Journal of allbiosolution

(2020) Volume 2, Issue 1, Article ID: A-0201010

Editorial

A Bird's Eye View of the Novel Corona Virus Pandemic

Sandeep Asthana[1]

1. Department of Biotechnology, RJSPM´s College affiliated to Savitribai Phule Pune University, Pune, India.

Editorial

World is witnessing the pandemic of a RNA virus SARS-CoV-2 (severe acute respiratory syndrome coronavirus-2) as it is named by the WHO on February 11, 2020. The syndrome is named COVID-19 (corona virus disease 2019). This pandemic has led to health, social and economic problems including economic slowdown, loss of life, unemployment, psychological problems, and stress. SARS-CoV-2 is believed to have originated in Wuhan province of China. Initially it was thought to be an animal to human transmission. But posterior the WHO (World Health Organization) declared its spread from human to human, creating a huge problem in Wuhan and Hubei province of China. It came from the wet market of China from bats to humans. From there, it spread over 190 countries across the globe.

SARS-CoV-2 is similar to SARS (severe acute respiratory syndrome) & MERS (Middle East respiratory syndrome) viruses but milder in nature and faster in dissemination. SARS-CoV-2 contains single stranded RNA of 30 kb size enclosed within the capsid. Capsid has spikes made up of glycoprotein(s) that impart a characteristic appearance of “Corona”. Word “Corona” had come from the crown, which is owing to spikes on the surface. It has some 15 genes that make few proteins; one that is targeted for drug and vaccine developments is RNA dependent RNA polymerase, a viral enzyme that replicates nucleic acids. However, viral mutations can make virus resistance to drugs and vaccines, escape to immune and pathogenesis related mechanisms.

One burning question posed against the world community is how long will this pandemic last defying all the answers. Still there are no any vaccines and proper medications. Only a few hit and trial methods are available which worked in some cases, may or may not work in others. Hydroxychloroquine (HCQ), an anti-malarial drug, seems to work with few other combinations. Medication against Dengue fever or antiviral drugs like Remdesivir is working in some cases.

Keywords

Corona Virus; SARS-CoV-2; COVID-19; SARS; MERS; Hydroxychloroquine; Remdesivir

Type of article

Editorial

Corresponding author

Sandeep Asthana. Department of Biotechnology, RJSPM´s College affiliated to Savitribai Phule Pune University, Pune, India.
Email: Sandeepasthana76@gmail.com

Publication

Received: 28/05/2020
Accepted: 18/06/2020
Published: 18/06/2020

SARS-CoV-2 has similarities with SARS. It has 89% similarity at nucleic acid level, but SARS is far more dangerous than SARS-CoV-2. The SARS outbreak was controlled during 2003. Since then there are sporadic cases. But SARS-CoV-2 has a higher reproductive number (*R*0) of 2.2. Mean incubation period of the virus is 5-8 days. SARS-CoV-2 may spread from an asymptomatic person to others. It may take one to two weeks to develop. Over 10 million people have developed Covid-19, 0.5 million deaths is reported until now and it is increasing with time due to absence of a specific and targeted treatment. The USA alone has crossed 0.1 million deaths.

There could be few solutions to stop the spread like; use of masks, sanitizers and PPE kits, maintaining social distancing and social awareness, and herd immunity development are few of them. Nevertheless all these have some limitations. Therefore, development of antiviral vaccines is in prime focus at present. Many countries have started making them. Many of them have gone to pre-clinical trials to clinical trials. Some strategies adopted by various countries are; whole virus vaccines, RNA vaccines, subunit vaccines, and, may be, some proteins like RNA dependent RNA polymerase can be targeted.

One lateral view go by is that virus generation after generation becomes milder in nature and loose virulence, hence, favoured by evolution, it may disappear with time as it happened with other viruses.

The SARS-CoV-2 vaccine development process can be made rapid by using next generation techniques but these novel platforms pose few challenges.

Firstly, although the viral spike protein(s) is a potent immunogen for protection, optimising antigen design is critical to ensure optimal immune response.

Secondly, preclinical experiences with viruses like SARS and MERS. One of the problems of these viral infections is complexity development in functioning of the lung, either by antibody dependent manner or T helper cells mediated response. Therefore, finding a right animal model is a key.

Thirdly, experiences from SARS and MERS have indicated that potential duration of immunity is uncertain; we need a single dose vaccine or boosters are required, and use of adjuvants are not yet certain.

Primary endpoint for defining the effectiveness of a Covid vaccine also requires discussion, most commonly on two points;

i) Protection from infection as defined by seroconversion.

ii) Prevention of clinically symptomatic disease, especially amelioration of disease severity, including the frequency of disease requiring high intensity medical care with some reduction in hospitalization.

To sum it up the word needs courage and a revolutionary approach to save lives and rebuild the economy. There is a hope that vaccines will be developed soon to overcome this pandemic.

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