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The Effects of SARS-CoV-2 & its Variants in Human Body.

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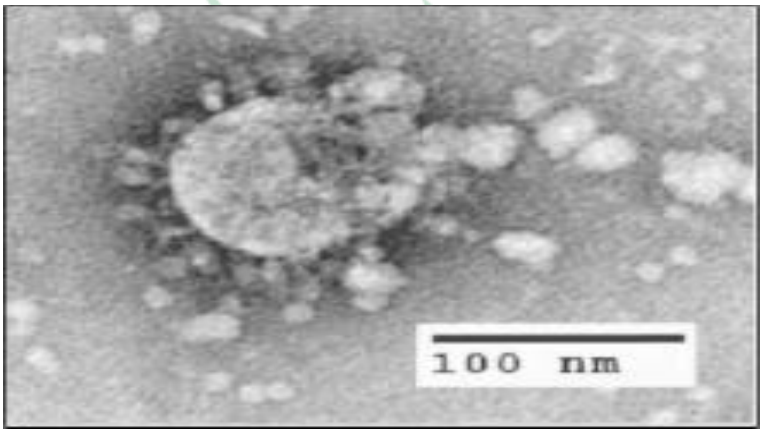
Introduction

Basically Severe Acute respiratory syndrome corona virus (SARS-CoV-1 or SARS-CoV-2) is a strain of virus that causes severe acute respiratory syndrome (SARS). It is a single-stranded RNA virus which infects the epithelial cells within the lungs. The virus enters the host cell by binding to Angiotensin Converting Enzyme-2. It infects humans, bats, and palm civets. On 16 April 2003, following the outbreak of SARS in Asia and secondary cases elsewhere in the world, the World Health Organization (WHO) issued a press release stating that the corona virus identified by a number of laboratories was the official cause of SARS. The Centers for Disease Control and Prevention (CDC) in the United States and National Microbiology Laboratory (NML) in Canada identified the SARS-CoV-1 genome in april 2003. Scientists at Erasmus University in Rotterdam, the Netherlands, demonstrated that the SARS corona virus fulfilled Koch's postulates, thereby confirming it as the causative agent. In the experiments, macaques infected with the virus developed the same symptoms as human SARS victims.



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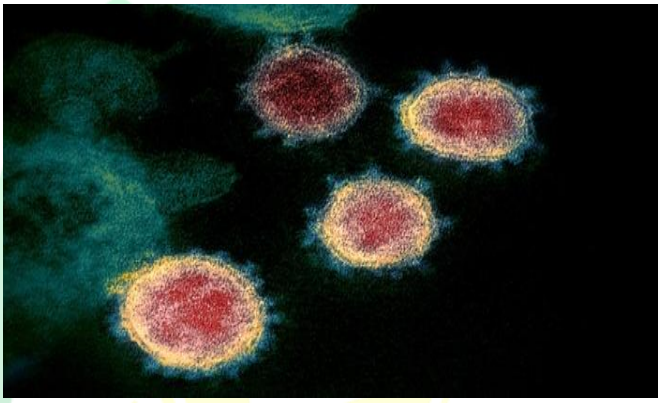
A similar virus was discovered in December 2019. This virus, named severe acute respiratory syndrome (SARS-CoV-2), is the causative pathogen of the ongoing COVID-19 pandemic. Severe acute respiratory syndrome corona virus 2 (SARS-CoV-2) is the virus that causes corona virus disease 19, we also called COVID-19. The respiratory illness responsible for the COVID-19 pandemic. The World Health Organization declared the outbreak a Public Health Emergency of International Concern on30 January 2020, and a pandemic on 11 March 2020.

The Microscopic view of the SARS-CoV-2



Virus Classification

Realm	Riboviria
Kingdom	Orthornavirae
Phylum	Pisuviricota
Class	Pisoniviricetes
Order	Nidovirales
Family	Coronaviridae
Genus	Betacoronavirus
Subgenus	Sarbecovirus
Species	Severe acute respiratory syndrome related coronavirus
Virus	SARS-CoV-2

Origin of SARS-CoV-2

SARS-CoV-2 is a positive-sense single stranded RNA virus that is contagious in humans. As described by the US National Institute of health, it is the successor to SARS-

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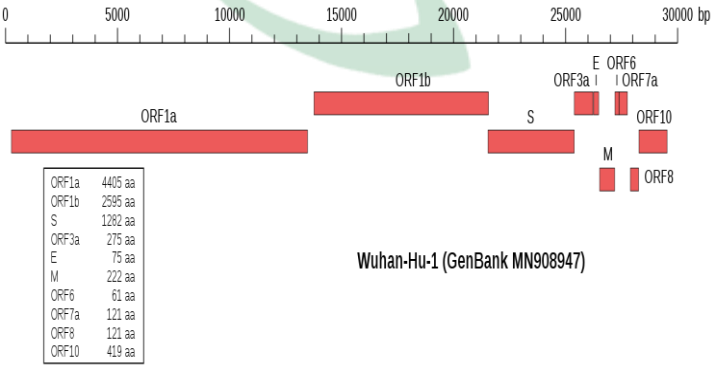
CoV-1, the virus that caused the 2002-2004 SARS outbreak. The initial outbreak of SARS-CoV-2 in Wuhan, China (December 2019). In January 2020, the WHO recommended "2019 novel corona virus"(2019-nCov) as the provisional name of virus. On 11 February 2020, the International Committee on Taxonomy of Viruses adopted the official name "severe acute respiratory syndrome coronavirus2" (SARS-CoV-2). To avoid the confusion with the disease SARS, the WHO sometimes refers to SARS-CoV-2 as COVID-19 virus in public communication. A phylogenetic network analysis of 160 early coronavirus genomes sampled from December 2019 to February 2020 showed that the virus type most closely related to the bat coronavirus was most abundant in Guangdong, China and designated type A. The predominant type among samples from Wuhan B is more distantly related to the bat coronavirus than than the ancestral type A.

The phylogenetic study also indicates that a virus from Rhinolophus affinis, collected in Yunnan province and designated RaTG13, has a 96% resemblance to SARS-CoV-2.

Genomic Information

Genomic organization of isolate Wuhan-Hu-1, the earliest sequenced sample of SARS-CoV-2.



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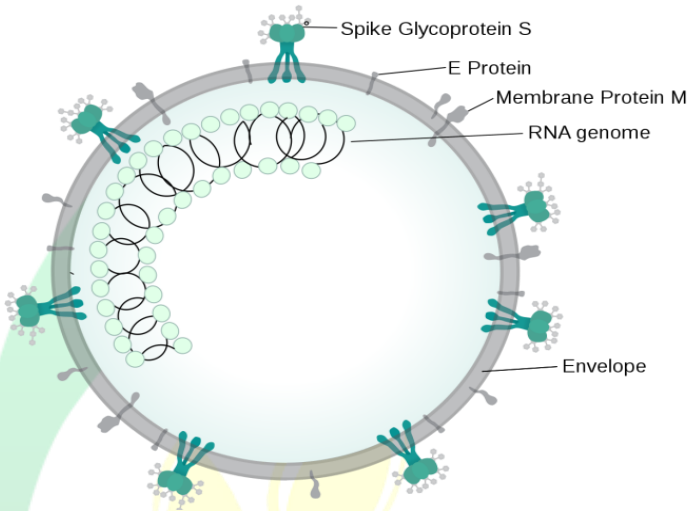
Structural Biology

SARS-CoV-2 virion is 50-200 nanometres in diameter. It has four structural proteins, known as the "S" (spike), "E"(envelop), "M'(membrane), and "N"(nucleocapsid). The protein holds the RNA genome and the S, E, and M protein together create the viral envelope.



The spike protein responsible for allowing the virus to attach to the receptor Angiotensin Converting Enzyme 2 (ACE2) on human cells to use them as a mechanism of cell entry.

Emerging of new variants of SARS-CoV-2 & its effects in human body

Viruses generally acquire mutations over time and changed its genetic constitution, giving rise to new variants appears to be growing in a population, it can be labeled as an emerging variant. Some of the harmful consequences of emerging variants are as following:

- Increased morbidity, transmissibility & mortality.
- Ability to evade detection by diagnostic tests & natural immunity.
- Decreased susceptibility to antiviral drugs, neutralizing antibodies.
- Ability to infect vaccinated individuals.
- Increased risk of particular conditions such as multisystem inflammatory syndrome.
- Damage the lungs and caused heart attack.
- Increased respiratory symptoms.
- Breathing difficulty or shortness of breath, chest pain and pressure.

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Recent study suggested that COVID-19 predominantly spreads through air, we also called airborne transmission. Initially human to human transmission of SARS-CoV-2 was confirmed on 20 January 2020, during the COVID-19 pandemic. Transmission was initially assumed to occur primarily via respiratory droplets from coughs and sneezes within a range of about 1.8 meters. Indirect contact via contaminated surfaces is another possible cause of infection.

Conclusion

The corona virus pandemic is a devastating blow for the world economy. According to World Bank report says that around 60 million people could be pushed into extreme poverty line by the effect of corona virus, millions of peoples are homeless, starvation and unemployment creates globally. Lives have been lost, livelihood disrupted, and education adversely impacted. We can overcome this pandemic situation by maintaining social distance, using proper mask and sanitizing or washing our hands by soaps. Now mass vaccination process is only solution to prevent or control the pandemic until we get herd immunity. In India central drugs standard control organization (CDSCO) give approval to three vaccines this are Oxford COVID-19 vaccine Covishield, manufactured by Serum Institute of India at Pune Maharashtra, Bharat biotech vaccine Covaxin and emergency used of Russian vaccine Sputnic-V.

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