Lecture -11
III Semester

Medical Microbiology

Severe Acute Respiratory Syndrome (SARS)

Dr. Dharmesh Harwani
Department of Microbiology

Definition of disease: Resulting from a pathophysiological response to external or internal factors.

Definition of disorder: A disruption (caused by the disease) of the normal or regular functions in the body or a part of the body.

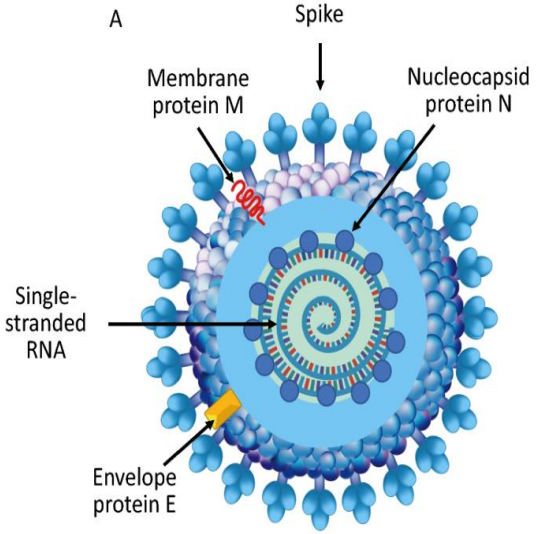
Definition of syndrome: A collection or set of signs and symptoms that characterize or suggest a particular disease.

- **Severe acute respiratory syndrome (SARS)** is a viral respiratory disease of zoonotic (**cave-dwelling horseshoe bats**) origin caused by SARS-CoV-1.

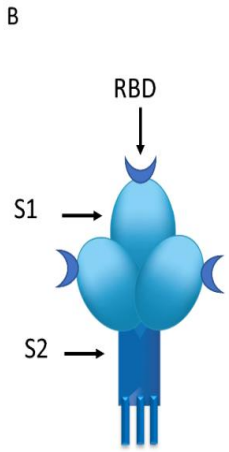
- SARS was a relatively rare disease; at the end of the epidemic in June 2003, the incidence was 8,422 cases with a case fatality rate (CFR) of 11%.No cases of SARS-CoV have been reported worldwide since 2004.

- In 2019, the related virus strain severe acute respiratory syndrome coronavirus-2 was discovered.

- As with MERS and COVID-19, SARS resulted in significantly more deaths of males than females.



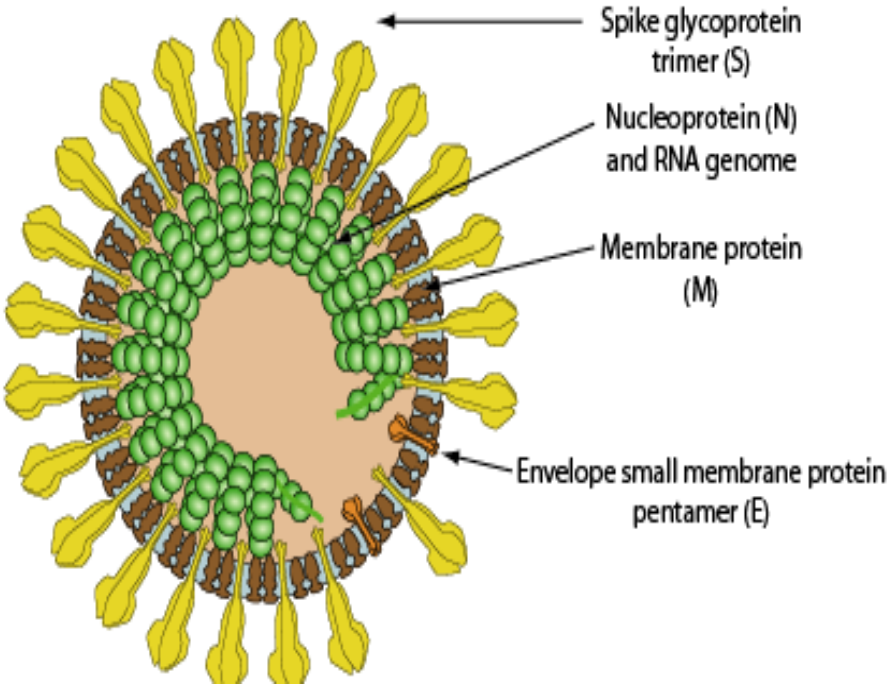
Coronavirus



Spike

Coronaviruses constitute the subfamily *Orthocoronavirinae*, in the family *Coronaviridae*. The genome size 26.4 to 31.7 kilobases, one of the largest among RNA viruses. They have characteristic club-shaped spikes that project from their surface,

SARS-CoV-1



Human SARS-CoV-1 and other six are
- Human coronavirus 229E (HCoV-229E)
- Human coronavirus NL63 (HCoV-NL63)
- Human coronavirus OC43 (HCoV-OC43)
- Human coronavirus HKU1 (HCoV-HKU1)
- Middle East respiratory syndrome-related coronavirus (MERS-CoV)
- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

- It is an enveloped, positive-sense, SSRNA virus which infects the epithelial cells within the lungs by binding to **angiotensin-converting enzyme 2**.
- It infects humans, bats, and palm civets.
- 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 the Netherlands, demonstrated that the SARS coronavirus fulfilled Koch's postulates

Signs and symptoms

SARS produces flu-like symptoms and may include fever, muscle pain, lethargy, cough, sore throat, and other nonspecific symptoms. The only symptom common to all patients appears to be a fever above 38 °C (100 °F). SARS may eventually lead to shortness of breath and pneumonia.

Transmission

The primary route of transmission for SARS-CoV is contact of the mucous membranes with respiratory droplets or fomites. While diarrhea is common in people with SARS, the fecal–oral route does not appear to be a common mode of transmission.

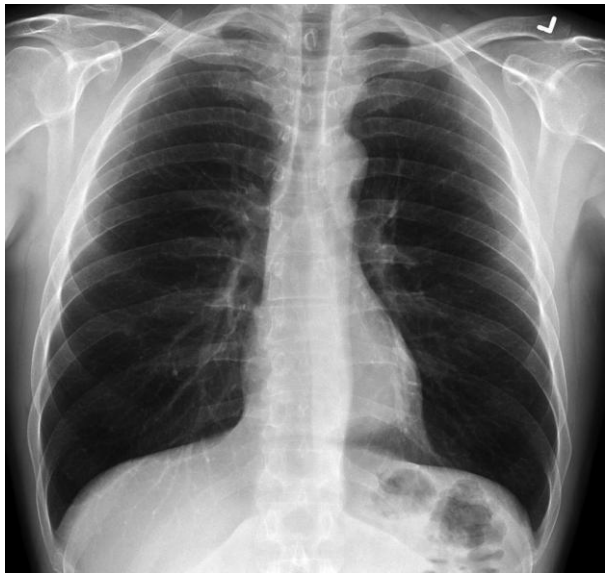
SARS-CoV may be suspected in a patient who has:

- Fever of 38 °C (100 °F) or higher, and Either a history of:
  - Contact and Travel

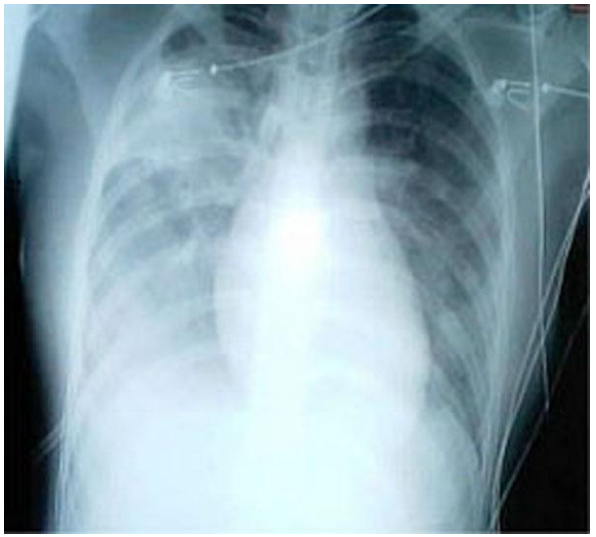
- **Clinical Criteria of SARS-CoV Diagnosis**

  - Early illness: chills,myalgia, diarrhea, sore throat
  - Cough, dyspnea

The appearance of SARS-CoV in chest X-rays is not always uniform but generally appears as an abnormality with patchy infiltrates.



Normal



A chest X-ray showing increased opacity in both lungs, indicative of pneumonia, in a patient with SARS

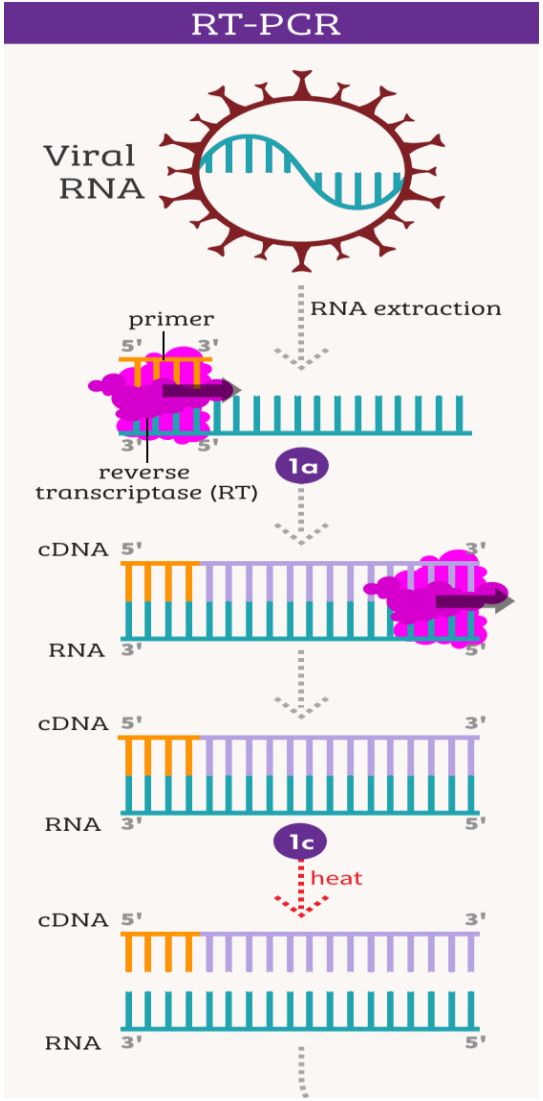
Prevention

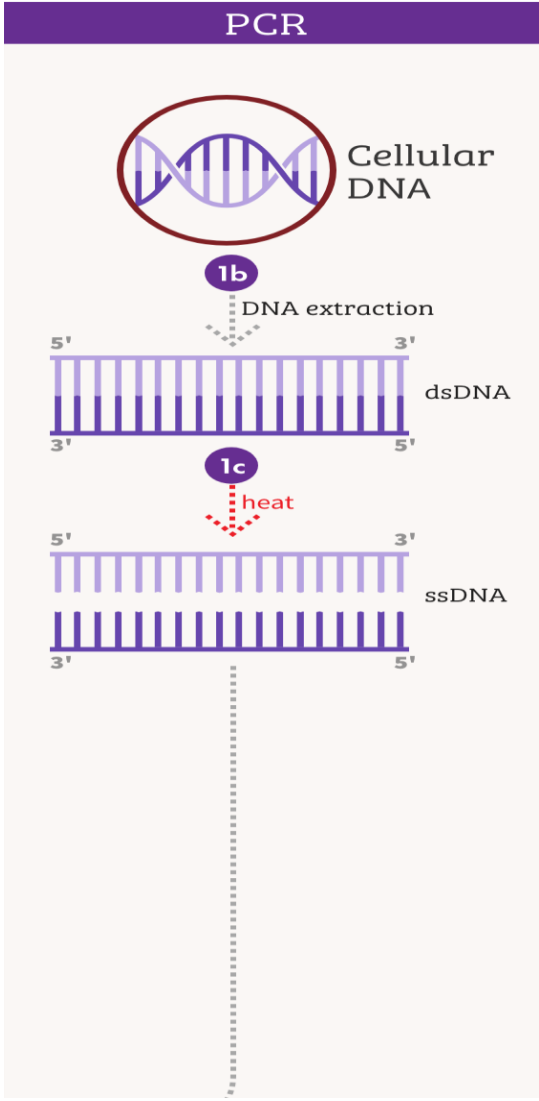
There is no vaccine for SARS, although the CDC developed a prototype and is not field-ready as of March 2020. Clinical isolation and quarantine remain the most effective means to prevent the spread of SARS.

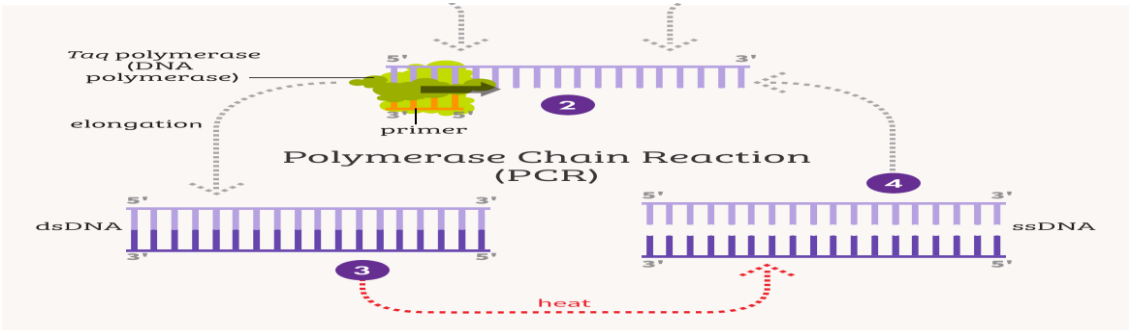
Other preventive measures include……

Treatment

As SARS is a viral disease, antibiotics do not have direct effect but may be used against bacterial secondary infection. Treatment of SARS is mainly supportive with antipyretics, supplemental oxygen and mechanical ventilation as needed.







Review | Open Access | Published: 31 July 2020

Differences and similarities between SARS-CoV and SARS-CoV-2: spike receptor-binding domain recognition and host cell infection with support of cellular serine proteases

Giovanni A. Rossi, Oliviero Sacco, Enrica Mancino, Luca Cristiani & Fabio Midulla

Infection **48**, 665–669(2020) | Cite this article

1970 Accesses | **1** Altmetric | Metrics

https://link.springer.com/article/10.1007/s15010-020-01486-5

Probable Pangolin Origin of SARS-CoV-2 Associated with the COVID-19 Outbreak

Tao Zhang,[1,2] Qunfu Wu,[1,2] and Zhigang Zhang[1,3,*]

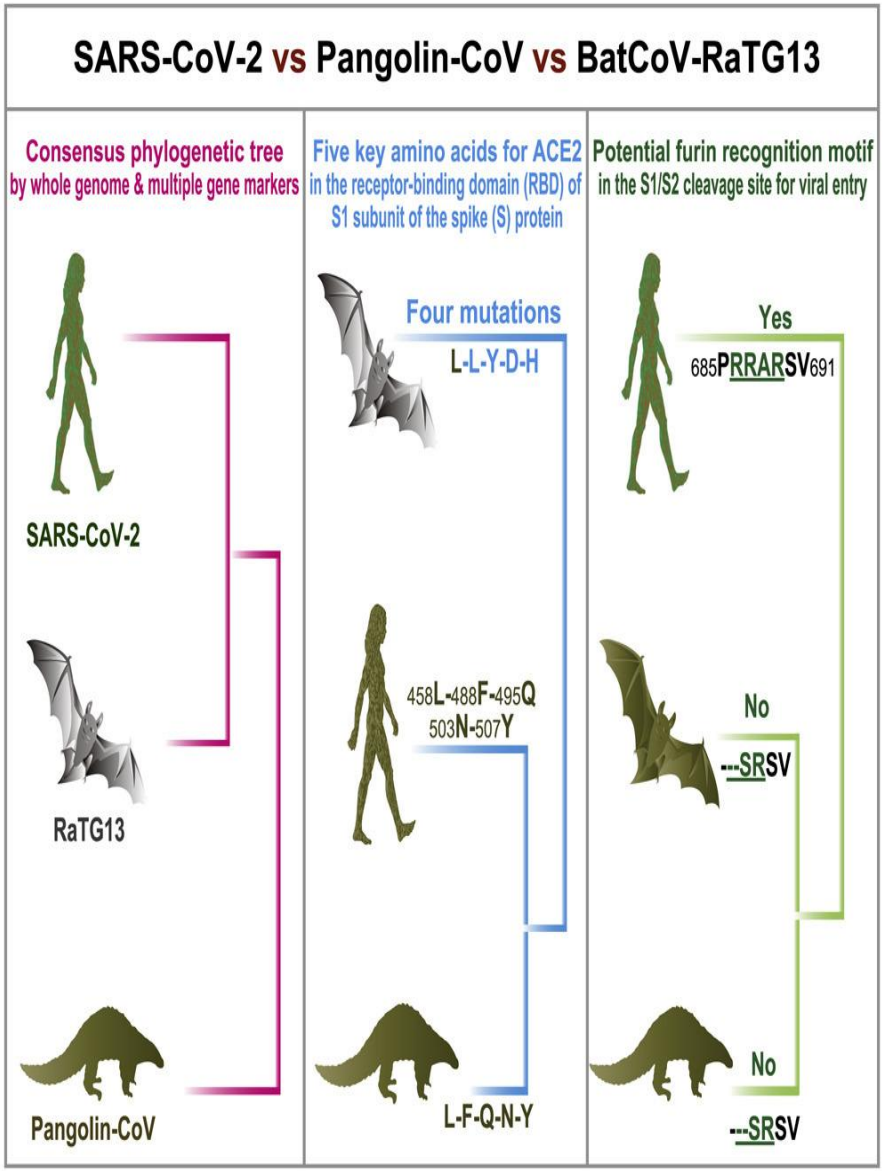
[1]State Key Laboratory for Conservation and Utilization of Bio-Resources in Yunnan, School of Life Sciences, Yunnan University, No. 2 North Cuihu Road, Kunming, Yunnan 650091, China

[2]These authors contributed equally

[3]Lead Contact

*Correspondence: zhangzhigang@ynu.edu.cn

https://doi.org/10.1016/j.cub.2020.03.022



https://www.sciencedirect.com/science/article/pii/S0960982220303602