

A Review on COVID-19 - A Pandemic Disease

Aveek Datta¹, Karan Kumar Das²

¹Faculty of Pharmaceutics Department, Bharat Technology, Uluberia, Howrah, West Bengal, India
Email: [dattaaveek89\[at\]gmail.com](mailto:dattaaveek89[at]gmail.com)

²Faculty of Pharmaceutical Chemistry Department, Bharat Technology, Uluberia, Howrah, West Bengal, India
Email: [karankumardas103\[at\]gmail.com](mailto:karankumardas103[at]gmail.com)

Abstract: *There is a new world health crisis threatening the public with spread of COVID-19 (Corona virus Disease - 2019). Since December 2019, when COVID-19 emerged in Hunan seafood market at Wuhan, South China and rapidly spread throughout the world. Throughout the world the disease has caused varying degrees of illness. Patient shows various symptoms usually fever, cough, sore throat, breathlessness, fatigue, and malaise among others. It has been also shown that the asymptomatic cases may be affected by COVID-19. The disease is being cured through general treatment, symptomatic treatment, by using antiviral drugs, oxygen therapy and by the immune system. It is necessary to identify the potential cases as soon as possible and isolate the suspected people from the confirmed cases of COVID-19, to prevent the potential transmission of infection to other patients and health care staffs.*

Keywords: SARS COVID-19, RT - PCR, Nasopharyngeal swab, Oropharyngeal swab Treatment, Sanitizer

1. Introduction

The molecular mechanisms of replication as well as the pathogenesis of several Corona viruses have been actively studied since the 1970s. Some of the animal viruses, such as porcine transmissible gastroenteritis virus (TGEV), bovine coronavirus (BCoV), and avian infectious bronchitis viruses (IBV), are of veterinary importance. The murine corona virus mouse hepatitis virus (MHV) is studied as a model for human disease. This family of viruses remained relatively obscure, probably because there were no severe human diseases that could definitely be attributed to corona viruses; human corona viruses caused only the common cold. However, in the spring of 2003, when it became clear that a new human corona virus was responsible for severe acute respiratory syndrome (SARS), corona viruses became much more recognized. With the occurrence of the SARS epidemic, corona viruses may now be considered “emerging pathogens.” The origin of the SARS coronavirus (SARS - CoV) poses interesting questions about corona virus evolution and species specificity. Since the SARS epidemic, two new human respiratory corona viruses have been described. In this review, we discuss the pathogenesis of the previously known coronaviruses. We then discuss the newly isolated SARS - CoV. It has become evident that the body of information gathered over the last 30 years regarding coronavirus replication and pathogenesis has helped to begin understanding of the origin and the biology of SARS - CoV.

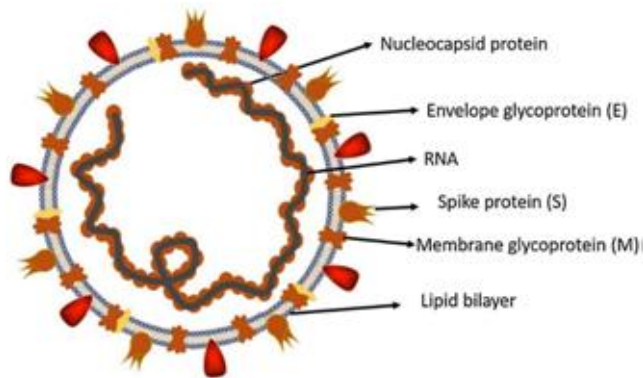
Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several corona viruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and severe acute respiratory syndrome (SARS). The most recently discovered corona virus causes coronavirus disease COVID-19. COVID-19 is the infectious disease caused by the most recently discovered coronavirus. This new virus and disease were unknown before the outbreak began in Wuhan, China,

in December 2019. COVID-19 is declared by WHO as pandemic on 11th March, 2020, affecting many countries globally.

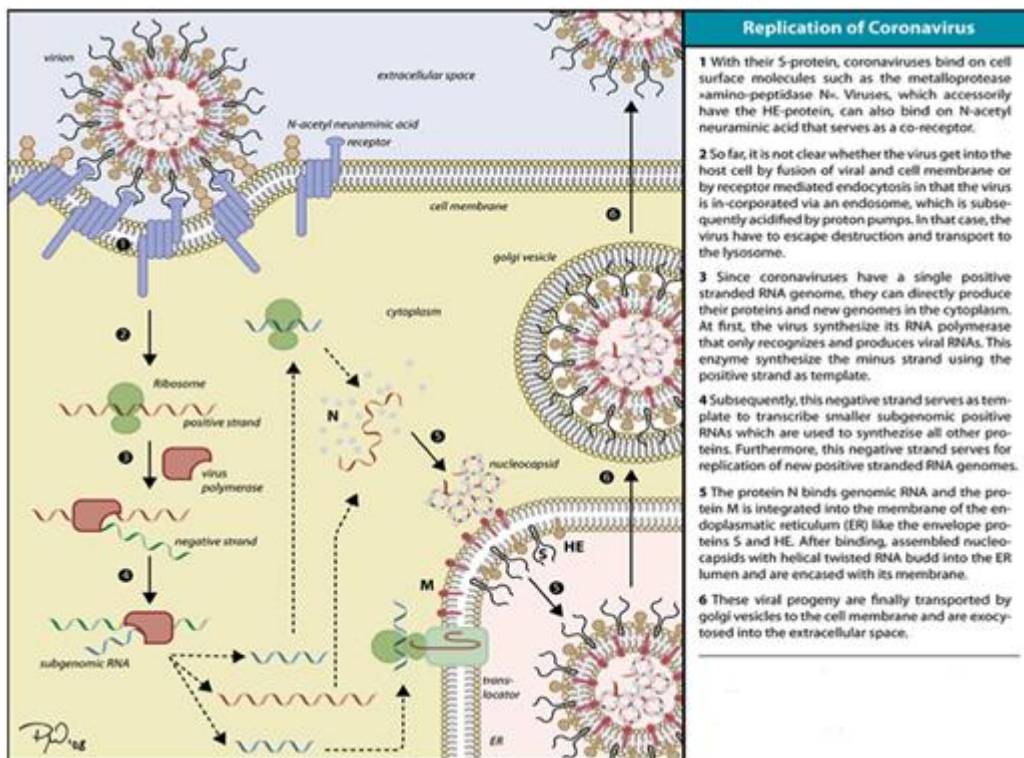
Spread of COVID-19 - People can catch COVID-19 from others who have the virus. The disease spreads primarily from person to person through small droplets from the nose or mouth, which are expelled when a person with COVID-19 coughs, sneezes, or speaks. These droplets are relatively heavy, do not travel far and quickly sink to the ground. People can catch COVID-19 if they breathe in these droplets from a person infected with the virus. This is why it is important to stay at least 2meters away from others and wear a mask. These droplets can land on objects and surfaces around the person such as tables, doorknobs, handrails etc. From different researches it had found that the life span of coronavirus is different on different surfaces like: four hours on copper surfaces, twenty - four hours on cardboard surfaces, seventy - two hours on plastic and stainless - steel surfaces. People can become infected—by touching these objects or surfaces, then touching their eyes, nose or mouth. This is why it is important to wash your hands regularly with soap and water or sanitize with alcohol - based hand rub. WHO is assessing ongoing research on the ways that COVID-19 is spread and will continue to share updated findings.

COVID-19 is mainly spread through respiratory droplets expelled by someone who is coughing or has other symptoms such as fever or tiredness. Many people with COVID-19 experience only mild symptoms. This is particularly true in the early stages of the disease. It is possible to spread COVID-19 from someone asymptomatic patient who has just a mild cough and does not feel ill.

Some reports have indicated that people with no symptoms can transmit the virus. It is not yet known how often it happens.



Structure of COVID-19 - The structure of COVID-19 has been depicted as in the picture here;



Replication - Infection begins when the virus enters the host cell, the virus particle is uncoated and the spike protein attaches to its complementary host cell receptor. After attachment, a proteolytic enzyme of the host cell cleaves and activates the receptor - attached spike macromolecule. Depending on the host cell proteolytic enzyme available, cleavage and activation enable cell entry through endocytosis or direct fusion of the viral envelope with the host membrane. (SA16). The chemical structure of Coronavirus RNA consists of 5' methylated head and a 3' polyadenylated tail, through which the RNA attaches to the free ribosomes of the host cell. This leads to the process of translation and formation of a long polypeptide chain. This protein has its enzyme (Proteases) which break the polypeptide into multiple nonstructural proteins. Coronavirus (CoVs), are the family of viruses that have prickly spikes that project from their surface. They have enveloped RNA viruses, are characterized by club-like spikes that project from their surface, they have a unique replicating process. These viruses are the cause of many types of diseases in mammals and birds leading to enteritis in cows and pigs and upper respiratory infection in humans which may be fatal. In

the given review we have discussed a brief introduction to coronavirus detailing its replication and pathogenic activity, preventive measures and treatment strategies. We will elaborate the discussion on the outbreaks of the highly pathogenic Severe Acute Respiratory Syndrome Coronavirus (SARS - CoV) and the recently discovered Middle Eastern Respiratory Syndrome Coronavirus (MERS - CoV).

SARS - CoV - 2 (COVID-19) QUALITATIVE REAL TIME RT - PCR (Real Time PCR)

Type of Specimen: Nasopharyngeal/Oropharyngeal Swabs

Condition of specimen received / Quality on arrival:
Good Quality Specimen / In Cold Chain

2. Interpretation

Result	Remarks
Positive	RNA specific to SARS - CoV - 2 Detected
Negative	RNA specific to SARS - CoV - 2 NOT detected
For repeat sample	Inconclusive. A repeat sample is recommended for confirmation

Note

- 1) ICMR Registration number for COVID-19 is DLPLL001.
- 2) Negative result does not rule out the possibility of COVID-19 infection. Presence of inhibitors, mutations & insufficient RNA specific to SARS - CoV - 2 can influence the test result. Kindly correlate the results with clinical findings. A negative result in a single upper respiratory tract sample does not rule out SARS - CoV - 2 infection. Hence in such cases a repeat sample should be sent. Lower respiratory tract samples like Sputum, BAL, ET aspirate are appropriate samples especially in severe and progressive lung disease.
- 3) COVID-19 Test conducted as per kits approved by ICMR / CE - IVD / USFDA.
- 4) Kindly consult referring Physician / Authorized hospitals for appropriate follow up.
- 5) Test conducted on Nasopharyngeal & Oropharyngeal Swabs

Comments

Corona viruses (CoV) are a large family of viruses that cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS - CoV) and severe acute respiratory syndrome (SARS - CoV). Corona virus disease (COVID-19) is a new strain that was discovered in 2019 and has not been previously identified in humans. Common signs of infection include respiratory symptoms, fever, and cough, shortness of breath and breathing difficulties. In more severe cases, infection can cause pneumonia, severe acute respiratory syndrome and kidney failure.

Note: The results relate only to the specimens tested and should be correlated with clinical findings.

3. Interpretation Guidance

- Please ensure and maintain the systematicity of the test report.
- Testing of referred clinical specimens were considered on the basis of request /referral received from/ through the State Surveillance Officer (SSO) of concerned State Integrated disease Surveillance Programme (IDSP) / any other health facility affirming requirements of the case definition/s.
- A single negative test result, particularly if this is from an upper respiratory tract specimen, doesn't exclude infection.
- Repeat sampling and testing of lower respiratory specimen is strongly recommended for severe or progressive disease. The repeat specimens can be considered after a gap of 2 to 4 days after the collection of first specimen for additional testing if required.
- A positive alternate pathogen doesn't necessarily rule out either, as little is yet known about the role of confectons. Testing of non - viral agent has not been undertaken.

4. Important Instructions

- Test results released pertain to the specimen submitted.
- All test results are dependent on the quality of the sample received by the Laboratory.

- Laboratory investigations are only a tool to facilitate in arriving at a diagnosis and should be clinically correlated by the Referring Physician.
- Sample repeats are accepted on request of Referring Physician within 7 days post reporting.
- Report delivery may be delayed due to unforeseen circumstances. Inconvenience is regretted.
- Certain tests may require further testing at additional cost for derivation of exact value.
- Test results may show inter - laboratory variations.
- The Courts/Forum at Delhi shall have exclusive jurisdiction in all disputes/claims concerning the test (s) & or results of test (s).
- Test results are not valid for medico legal purposes.

General Medications/Treatment:

- Quarantine for 19 days (Isolation);
- Azithral tablets (500mg ODPC for 5 days);
- Vitamin C (Ascorbic Acid) Containing Tablets 500mg BD;
- Zinc containing Tablets ODPC AD;
- Paracetamol tablets 500mg or 650mg (if required);
- Antiviral drugs (Remdesivir);
- Gargle (Salt - warm water);
- Alcohol based Sanitizer (Not Less than 70% v/v Alcohol);
- Mask;
- Hot water Bath with soap.

5. Conclusion

Through this review, we conclude that the disease profile of COVID-19 is dynamic and continues to rapidly evolve. There are still many open questions that are pending about COVID-19. Corona viruses are a fascinating group of viruses, providing animal models of pathogenesis, unusual molecular mechanisms of transcription and recombination, and new emerging pathogens. The emergence of SARS and the identification of a corona virus as the etiologic agent of the disease was a surprise to the corona virus community, as it was the first definitive association of a corona virus with severe disease in humans. While it is not clear whether SARS - CoV will again emerge into the human population, it has spurred on the awareness to consider corona viruses as the cause of human respiratory and perhaps other types of disease.

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