



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.3667082>Available online at: <http://www.iajps.com>

Review Article

**CORONA VIRUS - INFECTIOUS AGENT:
AN OVERVIEW****Rakesh Wani¹, Siddhita Shedge¹, Utkarsha Ohol¹, Anoop Singh²**¹Department of Pharmaceutical Chemistry, Loknete Shri Dadapatil Pharate College of Pharmacy,
Mandavgan Pharata, Pune-412211, India.²Department of Pharmaceutical Chemistry, Sanjeevan College of Pharmacy, Dausa-303303,
Rajasthan India.**Article Received:** December 2019 **Accepted:** January 2020 **Published:** February 2020**Abstract:**

In December 2019 a series of pneumonia cases of unknown cause emerged in Wuhan, Hubei, China, with clinical presentations greatly resembling viral pneumonia. Deep sequencing analysis from lower respiratory tract samples indicated a novel coronavirus which was named 2019 novel coronavirus (2019-nCoV). Thus far more than 800 confirmed cases including in health care workers have been identified in Wuhan and several exported cases have been confirmed in other provinces in China, and in Thailand, Japan, South Korea, and the USA. The objective of this review is to provide overview of Name and morphology, Replication, Transmission, Sign and symptoms, Prevention and precautions and Diagnosis. We hope our study findings will inform the global community of the emergence of this novel coronavirus.

Keywords: Middle East Respiratory Syndrome, Severe Acute Respiratory Syndrome, Reverse Transcriptase.

Corresponding author:**Rakesh M. Wani,**

Department of Pharmaceutical Chemistry and Quality Assurance,

Loknete Shri Dadapatil Pharate college of Pharmacy,

Mandavgan Pharata, Pune-4132211, India

Email ID: wanirakesh1994@gmail.com

QR code



Please cite this article in press Rakesh Wani et al., *Corona virus - infectious agent: An overview.*, Indo Am. J. P. Sci, 2020; 07(02).

1. INTRODUCTION:

Corona virus disease was describe in 1931 with the first corona virus (HCoV-229F) isolated from human in 1965. Coronavirus are viruses in subfamily ortho coronavirus in the family coronaviridae in the order Nidovirales. Coronaviruses are enveloped viruses with a positive sense single stranded RNA genome and with a nucleocapsid of helical symmetry. Corona viruses are classified into three groups initially based on antigenic relationship of the spike membrane and nucleocapsid. Coronavirus are the group of viruses that include diarrhea in mammals and birds that include diarrhea in cows and pig and upper respiratory disease in chickens. In human the virus cause respiratory infection which is often mild but in rare cases is potentially lethal.^[1]

The possible sources of virus are from bats, snakes and exotic live wild animals. The symptoms of the most corona viruses are similar to any other upper respiratory infection, including runny nose, coughing, sore throat and sometime a fever. It can cause pneumonia, especially in older people, people with heart disease or people with weakened immune system.

More than 6000 cases so far identified have been in China mostly in around Wuhan. The other countries with confirmed cases include Australia, Cambodia, Canada, France, Germany, Japan, Malaysia, Nepal, Sri Lanka, Singapore, Thailand, South Korea, the UAE, the US and Vietnam.^[2] Since 2003 at least five new human coronaviruses have been identified including severe acute respiratory syndrome coronavirus.^[3] Since 2012 an outbreak of MERS coronavirus has affected several countries primarily in its namesake the Middle East. MERS coronavirus was first identified in a patient from Saudi Arabia in April 2012. The positive case has been detected in Kerala's Thissur district. The patient has been kept in an isolation ward while the number of people under observation in the state rose to 1, 053.^[3]

1.1 NAME AND MORPHOLOGY:

The name "coronavirus" is derived from the Latin corona and the Greek κορώνη (*korōnē*, "garland, wreath") meaning crown or halo. This morphology is created by the viral spike (S) peplomers, which are proteins that populate the surface of the virus and determine host tropism.

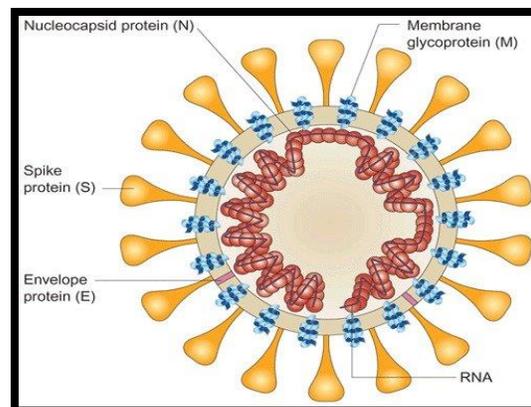


Fig. 1: Structure of Coronavirus

Proteins that contribute to the overall structure of all coronaviruses are the spike (S), envelope (E), membrane (M), and nucleocapsid (N).^[4] In the specific case of the SARS coronavirus a defined receptor-binding domain on S mediates the attachment of the virus to its cellular receptor, angiotensin converting enzyme 2 (ACE2). Some coronaviruses (specifically the members of Beta coronavirus subgroup A) also have a shorter spike-like protein called hem agglutinin esterase (HE).^[5]

2. REPLICATION:

Following the entry of this virus into the cell the virus particle is uncoated and the RNA genome is deposited into the cytoplasm. The coronavirus RNA genome has a 5' methylated cap and a 3' polyadenylated tail. This allows the RNA to attach to ribosomes for translation.

Coronaviruses also have a protein known as a replicase encoded in its genome which allows the RNA viral genome to be transcribed into new RNA copies using the host cell's machinery. The replicase is the first protein to be made once the gene encoding the replicase is translated the translation is stopped by a stop codon. This is known as a nested transcript. When the mRNA transcript only encodes one gene it is monocistronic. A coronavirus non-structural protein provides extra fidelity to replication because it confers a proofreading function which is lacking in RNA dependent RNA polymerase enzymes alone.

The RNA genome is replicated and a long polyprotein is formed where all of the proteins are attached. Coronaviruses have a non-structural protein a protease which is able to separate the proteins in the chain. This is a form of genetic economy for the virus allowing it to encode the greatest number of genes in a small number of nucleotides.^[6]

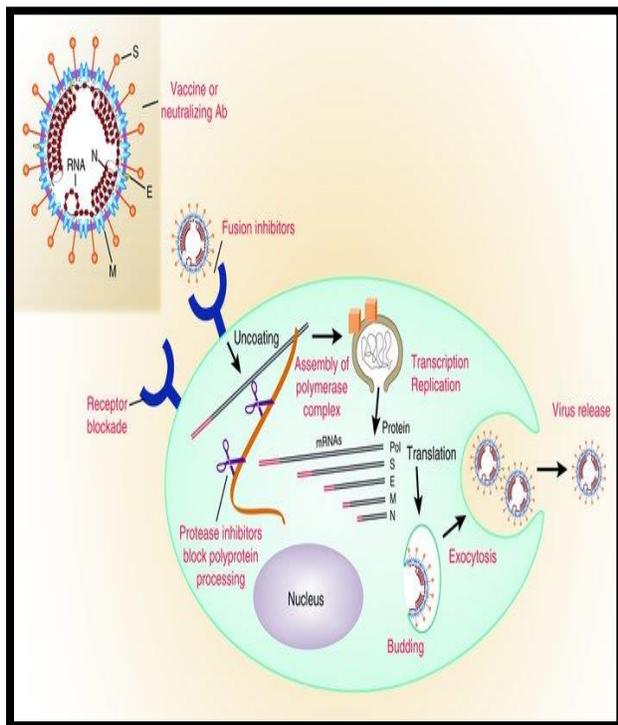


Fig. 2: Replication of Coronavirus

3. Transmission:

There has not been a great deal of research on how a human coronavirus spread from one person to next. The virus transmits using secreted fluid form respiratory system.⁵ Coronavirus still speculation but if the virus is in the secretion or feces of snakes it would be possible to aerosolize and be breathed.⁶ Coronaviruses are large family of virus that are common in many different species of animals including camels, cattle, Cats and Bats. Rarely animal coronaviruses can infect people and then spread between people such as with MERS (Middle East Respiratory Syndrome) and SARS (Severe Acute Respiratory Syndrome).⁷ When person to person spread has occurred with MERS and SARS it is thought to have happen mainly via respiratory droplets produced to how influenza and other respiratory pathogens spread.⁷

The SARS virus was found in bat, civet and cat. The MERS were infected with large number of camels in gulf. Rarely do these viruses reach humans. The mutation of the virus occurs so because of mutation of virus people may infect. This new virus has evolved from two types of snakes that emits nests and rat hesnake crate. These two species of snakes are found in the province of Hubai.

A new protein is produced in virus due to gene mutation. This protein has ability to sticks or bound the molecules which are present on the cell membrane of human. In such a way the virus began to spread rapidly throughout the body.^[7]

4. Sign and Symptoms:

- 1 The symptoms of most coronavirus are similar to any other upper respiratory infection, including runny nose, coughing sore throat and sometimes a fever.²
- 2 Outdoors the virus can usually only survive for hours and days. Indoor in dried up cat litter it can survive for upto seven weeks.
- 3 But if a coronavirus infection spreads to the lower respiratory tract it can cause pneumonia, especially in older people, people with heart disease or people with weakened immune system.²

5. PREVENTION AND PRECAUTION:^[5, 12]

- 1 Maintaining personal hygiene.
- 2 Wearing masks.
- 3 Avoid contact with people who are ill and cooking meat and eggs.
- 4 Wash your hands with soap and water for at least 20 seconds.
- 5 If soap and water are not available, use alcohol based hand sanitizer.
- 6 Avoid touching your eyes, nose and mouth with unwashed hands.
- 7 Avoid close contact with people who are sick.
- 8 Avoid animals (alive or dead) animal markets and products that come from animals.(Such as uncooked meat)^[8-11]
- 9 Those who drink milk should boil it well and drink it.
- 10 People who come in contact with animals should wash their hands after handling animals.
- 11 Cover your sneeze with a tissue and then throw tissue in the trash.
- 12 People who eat meat should make sure they are well cooked.^[13]

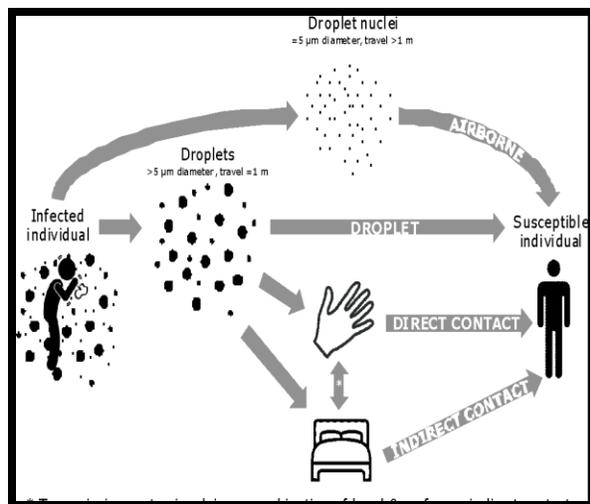


Fig. 3: Source of Coronavirus

6. DIAGNOSIS:

There is sophisticated new test called Reverse Transcriptase PCR (RT-PCR) which measures the amount of viral RNA in a patient's sputum, serum or blood.^[12] There is no specific antiviral treatment recommended for 2019-2020 nCov should receive supportive care to help relieve symptoms. For severe cases treatment should include care to support vital organ function.^[14, 15] Protease inhibition (eg. Lopinavir/ Ritonavir) demonstrated antiviral activity against several acute respiratory syndrome corona virus infection.¹⁴

- 1 The best way to prevent infection is to avoid being exposed to this virus.⁷
- 2 There are two ways of treating viral infection, one is to find small molecule that stop viruses replicating by interfering with viral proteins.
- 3 The second way is to use the antibiotics. There are the larger proteins that bind to virus and trigger their destruction.¹⁵
- 4

7. CONCLUSION:

The virus first popped up in Wuhan in people who had visited a local seafood and animal market. The virus is spreading from person to person in many parts of China and in some other countries. In public health authorities will focus on mitigation, dealing with the disease and trying to minimize the harm it does to people and communities. The result of this study emphasizes the importance of perceived health status. The upcoming years is likely to see the advancement of this indulgent and significantly practical applications as vaccines corona virus to get into human clinical trials, prevention of infection through modifying risk factors for development of therapeutics and techniques capable for treating

infected patients to diminish morbidity and mortality. There is no specific antiviral treatment recommended for 2019 nCov so personal hygiene is very essential.

REFERENCES:

- [1] <https://www.cats.org.uk>
- [2] <https://www.webmed.com/lung/coronavirus>
- [3] <https://newmeter.in>
- [4] <https://www.voanews.com>
- [5] <https://www.medicalnewstoday.com/articles/256521.php>
- [6] <https://www.newscientist.com>
- [7] <https://www.cdc.gov>
- [8] <https://www.mercurynews.com>
- [9] <https://en.m.wikipedia.org/wiki/cpronavirus>.
- [10] J.S.M. Peins in medical microbiology 18th edition, 2012.
- [11] <https://www.theindubusinessline.com>
- [12] <https://www.livemint.com>
- [13] Kahn Jeffrey et al., The pediatric infection disease journals 2005:24(11), 5223-5227.
- [14] Chu CM, et al., Role of lopinavir/ritonavir in the treatment of SARS, Initial virological and clinical finding, 2004:59(3), 6-252.
- [15] <https://www.newscientist.com>