

Coronavirus- (COVID-19) - Formal assessment and overview

Coronavirus (CoV) (2019) belongs from family betacoronavirus (Subfamily-*Orthocoronavirinae*) well known as COVID-19 and nCOVID19 (n Stands for *NOVEL* means new), so the name given nCOVID-19 (novel coronavirus 19) is an epidemic infectious disease first reported in Wuhan (Central China Hubei Province) probably from Wet Market China. It has now spread in 199 countries and territories. The most affected countries by this epidemic infectious disease are China, Italy, America, Spain, Iran, France, Germany, South Korea, India, etc., Structure of nCOVs-19 is crown-like appearance, composed of several proteins spike, nucleocapsid envelope (Spike Glycoprotein) encasing positive-sense single-stranded RNA (Genome) and VIRIONS (Viruses). It is the largest known RNA virus with + ssRNA-30 kb in length (5` Cap Structure and 3` Tail Structure). The Diameter of Coronavirus is 15–200 nm, and nCOVs-19 is approximately 60–140 nm. The spike protein is located on the surface of the virus and forms a rod-like structure. Coronavirus replicate locally in cells of ciliated epithelium, causing cell damage and inflammation. Diagnostic antigen. Structure^[1] of Corona-Virus (4 Proteins) Includes–

- Envelope protein
- Spike protein
- Membrane protein
- Nucleocapsid protein/RNA
- Hemagglutinin esterase dimer.

Coronavirus has two divisions^[2]–

- Group based on serology
- Group based on phylogenetic clustering.

Types^[3]–

- Alpha CoV
- Beta CoV-Divides in 5 Genere or lineage
- Delta CoV
- Gamma CoV.

Source

- Bats
- Humans
- Civets (intermediate source)

- Cattle and cats
- Bamboo rats and badgers.

Probably, it is known that Bats and Rodents are *Gene Source* of alpha and beta coronavirus.

Human CoV (HCoV) from family alpha and beta CoVs from sub family CoronaVirinae (3) are^[3,4]

1. Alpha CoVs
 - HCoV-229E
 - HCoV-NL 63.
2. Beta CoVs
 - HCoV-OC 43
 - HCoV-KHU1.
3. Others
 - Severe acute respiratory syndrome (SARS)-CoV (2003)
 - SARS-CoV 2 (2019)/nCoV-19/COVID-29
 - Middle east respiratory syndrome (MERS)-CoV (B and C Lineage).

SARS-CoVs₂ name was given by the International Committee of Taxonomy of Virus, and NCoV-19 belongs to Beta Group A lineage was given by the World Health Organization.

The transmission of Corona Virus occurs by Replication-Transcription Complex and known route of communication is-

- Animal to human
- Human to human
- Symptomatic people (most frequent source)
- Transmit through coughing or sneezing (respiratory droplets)
- Aerosol transmission is also possible in closed spaces.

Binds and entered through endocytosis and membrane fusion, then release of nCoV genome. Transmit viral RNA in the form of Polyprotein 1a/1ab (PP1a/PP1b) in the host. Two processes occur, i.e., Genomic RNA replication and sgRNA transcription. S, E and M proteins combine with nucleocapsid and hence CoV enters in golgi vesicles. Assemble of mature virion and exocytosis.

Diagnosis

- Viral culture gold standard
- Reverse transcriptase polymerase chain reaction
- Respiratory material (nasopharyngeal and oro-pharyngeal swab)
- Serum for serological testing
- Pneumococcal antigen detection.

Associated disease (syndrome)

- SARS
- MERS

Possible treatment (till date nothing has been postulated)–

- Phase-I
 - Influenza vaccine to uninfected patients
 - Convalescent plasma to infected COVID-19 patients
 - Washing hand for 20 s
 - Self-isolation for 7 days (active) and 14 days (passive)
 - Wear N-95 mask
 - Social distancing upto 6 feet.
- Phase II
 - Solutions used to inactive nCoV-19 are
 - Chlorhexidine gluconate
 - 75% alcohol
 - Chlorine containing disinfectants
 - Peracetic acid
 - Chloroform and other lipid solvents.
- Phase III (for hospitalized patients)
 - For severe cases maintain oxygen therapy
 - Fluid therapy and steam inhalation
 - Correct temperature.

ANAND KUMAR¹, NIRMA YADAV²


¹Department of Dental Surgery, MLN Medical College, Prayagraj, Uttar Pradesh, India, ²Department of Periodontics, Ahmedabad Dental College and Hospital, Ahmedabad, Gujarat, India
E-mail: anandkmr901@gmail.com

Submitted: 28-Mar-2020, **Revised:** 16-Apr-2020, **Accepted:** 23-Apr-2020, **Published:** 28-Jul-2020

REFERENCES

1. Available from <https://apps.who.int/iris/bitstream/handle/10665/330374/WHO-2019-nCoV-laboratory-2020.1-eng.pdf>. [Last accessed on 2020 Mar 28].
2. Li F. Structure, function, and evolution of coronavirus spike proteins. *Annu Rev Virol* 2016;3:237-61.
3. Corman VM, Ithete NL, Richards LR, Schoeman MC, Preiser W, Drosten C, *et al.* Rooting the phylogenetic tree of middle east respiratory syndrome coronavirus by characterization of a conspecific virus from an African bat. *J Virol* 2014;88:11297-303.
4. Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. StatPearls [Internet]. Features, Evaluation and Treatment Coronavirus (COVID-19). Treasure Island (FL): StatPearls Publishing; Mar 20, 2020.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Access this article online	
Website: www.sidj.org	Quick Response Code 
DOI: 10.4103/sidj.sidj_10_20	

How to cite this article: Kumar A, Yadav N. Coronavirus- (COVID-19) - Formal assessment and overview. *Saint Int Dent J* 2020;4:2-3.