NEW FRONTIERS

Battling Covid-19 with gene technology

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GENE editing is a revolutionary technology believed to be the salvation for gene-related diseases. It has been around for over three decades.

Some equate gene editing to "playing God" as it involves meddling with genetic composition and making changes. Others are just grateful because it gives hope to themselves and their loved ones who are suffering from genetic disorders such as muscular dystrophy or cystic fibrosis.

To simply explain how gene editing works, we can say that it's a cut and paste system. You delete the unwanted gene and replace it with your gene of choice. Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) is the latest form of gene editing, with two women awarded the 2020 Nobel Prize for its discovery.

Although there has been a lot of controversy and ethical concerns surrounding the CRISPR technology, it has extensively been studied to modify mosquito DNA to prevent malaria, modify crops to withstand harsh weather, cure genetic blindness "retinitis pigmentosa" and cancer immunotherapy testing for various types of cancer.

In addition, CRISPR revolutionised the medical world when it was used to treat and cure a patient with sickle cell disease.

The Covid-19 pandemic has shaken the global community. As the public shies away from Covid-19, the scientific world is embracing the challenge to discover new CRISPR-based Covid-19 detection and therapeutic methods.

Currently available methods for Covid-19 are RTK-Ag and RT-PCR, where RTK-Ag detects the presence of the virus in the body, while confirmation of infection is done using the RT-PCR technique.

However, RT-PCR has a 30 per cent chance of a false negative and takes about 24 hours from collection of the sample to the final result. Hence, there's a need for a detection method with high accuracy and rapid turnaround time.

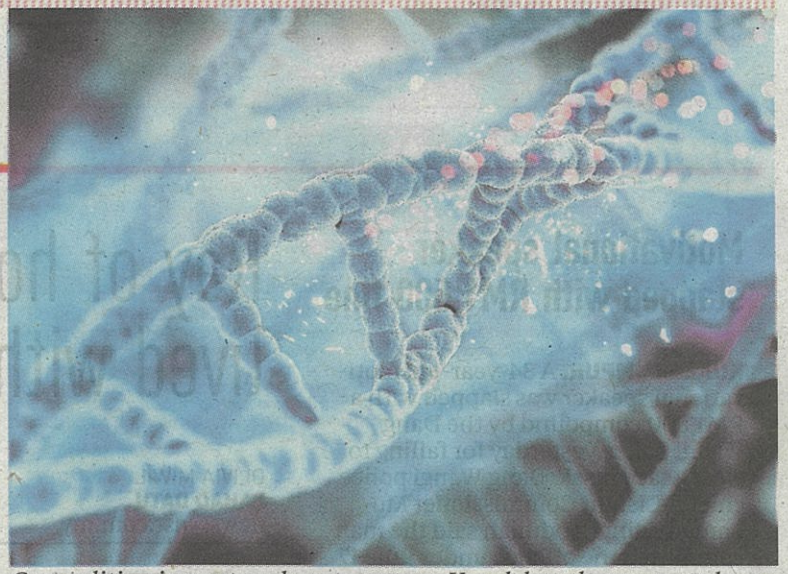
The result of such endeavours is the DETECTR and SHERLOCK Covid-19 detection kits. SHERLOCK has become commercially available, while DETECTR has been given Food and Drug Administration approval to be used in one diagnostic centre in the United States. Both boast high specificity and shorter diagnosis times.

Other Covid detection methods undergoing research using the CRISPR technology are CARMEN, STOPCovid, SENA and several others. Malaysia may not have access to these CRISPR-based Covid-19 test kits, but a Malaysian company has successfully developed Covid test kits that have gained access to European markets.

CRISPR is seen as a potential antiviral therapy and researchers have evaluated the application of CRISPR to the Covid-19 viral genome. The CRISPR system has been discovered to target parts of the genome with more precision, sensitivity and specificity.

Conversely, further research is needed to fine-tune the system for future antiviral treatments. The 10-10 Malaysia Science, Technology, Innovation and Economy Framework was launched to ensure robust development of sectors that may act as drivers of economic growth.

One of the socioeconomic drivers listed under bioscience technology under this framework is the development of CRISPR for antiviral treatment. Although CRISPR research here is still in its infancy, we are catching up in the biotechnology arena as Malaysia aims to be globally competitive in science and technology.



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New technology always has both pros and cons. While the technology can be used for the betterment of agriculture and to find cures for diseases, there was a case where CRISPR was used to modify human embryo cells, leading to the birth of two gene-edited humans.

This caused an uproar in the scientific community and ethics bodies. Currently, Malaysia has no guidelines on gene editing, but Guidelines for Stem Cell Research and Therapy, National Standards for Stem Cell Transplantation and National Guidelines for Hemopoietic Stem Cell Therapy have existed since 2009.

It is notable that Malaysia began developing Guidelines for Registration of Cell and Gene Therapy Products in 2014, and it was to be enforced from 2021 to safeguard public health. Unfortunately, the Covid-19 pandemic has overshadowed any announcement of such guidelines.

However, in whatever scientific endeavours man undertakes, he needs to abide by regulatory and legislative policies and be accountable for all his actions.

Through elements of good governance, policymakers can ensure that such innovative technology is used for the public's benefit.

The National Institute of Public Administration concurs with policymakers that innovation is essential for a country's economic development and reiterates that governance of any gene-related therapies should abide by coordinated regulation and legislation.

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