MOLECULAR BIOLOGY

COST-EFFECTIVE

ACCURATE DIAGNOSIS

QUICK-TIME

INNOVATION

PCR

A stitch in time: Early diagnosis saves lives

Often fatalities and complications associated with infectious diseases occur due to delay in diagnosis. The holy grail of medical diagnostics is a device that can identify the pathogen in the least amount of time in a cost-effective manner and is widely accessible.

Polymerase chemical reaction (PCR), invented in 1985, revolutionized molecular biology. Only trace samples are needed and using the PCR method, scientists could make do with less material for testing. Thus, this technique had the potential to significantly enhance clinical diagnostics, given its sensitivity and specificity.

But the devices were sophisticated and the processes were cumbersome, necessitating large labs in urban centers with good infrastructure to house them and well qualified staff to run them. Typically, PCR test results take between 4-8 hours. In India, where large parts of the population live in areas without sophisticated infrastructure, there was no access to such gold standard and potentially life-saving tests. Delays in diagnosis often lead to presumptive therapies and fatal outcomes for patients even in easily treatable diseases. In certain conditions like tuberculosis, the timing of diagnosis is critical, not only to ensure good outcomes for the patients but also to prevent the spread of the disease.

The Truenat platform developed by Dr. Chandrasekhar Nair and team is this need-gap fitting jigsaw piece. The tests are rapid, sensitive, and cost-effective. These battery-operated, chip-based testing devices don't need elaborate infrastructure and require only minimal training to operate. Importantly the devices provide accurate diagnosis in less than an hour thus ensuring rapid return to wellness for the patients and preventing diseases from spreading in the community.
The Truenat platform consists of mesofluidic and sample agnostic cartridges for sample preparation and low temperature cofired ceramic chips for rapid thermocycling –the process of amplifying DNA—that results in faster PCR reactions and quick diagnostic results.

These features made the Truenat platform the ideal choice for the Government of India to deploy in remote reaches of the country when the COVID-19 pandemic hit in 2020. Truenat was an effective tool in the government's strategy to ensure availability of widespread and effective testing.