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## THE MUTATION & THE EVOLUTION OF THE VIRUS RESPONSIBLE FOR THE COVID-19 DISEASE



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Viruses can mutate. Quite easily too, as their basic structure is just genetic material—either deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) encapsulated within a protective coat called a **capsid**. They typically replicate by injecting their genetic material into a cell, use the cell's own genetic material replication system to create more copies of the virus.

When a virus makes copies of itself, its genetic material can sometimes be altered slightly due to contact with genetic materials of the host. These changes are called 'mutations'. A virus

with one or more new mutations is referred to as a 'variant' of the original virus.

"A virus mutates for survival, not to kill," explains virologist Dr Kenny Voon Gah Leong. "Humans are a reservoir for viruses such as the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus responsible for COVID-19. We help them propagate more. They don't want to kill us, the host. If the host dies, there is no co-existence. This is why their main aim is *not* to become more deadly."

### VIRUSES DON'T WANT TO KILL US? THEN WHY ARE SO MANY PEOPLE DYING AFTER BEING INFECTED BY COVID-19?

That's because the virus is still getting to know us humans, as morbid as that may sound.

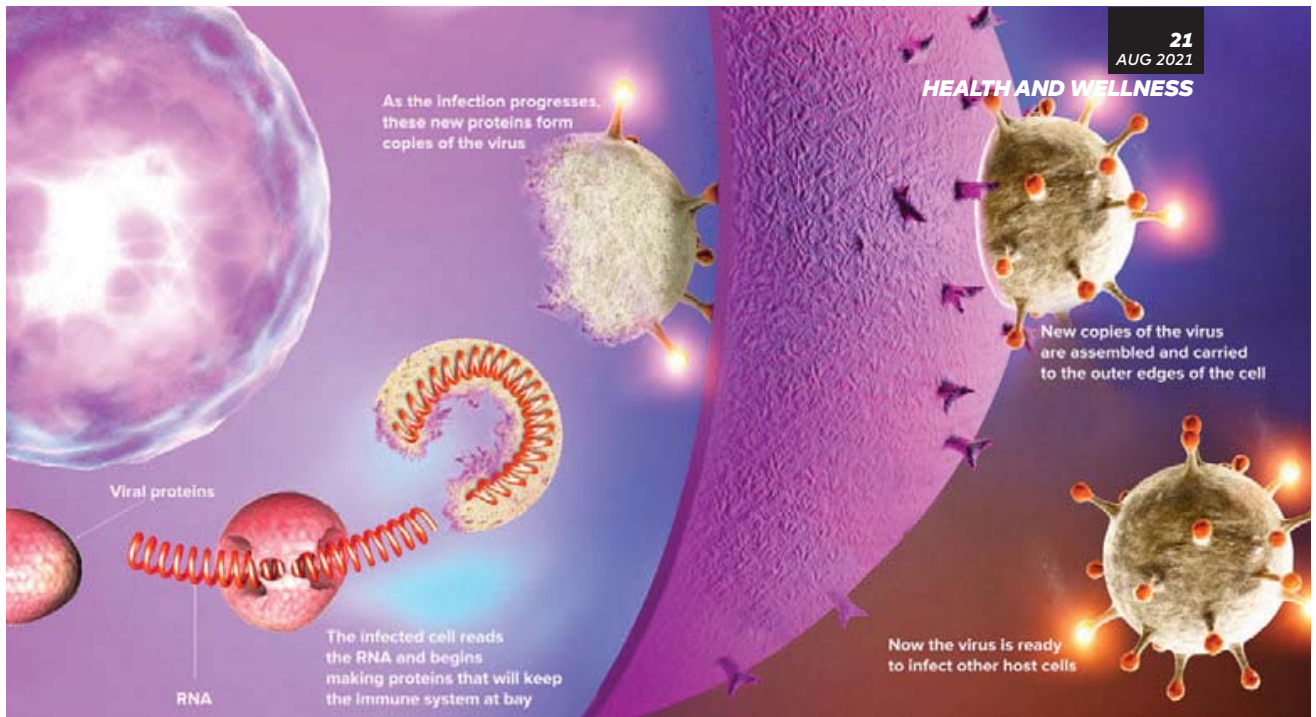
Dr Kenny points out that a high death rate is pretty typical when a

virus makes the initial jump from one species to another.

This is because the environment inside the human host is still a brand new world to the virus.

Laboratory studies comparing the infectivity and virulence of emerging SARS-CoV-2 variants on Syrian hamsters, for example, suggest that new variants may be more easily transmitted from one person to another, but they are not necessarily more deadly. This has been noted on studies on the Delta or Indian variant as well.

However, don't be too hasty to rejoice or assume that the COVID-19 vaccine is no longer necessary. Dr Kenny points out that these tests are conducted in laboratories, often on animals, and more research is needed to determine whether these viruses affect us the same way in the real world. "We will only know for certain once we have more data from community samples."



In our current pandemic, the bat coronavirus carries 96.2% of the same genetic sequence as the SARS-CoV-2 virus in humans, leaving a significant 4% difference. “The virus may have been propagating in another intermediate host before jumping into humans but we have not been able to identify that pro-genitor virus yet,” notes Dr Kenny.

Now that the virus has jumped onto humans, next step is for it to mutate into different variants, in order to

adapt to our bodies. See Table 1 for a list of the SARS-CoV-2 variants that exist at the time of writing.

### WHAT DOES ‘VARIANTS OF CONCERN’ MEAN?

The term ‘variants of concern’ (VOCs for short) frequently comes up when it comes to the subject of virus mutation. This term refers to variants that have mutated in such a manner that it has changed significantly from previous generations in the following ways:

- Transmissibility, or how fast and easy it spreads from one person to another.
- Virulence, or how much the virus harms its host cells.
- Antigenicity, how the cells of the immune system respond to the virus.

At the time of writing, there are four VOCs: Alpha, Beta, Gamma and Delta. Dr Kenny points out that 3 of them—Alpha, Beta, Delta—are recorded in Malaysia

### ‘VARIANTS OF INTEREST’—WHAT ARE THEY?

Variants of interest (VOIs) are a term given to variants that are still largely a mystery of us; we don’t know much about them at present, due to insufficient research data.

### WHAT COULD BE DRIVING THE VIRUS TO MUTATE SO QUICKLY?

As of now, we simply don’t know. “We cannot pinpoint what factors induce mutation as there are too many variables,” says Dr Kenny.

TABLE 1: FROM BATS TO HUMANS  
The many variants of SARS-CoV-2

Variants of concern	Variants of interest
<b>Alpha</b> First documented in the UK, September 2020	<b>Epsilon</b> <b>Zeta</b>
<b>Beta</b> First documented in South Africa, May 2020	<b>Eta</b> <b>Theta</b>
<b>Gamma</b> First documented in Brazil, November 2020	<b>Iota</b> <b>Kappa</b> <b>Lambda</b>
<b>Delta</b> First documented in India, October 2020	



## COULD MALAYSIA BE HOME TO A BRAND NEW VARIANT?

Given how there are a number of cases in which people are getting infected again after having already been infected by and recovered from COVID-19, there is some speculation of a local strain that has escaped the currently available vaccines.

However, Dr Kenny says that we can only confirm or refute this claim after we have conducted intensive genetic sequencing. This is a very expensive procedure, however, that limits Malaysia from obtaining as much sequencing data from our population as countries such as the US, UK, and China.

At the moment, sequencing is only carried out when it is required. Given our limited resources, it makes more pragmatic sense for our country to focus on vaccinating the population and healing the economy of the country.

Nonetheless, the need to trace and discover various variants of COVID-19 remains important, as doing so will allow us to find out whether available vaccines are still effective against new variants, as well as to develop new measures against future variants.

## WHAT CAN WE DO ABOUT THE MUTATING COVID-19 VIRUS?

Individual Malaysians should continue following current SOPs. “Wash your hands, wear your masks, and practice social distancing,” says Dr Kenny. “The virus may become more infectious but the same SOPs will still help to protect us.”

There is also the option of vaccinating ourselves to consider.

## SINCE THE VIRUS IS MUTATING PRETTY QUICKLY, IS VACCINATION STILL AN EFFECTIVE PROTECTIVE MEASURE?

Dr Kenny believes that the answer is yes, as studies show that vaccination is still effective against current variants.

