

COVID-19 RESEARCH STUDIES FACT SHEET

ACADEMY OF SCIENCES MALAYSIA (ASM)

ASM is a statutory body of eminent Malaysian scientists elected for their contributions to science. At this period of unprecedented uncertainty due to the Covid-19 pandemic, ASM has established a Special Interest Group (SIG) on COVID-19 comprising Fellows of the Academy, Young Scientists Network (YSN-ASM) and Top Research Scientists Malaysia (TRSM) who are the expert network of ASM to review key research findings around the world and issue fact sheets to help the public understand the implications (and limitations) of the research studies. This factsheet briefly discusses the therapeutics of Covid-19 focusing on the various drugs currently undergoing clinical trials for treatment of the disease.



COVID-19 THERAPEUTICS

What is the current medication for COVID-19?

Currently, there is no antiviral medication approved to treat COVID-19. Treatment focuses on managing and relieving the symptoms. New medicines and vaccines are currently under clinical trials^[1].

How are COVID-19 patients treated?

Not all COVID-19 positive patients require medical care. Patients with mild disease (uncomplicated upper respiratory tract infection with non-specific symptom) do not require hospital care while given antipyretics for fever. Yet, isolation is necessary to contain the virus transmission to others. Patients with severe disease (fever or suspected respiratory infection with either respiratory rate > 30 breaths/min or severe respiratory distress or normal blood oxygen saturation levels $[SpO_2] \leq 93\%$ on room air) will be hospitalised and medical care will be provided including supplemental oxygen therapy^[2].

When can a patient with positive COVID-19 be discharged from the hospital?

A patient can be discharged from the hospital when clinically recovered upon two negative tests, at least 24 hours apart, at least eight days after onset of symptoms. It can also depend on the case-by-case basis upon consultation from the medical authorities^[2].

There is a possibility of positive detection again after hospital discharge while remaining asymptomatic^[3]. This could be due to prolonged viral shedding (median duration of 20 days)^[4] which is highly associated with male gender, delayed admission, concomitant hypertension medication and invasive mechanical ventilation [5]. Hence, it is highly recommended to continue self-isolation at home or a safe place for an additional 14 days.

“What is viral shedding? It is a process of excreting viral progeny from the host.”

Are there any drugs available to treat COVID-19?

Several drugs showed promising *in vitro* outcome but had limited clinical findings. These drugs (except remdesivir) are registered with the National Pharmaceutical Regulatory Agency (NPRA) for the treatment of other illnesses and are under clinical trials for the treatment of COVID-19. These drugs are also currently under trials to investigate if they can reduce the viral shedding duration and reduce the transmission. Brief pharmacological aspects of these drugs as follows.

“What is NPRA? NPRA is an agency under the Ministry of Health, Malaysia that ensures the quality and safety of pharmaceutical and cosmetic products before marketing in Malaysia.”

1 CHLOROQUINE

Chloroquine is an antimalarial and amebicide drug which is approved for the prevention and treatment of malaria and amebiasis ^[1, 6].

Mechanism of action: The target of the drug has not been clearly elucidated. The drug believed to alter pH levels at the surface of cell membrane. This inhibits the fusion of the virus to the cell membrane which prevents the entry and transport of the virus ^[1, 7].

2 HYDROXYCHLOROQUINE

Hydroxychloroquine is a less toxic derivate of chloroquine. It is prescribed to treat autoimmune diseases, i.e. systemic lupus erythematosus and rheumatoid arthritis. Hydroxychloroquine has been reported to be more potent than chloroquine at inhibiting the SARS -CoV-2 virus ^[8].

Mechanism of action: It is not well elucidated but suggested to be similar to the parent compound, chloroquine ^[9, 10].

3 LOPINAVIR / RITONAVIR

Lopinavir/ritonavir is a fixed-dose combination medication (lopinavir with a low dose of ritonavir) for the treatment and prevention of HIV.

Mechanism of action: Lopinavir acts on a protease enzyme involved in the coronavirus replication. Protease enzyme is crucial in the formation of new viral proteins and enzymes. Ritonavir inhibits the lopinavir-metabolising enzymes to enhance lopinavir exposure ^[11].

4 RIBAVIRIN

Ribavirin in combination with other antiviral medications used for the treatment of hepatitis C virus and respiratory syncytial virus.

Mechanism of action: The drug inhibits the replication of viruses via interfering with polymerase and dehydrogenase enzymes ^[12].

5 TOCILIZUMAB

Tocilizumab is a biopharmaceutical drug, monoclonal antibody interleukin-6 (IL-6) receptor antagonist. It is used to treat rheumatoid arthritis.

Mechanism of action: Tocilizumab binds to IL-6 receptors to inhibit chronic inflammation in the human cells ^[13].

6 REMDESIVIR

Remdesivir is still at the investigational stage for the treatment of Ebola virus disease and Marburg virus infections which gained attention for the treatment of COVID-19 virus. NPRA has not approved this drug.

Mechanism of action: Remdesivir acts on viral RNA polymerase enzymes to inhibit viral replication ^[14].

Is there any traditional medicine available?

Up to date, no traditional medicine, including traditional Chinese medicine (TCM) or Ayurvedic medication, has been approved for the treatment of COVID-19. Though one TCM study reported an effective cure rate of over 90 % against COVID-19 cases ^[15], the findings are anecdotal and require large clinical trials to prove its efficacy and safety.

Take home message

Up to date, there is no well-established or proven medication for the treatment of COVID-19. Clinical trials are ongoing for the discovery of a definitive treatment option.

Self-medication is strongly prohibited. It is not only illegal, but it is also highly dangerous. Public **MUST** consult the physicians before undertaking any treatments.

Prevention is better than cure. Social distancing, regular handwashing with soap, wearing a face mask at public places and disinfecting high-touch surfaces are the most effective ways to prevent the infection.

“What is self-medication? A process of medicating oneself without consulting a health care professional.”

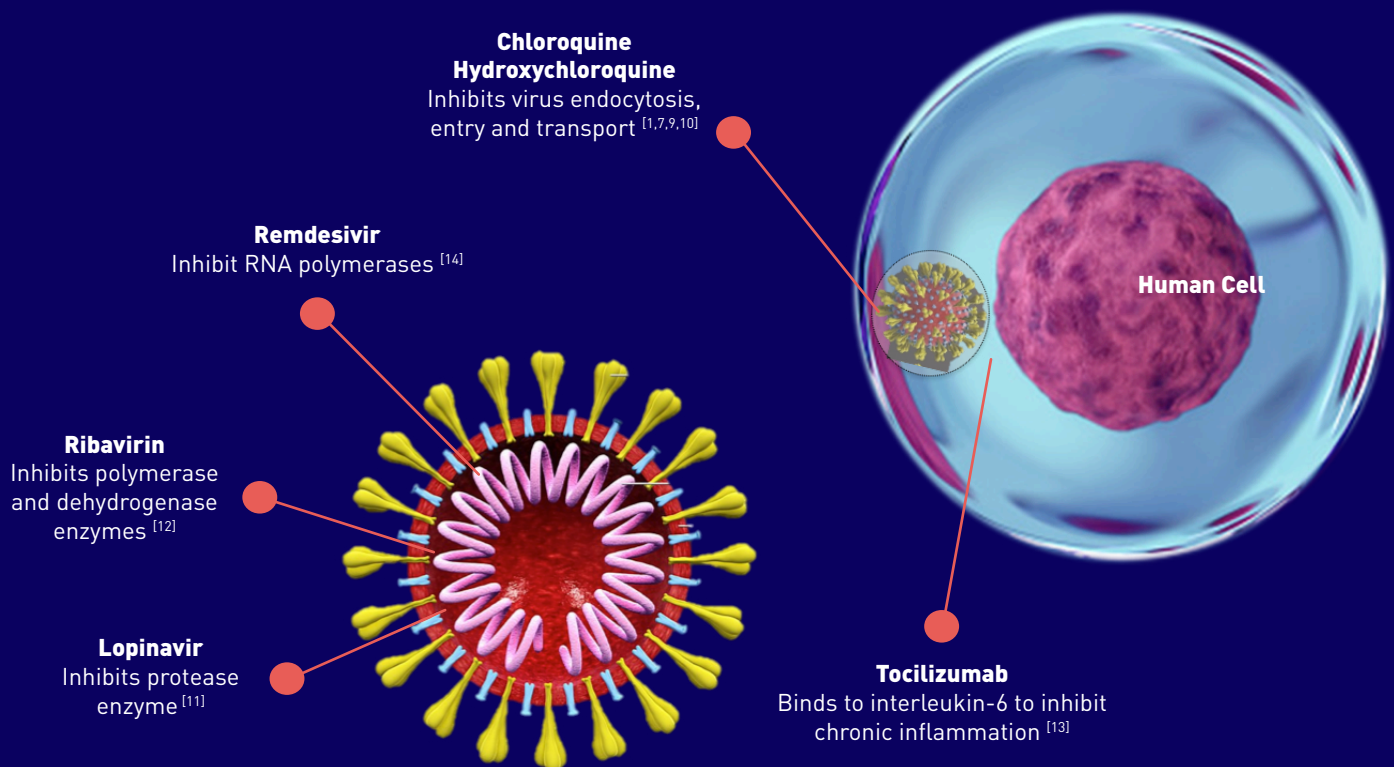


Figure 1. Mechanism of action of COVID-19 drugs under development.

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