



## ELISA Antibody Kits

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### Why in News

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Recently, the Indian Council of Medical Research (ICMR) has **approved the first batch of antibody testing** kits called “**Covid KAVACH ELISA**” manufactured by Zydus-Cadila to be used in **sero-survey**.

### Key Points

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- Covid KAVACH ELISA has been developed at the **National Institute of Virology, Pune**, by **isolating the virus from patients in India**.
  - **Enzyme-Linked Immunosorbent Assay (ELISA)** is a test that detects and measures antibodies in blood.
  - The test can be used to determine **antibodies related to certain infectious conditions**.
  - It can be used to diagnose **HIV, which causes AIDS, Zika virus** etc.
- The ELISA kits will be used in the **new nationwide “sero-survey” of the Ministry of Health**.
  - Sero-survey is **meant to detect the prevalence of antibodies** that appear after a patient has recovered.
  - The ICMR will lead the testing of 24,000 individuals in 69 districts at household level as part of this sero-survey.

- According to the ICMR, **real-time Reverse Transcription Polymerase Chain Reaction (RT-PCR) is still the frontline test for clinical diagnosis of Covid-19**, but the **antibody tests are critical for surveillance** to understand the proportion of population exposed to infection.
  - The antibody test for **Covid-19** acts as a **screening process** that gives quick results in a few hours.
  - The antibody test detects the body's response to the virus. It gives an indication that a person has been exposed to the virus.
  - If the test is positive, the swab is collected and an Ribonucleic Acid (RNA) test is done using the Polymerase Chain Reaction (PCR) kit.
- ELISA antibody tests are **different from the rapid antibody tests** previously used by Indian authorities.
  - ELISA kits are **more reliable and cheaper** than rapid antibody testing kits.
  - The ELISA kit has a **sensitivity** of 98.7% and a **specificity** of 100%.  
Sensitivity signifies accurate positive test results, whereas specificity signifies accurate negative test results.
  - According to the **World Health Organisation (WHO)** the kits are suitable for **“for testing large numbers of samples per day, as well as in blood banks or for surveillance studies”**.
- ELISA has **minimal biosafety and biosecurity requirements** as compared to the real-time **RT-PCR** test.
- Moreover, **ELISA-based testing is easily possible even at the district level** as the test kit has **inactivated virus**.

## Antibody

- **Antibody, also called immunoglobulin** is a **protective protein** produced by the immune system in response to the presence of a foreign substance, called an **antigen**.  
A wide range of substances are regarded by the body as antigens, including disease-causing organisms and toxic materials.
- Antibodies **recognize and attack onto antigens** in order to remove them from the body.

## PCR Test

- Kary Mullis, the American biochemist invented the **PCR technique**. He was awarded the Nobel Prize for Chemistry in 1993.
- Under this, **copies of a segment of DNA (deoxyribonucleic acid) are created** using an **enzyme called Polymerase**.  
The **'chain reaction'** signifies how the DNA fragments are copied, exponentially — one is copied into two, the two are copied into four, and so on.

- A **fluorescent DNA** binding dye called the **“probe”** is added to DNA, which shows the presence of the virus on a **fluorometer**.
- However, coronavirus is made of RNA (ribonucleic acid).
- Therefore to detect coronavirus, RNA is converted into DNA using a technique called **reverse transcription**.

A **‘reverse transcriptase’ enzyme** converts the RNA into DNA.

- Copies of the DNA are then made and amplified.
- Generally, the entire process of PCR test takes 24 hours to deliver the result.

### **Indian Council of Medical Research**

- 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: IE**