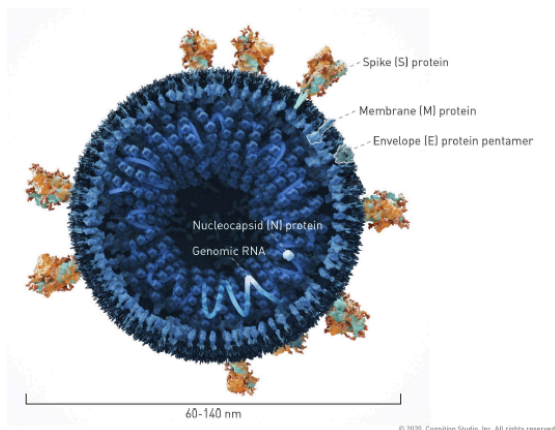


What is the Coronavirus?

Coronaviruses belong to a family of viruses. Coronaviruses have spike proteins on the surface, hence the name “corona”, meaning crown. The largest number of different coronaviruses can be found in bats, but some coronaviruses have now also been observed in humans. Usually these cause mild respiratory illnesses, such as a cold. However, some types of the coronavirus like the SARS-CoV-2, can cause very serious illnesses, such as COVID-19.



2019 Novel Coronavirus (2019-nCoV) is a new type of coronavirus, genes are single-stranded RNA.

Mainly protein on virus
Spike protein (S)
Envelope protein (E)
Membrane protein (M)

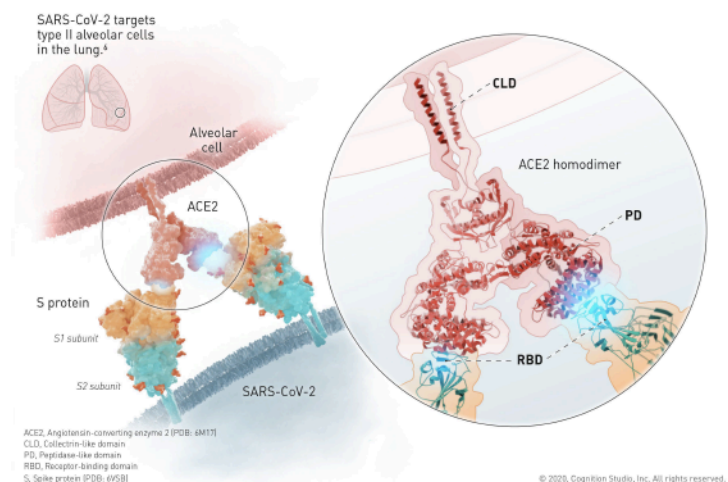
Nucleocapsid protein enclosing RNA (N)

The difference between COVID-19 and Coronavirus?

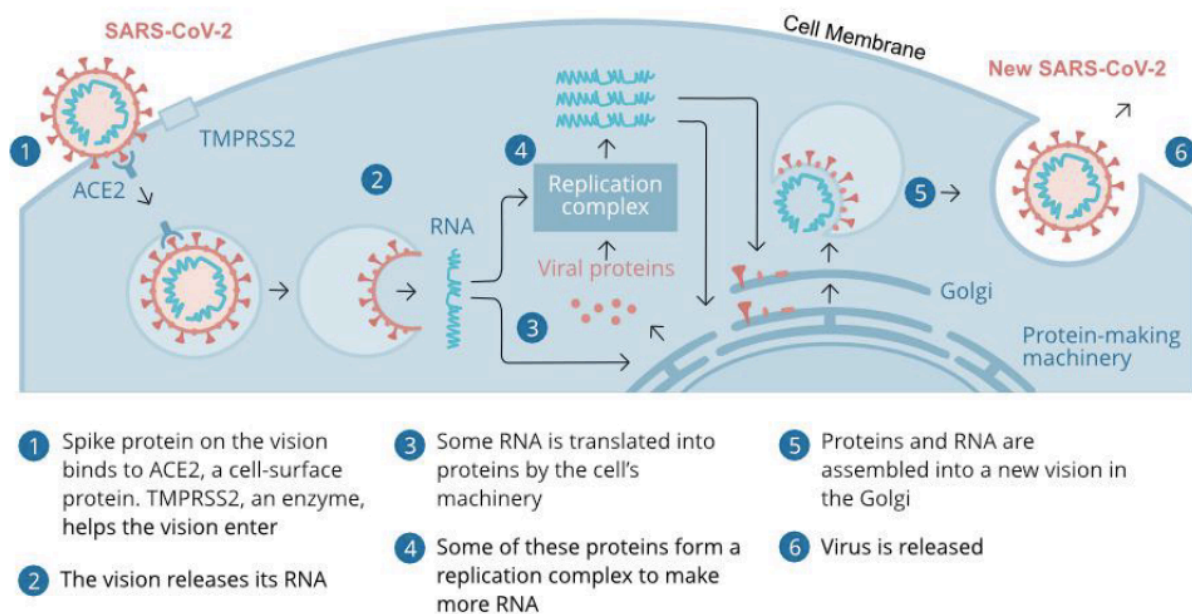
COVID-19 is the official short name for Corona Virus Disease 2019. COVID-19 is a disease caused by the SARS-CoV-2 virus, a coronavirus that causes serious respiratory diseases. SARS stands for Severe Acute Respiratory Syndrome, which is a serious disease of the lungs. SARS-CoV-2 is a new type of coronavirus and was first detected in Wuhan, China, in December 2019. It is genetically related to the SARS-CoV virus that was first detected in 2003. Like the SARS-Cov virus of 2003 and the MERS-CoV virus, which emerged in 2012, the SARS-CoV-2 virus, the virus that causes COVID-19, is caused by an animal coronavirus that has been transmitted to humans. This is called “zoonotic transmission”.

Mechanism of COVID infection.

Structure of the Spike (S) protein which contains the receptor binding domain for ACE2 and creates the virus’s recognizable ‘crown’ shape. After binding to an ACE2 homodimer, the virus enters the cell through a process called receptor-mediated endocytosis. Inside the cell, the virus releases its RNS and takes advantage of the host cell’s machinery, allowing it to reproduce, escape and continue infecting human tissue.



Replication of SARS-CoV-2 in the cells of those infected



Source: Son et al., *Viruses*, 2019; Jiang et al., *Emerging Microbes and Infections*, 2012; *The Economist*

The difference between a rapid antigen, a rapid antibody and a PCR test?

A rapid antigen test, a rapid antibody test and a PCR test are three different types of tests. The PCR test looks for the RNA of the virus and uses an amplification technique, the so-called polymerase chain reaction (PCR) technique. This allows the test to detect very minute amounts of the SARS-CoV-2 virus. The test uses laboratory equipment and takes 24 to 48 hours to give results.

PCR tests are almost 100% accurate in detecting infections. However, because the PCR test can detect very tiny amount of virus particles to show infection, a positive result of a PCR test does not always mean that you are also contagious. An antigen test is useful to show whether you are contagious.

An antigen test is a rapid test. The test looks for proteins, so-called "antigens", which are located on the surface of the SARS-CoV-2 virus particles. In 15-20 minutes the rapid test shows whether there are antigens in your nose and / or throat mucus that indicate an infection with the virus. The antigen test identifies the people at the peak of the infection when there are many virus particles in the body. The antigen test should therefore preferably be conducted within the first two to nine days after symptoms have appeared. At that stage, the amount of virus particles in a SARS-CoV-2 infection is highest. This is also the time when someone is most contagious.

A positive result of an antigen test is a clear indication that someone is infected with the SARS-CoV-2 virus and also infectious to others. A negative test result means that the person being tested is most likely not contagious. However, it does not necessarily mean that the person tested is not infected.

A rapid antibody test does not look for the virus, but measures the presence of antibodies in the blood. Antibodies are produced by the body in response to the virus. First, the body produces IgM antibodies, which are released by the immune system as the first defense response to infections. About 15-20 days after the first symptoms appeared, IgG antibodies, the antibodies that provide a form of immunity, can also be found in the blood of most infected people. An antibody test detects these antibodies in the blood.