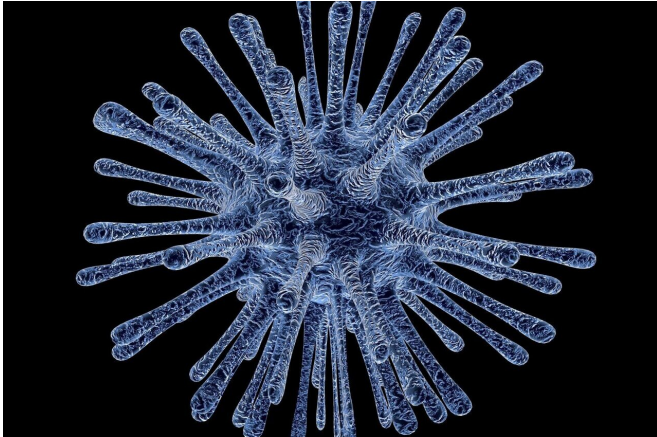


COVID-19: The tale of one virus and two testing methods

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When a new virus emerges that infects and sickens humans, the wheels of innovation start turning quickly in the world of health care and biomedical research. Teams versed in different aspects of laboratory medicine work together to better understand the virus and develop tests to identify those who are infected or have been exposed to the virus in the past.

Read on to learn about those tests, and why both are needed to fight pandemics.

What Is a Virus?

A virus' genome is composed of either DNA or RNA—the basic building blocks of all life. Viruses don't grow on their own. They must use host cells to make more virus and cause disease.

Sometimes people may be infected by a virus and never know it because their immune system successfully clears out the virus. Others may develop an active infection with symptoms that vary depending on the infecting virus. These symptoms can involve the [gastrointestinal tract](#),

lungs or central nervous system among other body sites.

There are more than 200 viruses in the world known to infect humans, and several new ones are identified each year. About 80% of known viruses that infect humans have a nonhuman host, where the virus is maintained in between human outbreaks. This includes coronaviruses—the family of viruses that includes SARS-CoV-2, the virus that causes the disease COVID-19.

"The prevailing opinion across the [health care](#) and [research community](#) is that we will continue to see new viruses emerge for the foreseeable future," says Matthew Binnicker, Ph.D., director of Mayo Clinic's Clinical Virology Laboratory.

Researchers weren't particularly surprised by COVID-19, he says. "For those of us who work in Clinical Virology, SARS, H1N1, MERS, Ebola and Zika were continual reminders that viral pandemics are something that we must prepare for so we can reduce the global impact with future pandemics."

Enter COVID-19

Whenever a [new virus](#) infecting humans shows up on the scene, a variety of clinical and research activities commence. Virologists determine what kind of a virus it is. There are 21 known virus families that infect humans. Knowing what family the virus comes from gives the medical and research communities an idea of what symptoms may emerge and what existing treatments could prove effective.

Public health experts investigate the source of the infection. The type of virus gives them some clues, as certain virus families are known to originate primarily in certain types of hosts, such as bats, or are transmitted by a defined vector, such as mosquitos. Subsequently, laboratory medicine researchers get to work on developing and

evaluating tests to help diagnose current and past infections.

Testing For Active Infection: Finding the virus

Diagnostic tests designed to detect nucleic acid (e.g., DNA or RNA) from the newly emerged virus can quickly indicate whether a symptomatic patient has been infected with the virus of interest. Such tests are frequently referred to as molecular assays. If the result is negative, clinicians can use this information to consider alternative causes of the patient's symptoms.

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