [Council of Scientific and Industrial Research \(CSIR\)](#) is working on developing mega labs to speed up testing as well as improve the accuracy of testing for [Covid-19](#) positive cases.

Key Points

- Large machines, called **Next Generation Sequencing machines (NGS)** will be modified to sequence 1,500-3,000 viral genomes at a go for detecting the SARS-CoV-2 novel coronavirus in these labs.
 - These machines are also used for [sequencing human genomes](#).
 - The NGS also found **two lineages of coronaviruses** which were unknown in Indian populations so far.
- The CSIR has partnered with the US-based Illumina, a company that specialises in the manufacture of NGS machines.
 - Five NGS machines are currently available in India.
- So far, 3,086 sequences of the virus isolated from humans have been shared by 57 countries, with India sharing [nine whole genome sequences of the novel coronavirus \(SARS-CoV-2\)](#) with the **Global Initiative on Sharing All Influenza Data (GISAID)**.
- **Benefits:**
 - **Accuracy:** The NGS tests has a sensitivity of 97.53% as compared to 70%-80% accuracy of **RT-PCR (Reverse Transcription Polymerase Chain Reaction)** and 50% accuracy of antigen tests.
 - These tests detect the possible presence of the virus even in several instances where the RT-PCR tests miss out on them.
 - This is primarily because the RT-PCR test identifies the SARS-CoV-2 virus by exploring only specific sections of the virus whereas the genome method can read a **bigger chunk of virus genome** and thereby provide **more certainty**.
 - **Confirmation:** NGS identified cases as either positive and negative when RT-PCR found them to be **'inconclusive'**. So this can also be used as a **confirmatory test**
 - **Reliability:** It can also trace the evolutionary history of the virus and track mutations more reliably.
 - This can help identify more places where [SARS-COV-2](#) viruses differ from other related viruses.
 - **Mass Testing:** According to the [Indian Council of Medical Research \(ICMR\)](#), the NGS tests can space up from the present approx. 7.5 lakh tests per day to at least **a million per day**.
 - Unlike the RT-PCR that needs **primers and probes**, which is a key hurdle in operationalising such tests on a mass scale early on in the pandemic, the NGS does not need primers and probes, and only needs **custom reagents**.

- **Primers** are short sequences of DNA used to amplify a particular DNA sequence. A **probe** is a small radioactively or fluorescently labelled DNA sequence used to identify a particular DNA sequence.
- **Reagent** for DNA is designed to easily prepare DNA extracts from animal tissues that can be used directly in PCR.
- **Other Uses:** Establishing “hubs” capable of **whole genome sequencing** would help track significant mutations in the virus and can be repurposed for any kind of outbreak, be they of viral or bacterial origin.
 - NGS can also be used to develop **new diagnostic tests for Covid-19.**
- **Surveillance and Tracing** : Due to limited accuracy and capacity of existing tests, a sizeable population is **falsely negative**. NGS can help in serving a larger purpose of continuous surveillance of large pools like industrial hubs, commercial establishments or places where an outbreak is likely.

Testing for Covid 19

- Different methods of testing are being experimented in the country to trace **Covid-19** infection. Some of these include:
 - [RT PCR Tests](#)
 - [Rapid Antigen Detection Tests](#)
 - [RTnPCR Tests](#)
 - [Feluda Tests](#)
 - [ELISA Antibody Tests](#)

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