Driving cancer research forward

CANCER has been reported as the third leading cause of premature death among Malaysians, and findings show that around 10 per cent of the population risk suffering from cancer before turning 75.

Despite these statistics, there is hope. Genomics may hold the key to early detection, which means there may be life-changing prognosis and diagnosis for cancer patients. Of course, the main aim is to find that elusive 'cure' for the big C. But what is needed today is an effective approach to identifying people who may be pre-disposed to cancer.

What exactly is genomics? To answer that, one has to first understand that all living cells contain DNA. DNA stands for deoxyribonucleic acid, and it has all the genetic information of an organism, passed down faithfully from parent to offspring.

Found on the DNA are segments that determine how we appear and function — these segments are called genes. We all inherit genes from our parents, and these genes determine what we inherit — from the colour of our eyes and our blood type, to whether we can roll our tongue.

Humans have approximately 25,000 genes, which is roughly the same amount found in mice, while corn has around 32,000. As can be seen, the number of genes in an organism does not exactly correlate to the organism's size or complexity.

The collection of all the genes in an organism is called 'genome'. Like genes, the size of the genome varies from organism to organism. The human genome is around 3Gb and the oil palm measures at approximately 1.8Gb, yet they pale in comparison to the 290Gb-sized amoeba genome.

Genomics is broadly defined as the study and analysis of genomes. It has emerged as one of the most important branches in biology and life sciences.

Rapid developments in genomics have opened up plenty of exciting new spaces that beg to be explored, from agriculture and biodiversity to healthcare and drug manufacture.

Researchers and geneticists have been able to map human genes by sequencing DNA, resulting in the landmark Human Genome Project, enabling geneticists to distinguish and isolate genes that are essential to biological processes. This is why genomics holds the key to battling cancer.

Medical researchers are able to extract tumour cells, sequence their genomes and ascertain the causes of them turning cancerous. This is achieved through the science of bioinformatics — information technology + biology — which refers to the interpretation of DNA sequence using special computer software and mathematical algorithms.

Karim Hercus is the founder and managing director of Malaysian Genomics Resource Centre Berhad (MGRC), a leading provider of bioinformatics services in Southeast Asia offering high-end and rapit turnaround sequencing and computational analytical services to customers around the world. Hercus has more than 40 years experience in the field of information science. He established MGRC's ultimate holding company, Neuramatix Sdn Bhd, in 2001 focusing on the creation of intelligent applications and devices in various domains.

Genomics unlocks human health mysteries

IT has been reported that one in every 20 cases of cancer is linked to inherited genes.

The ability to predict and identify cancer early is critical for increasing rates of battling and surviving cancer. Genomics and bioinformatics provide significant insight in this regard.

By studying the genomes of cancer and healthy patients, medical practitioners could eventually screen individuals for potential mutations, thus allowing the disease to be detected at an early stage.

Today, there are companies in the bioinformatics sector that have developed software and pipelines to help researchers get one step closer towards fully understanding cancer and how it spreads. In fact, it is not too far-fetched to say that there could be a cure for this deadly disease on the horizon, waiting to be discovered. And genomics could just be the key that unlocks the final door.

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