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Chitra GeneLAMP-N for Covid-19 Test

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Why in News

Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Trivandrum (Kerala), has developed a diagnostic test kit that can confirm Covid-19 in 2 hours at low cost.

SCTIMST is an Institute of National Importance under the **Department of Science and Technology (DST)**.

Key Points

- The test kit, funded by the DST called **Chitra GeneLAMP-N**, is highly specific for **SARS-CoV-2 N-gene** and can **detect two regions of the gene**.
This would ensure that the test does not fail even if one region of the viral gene undergoes mutation during its current spread.
- It is a confirmatory diagnostic test, which detects the N Gene of SARS- COV2 using **reverse transcriptase loop-mediated amplification of viral nucleic acid (RT-LAMP)**.
- The results can be read from the machine from the **change in fluorescence**.
Fluorescence is the **emission of light by a substance** that has absorbed light or other electromagnetic radiation.
- The tests performed at National Institute of Virology (NIV), Alappuzha (Kerala) (authorized by **Indian Council of Medical Research (ICMR)**) show that Chitra GeneLAMP- N has **100% accuracy** and match with test results using **Reverse Transcription Polymerase Chain Reaction (RT-PCR)**.
- This has been intimated to Indian Council of Medical Research (ICMR), the authority to approve it, for Covid-19 testing in India, following which License needs to be obtained from **Central Drugs Standard Control Organisation (CDSCO)** for manufacture.

- **Advantages**

- A total of 30 samples can be tested in a single batch in a single machine allowing a **large number of samples to be tested each day.**
- Current **Polymerase Chain Reaction (PCR)** kits in India enable detection of E gene for screening and RdRp gene for confirmation. Chitra GeneLAMP-N gene testing will allow confirmation in one test **without the need for a screening test and at much lower costs** (less than Rs. 1000/test).
- Chitra GeneLAMP-N makes confirmatory tests results of Covid-19 possible in 2 hours.

The detection time is 10 minutes, and the sample to result time (from RNA extraction in swab to RT-LAMP detection time) **will be less than 2 hours.**
- The testing facility can be **easily set up** even in the laboratories of district hospitals with **limited facilities and trained laboratory technicians.**

Gene

- Gene, unit of **hereditary information.**
- Genes achieve their effects by directing the **synthesis of proteins.**
- Genes are composed of **Deoxyribonucleic acid (DNA)**, except in some viruses, which have genes consisting of a closely related compound called **Ribonucleic acid (RNA).**

Reverse Transcription-based Loop Mediated Isothermal Amplification (RT-LAMP)

- It is a simple **quantitative detection method.**
- In this method, **a DNA copy of the viral RNA is generated** by reverse transcriptase, and then **isothermal amplification is carried out to increase the amount of total DNA.**
 - A reverse transcriptase (RT) is an enzyme used to generate complementary DNA (cDNA) from an RNA template, a process termed reverse transcription.
 - Isothermal amplification enables rapid and specific amplification of DNA at constant temperature (60-65 °C).

Source : PIB