



## COVID 19 : A Fatal Viral Disease

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Corona virus disease 2019 (COVID-19) is an ongoing infectious, pandemic disease and spread from person to person in multiple countries around the world. Corona virus is a group of viruses that cause infection in mammals and birds. In humans, bats serve as the main host reservoir for corona viruses causing respiratory tract infection and lead to be lethal.

### Classification of virus:

Realm: Riboviria

Phylum: incertae sedis

Order: Nidovirales

Family: Coronaviridae

Sub family: Orthocoronavirinae

Genera

- Alphacoronavirus
- Betacoronavirus(Causative agent of covid-19)
- Gammacoronavirus
- Deltacoronavirus

### Naming of Corona virus 2019:

There are different process and purpose for naming viruses and diseases. For example HIV is the virus and disease caused by it is AIDS. Viruses are named by International Committee on Taxonomy of Viruses (ICTV), based on genetic structure, development of diagnostic tests, vaccines and medicine. Officially diseases are named by WHO in the International Classification of Diseases (ICTV). ICTV announced “severe acute respiratory syndrome corona virus 2 (SARS-CoV-2)” as the name of new virus. This virus is genetically related to

the SARS-CoV responsible for SARS. Asia was severely affected by the SARS in 2003. Name SARS was creating an unnecessary fear in some population so that WHO and ICTV were discussed about the naming of both the virus and the disease. Finally WHO announced “COVID-19” as the name of this new viral disease on 11 February 2020.

### **History:**

The name corona virus is derived from Latin word corona, meaning “crown” or “wreath” because of having bulbous surface projections like a crown or of a solar corona. The name was first used in 1968 in the journal Nature, by the group of virologists for a new family of viruses.

Human corona virus were discovered in the 1960. Symptoms were common cold, which were later named human corona virus 229E and human corona virus OC43. Some other identified corona viruses include, SARS-CoV in 2003, HCoVNL63 in 2004, HKU1 in 2005, MERS-CoV in 2012, and SARS-CoV-2 in 2019. Most of these having severe respiratory tract infections. SARS-CoV-2 disease is first identified in December 2019 in Wuhan city of China and spread globally.

### **Structure:**

Corona viruses are spherical particles with bulbous surface projections that form corona around the circular body. The diameter of the virus particle is about 120nm (0.12 $\mu$ m). The diameter of envelop is 80nm (0.08 $\mu$ m) and the spikes are 20nm (0.02 $\mu$ m) long. The viral envelope consists of a lipid bilayer where the membrane, envelope and spike structural proteins are attached. Inside the envelop, there is a nucleocapsid, which is made up of multiple copies nucleocapsid protein which are bound to the single stranded RNA genome in a positive sense beads-on-a-string like conformation. The size of genome ranges from 26.4 to 31.7 kilobases. It is the largest among RNA viruses. The genome has 5' methylated cap and a 3' polyadenylated tails. There are 265 nucleotides in the 5' UTR and 342 nucleotides in the 3' UTR. The 5' methylated cap and 3' polyadenylatedtail allows the positive sense RNA genome to be directly translated by the host cell's ribosome on viral entry.

### **Symptoms:**

Symptoms of COVID-19 may appear 2 to 14 days after exposure and can include:

- Fever
- Cough
- Shortness of breath or breathing problem

**Some other symptoms include:**

- Tiredness
- Aches
- Runny nose
- Sore throat
- Headache
- Diarrhea
- Vomiting
- Loss of smell or taste may be a symptom.

These symptoms may vary from mild to severe. In some cases people may have no symptoms at all but they are corona positive. These patients are called **silent carriers**. Mostly affected people of this disease are older people or who have chronic medical conditions, such as heart disease lung disease or diabetes or who have weak immune systems. They have higher risk of illness.

**Lethality rate:**

The proportion death from the disease appears low (between 1% to 2%), but the figures are unreliable.

- A world health organization (WHO) examination of data from 56000 patients suggests.
- 6% become critically ill having lung failure, organ failure and risk of death.
- 14% develop severe symptoms like difficulty in breathing and shortness of breath.
- 80% develop mild symptoms like fever, cough, and some may have pneumonia.

**Diagnosis:**

Several testing protocols for this disease have published by WHO. The standard method of testing is real-time reverse transcription polymerase chain reaction (rRT-PCR). The test is typically done on respiratory samples obtained by a nasopharyngeal swab or sputum sample may also be used. Results are available within few hours to two days.

Blood test can be used to diagnose two blood samples require, taken two week apart. China developed genetics sequence of corona viruses in laboratories. So that laboratories across the world could independently develop polymerase chain reaction (PCR) test to detect infection by the virus. In a study COVID-19 patient's cough was collected in a sterile container thus producing a saliva sample and detected virus in patients using RT-PCR. This technique was faster than a swab and less health risk to health care worker. Along with laboratory testing, chest CT scans may be helpful to diagnose COVID-19 but it is not used for routine checkup.

Recently Pune based Mylab becomes first Indian molecular diagnostic company to develop validated COVID-19 test kits. It is also known as reverse transcription polymerase chain

reaction (RT-PCR) tests. By this kit testing takes around 2.5 hours and a kit can study 1000 samples from large labs and 200 from small labs.

### **Treatment:**

There are no specific antiviral medicines approved for COVID-19 but treatment are under investigation, but some of the same things we do to feel better if we have the flu, getting enough rest, staying well hydrated and taking medications to relieve fever, aches and pains, also help with COVID -19. In the meantime scientists are working hard to develop effective treatment. Drugs that are used in malaria and autoimmune diseases, antiviral drugs developed for other viruses are under investigations. Antibodies from the blood of the people who have recovered from the COVID-19(convalescent plasma) is given by transfusion to a patient who is suffering from COVID-19. These antibodies help the patients to fight against COVID-19 or may reduce the severity of the disease. Though convalescent plasma has been used for many years for the treatment of many diseases like polio, measles, chickenpox, and SARS, but not much known how effective it is for treatment of COVID-19. On March 24<sup>th</sup>, the FDA began allowing convalescent plasma to be used in patients with serious and immediately life threatening COVID-19 infections. This treatment is still considered experimental.

Recently the two related drugs, chloroquine and hydroxychloroquine, have been used for the treatment of malaria and several inflammatory diseases, including rheumatoid arthritis. There are present strong evidences that these drugs can kill corona virus in the laboratory dish. The drugs work through two mechanism. They make it harder for virus to attach itself to the cell, inhibit the virus to enter and multiplication within the cell. If anyhow virus get enter into the cell, the drug kill it before its multiplication. One report published in February 2020, claimed that chloroquine had been used in more than 100 patients in China who had COVID-19, where chloroquine is superior to the control treatment in pneumonia, improving lung capacity, eliminating the virus from the body and shortening the duration of the disease. These claims are virtual and no evidences are provided to support this.

Another study was done by a group of scientists in southern France. The scientists compared 26 patients who received hydroxychloroquine to 16 who did not received. After six days the virus was gone from the body of 70% of those given the treatment compared only 12.5% of those who weren't. The drug appeared to be effective but the study was too small to be sure. There are many researches and investigations underway and we should have more solid answers within a few months.

### **Prevention and cure:**

Preventive measures to reduce the chances of infection include staying at home, social distancing, avoiding crowded places, washing hands with soap and water for at least 20 seconds, practicing good respiratory hygiene and avoiding touching the eyes, nose and mouth. Always cover mouth and nose with tissue when coughing and sneezing. It is also recommended using the inside of the elbow if tissue is not available. Cover your face with cloth or face mask when go outside at public places.

Self-isolation at home has been recommended for those diagnosed with COVID-19. Health agencies have issued detailed instruction for proper self-isolation. Government have recommended self-quarantine for entire population living in affected areas.

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