Science

Tackling a deadly virus

A dedicated researcher and his team's breakthrough against malaria provides a ray of hope for those suffering from the disease, writes **Pennapa Hongthong**

For decades, we have been hearing about the spread of malaria here and there throughout Thailand, as well as in other tropical countries.

Despite knowing the cause of the mosquito-borne disease and how to treat patients, doctors have been unable to save lives because of a lack of the drugs that are required.

Thanks in part to the indifference of giant global pharmaceutical companies to the plight of developing nations, where patients cannot pay their high prices, this rampant tropical disease kills more than one million people every year.

Now the virus has Thai chemist Yongyuth Yuthavong to deal with.

Unlike other chemists who may have dedicated their research time to the pursuit of wealth, Yongyuth has devoted more than 30 years of his life to attempting to understand the tiny parasite "neglected" by the pharmaceutical industry, which would rather develop drugs for diseases in the West where people can afford higher prices.

"Malaria is a tropical disease. There is no incentive for big pharmaceutical companies to invest in developing drugs to combat the disease since the epidemic is only reported in poor countries in the tropical zone. In terms of economic return, it is not worth investing in," Yongyuth said in a previous interview with *The Nation*.

It was in the early 1970s, when there were still no effective drugs to combat malaria as it ran rampant through tropical countries, that Yongyuth, then a young man, first started paying attention to the disease.

The attempt to combat the killer has led him, now 62, to a first class honours degree from the University of London, a bachelor's degree in chemistry, a doctoral degree in organic chemistry from Oxford University, and a professorship of biochemistry.

His work is recognised not just in Thailand but globally. It has been said that if there was an Asian version for the Nobel Prize, Yongyuth and his team would get a nomination.

His hard work brought about tangible results in 2000 when he and his team made a breakthrough in the global scientific community by discovering the structure of the malaria parasite's enzyme, called DHFR, which enables the parasite to become resistant to drugs. The following year the magazine *Nature Structure Biology* devoted nine pages of its May issue to the breakthrough, which is leading to new directions in designing effective antimalarial drugs directly targeting the enzyme.

The discovery is the pride of his scientific career. However, he has not stopped there. Despite reaching retirement age two years ago, Yongyuth still leads the team in developing new drugs to directly target the parasite before it is able to mutate. Several drugs have been discovered and developed at the laboratory level. Yongyuth hopes his team will move to the next step very soon: testing on lab animals.

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Worldwide, 500 million people are afflicted by the disease, which causes more than one million deaths each year. Scientists believe that if the parasite lost its capacity to mutate, the death rate would be drastically reduced.

Malaria is caused by a parasite carried by the female anopheles mosquito. Humans have been battling the disease for more than 100 years, yet the malaria parasite has been a perennial winner.

Whatever weapons humans have developed to combat it, the parasite has always fought back successfully. The pesticide DDT was developed and used worldwide, but the tiny insect developed a tolerance. Antimalarial drugs, even the most effective like antifolate, were developed to directly attack the parasite, but it has mutated to resist them.

In 2003, the US-based Foundation for the National Institutes of Health and the Bill & Melinda Gates Foundation launched a programme called the Grand Challenges in Global Health to finance research, including into malaria. Yongyuth was selected by Harold Varmus, a Nobel laureate for his studies of the genetic basis of cancer, to be one of 20 scientists to select research projects across the globe for the programme.

Despite his global recognition, Yongyuth is humble, and always passes the honour to his team. Whenever *The Nation* has interviewed him about his research career, he has always asked that his team be mentioned in the story. "I can't do it alone," he often says.

As well as his own research project, Yongyuth also has had a crucial role in laying the foundations of Thailand's scientific research and development. He was actively engaged in the establishment of the National Science and Technology Development (NSTDA), of which he became the first director in 1992, serving for two terms. He was also a director of NSTDA's National Centre for Genetic Engineering and Biotechnology and now is the president of the Thai Academy of Science and Technology Foundation, also under NSTDA. Since it was established, NSTDA has helped thousands of new scientists by sponsoring them to study abroad and funding their research.

While Yonguth has held top positions at one of the country's major funding agencies for scientific research, he never used his power to favour his own projects. He said the limited budget should be reserved for young scientists who as yet do not have international support. He has received grants from the Medicines for Malaria Venture of the Bill & Melinda Gates Foundation and from the Wellcome Trust as well as from Thailand's Tropical Disease Research Programme.

Malaria might still not rank highly in the boardrooms of the giant global drug firms, but there is at least a ray of hope for millions of people in tropical countries, the light that comes from Yongyuth and his team's discovery. ■