Fast and simple detection of tropical diseases

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The VereChip biochip forms a central part of the VereTrop™ diagnostic kit, which requires only a single drop of blood to screen for 13 different major tropical diseases. Credit: A*STAR Singapore Immunology Network

While medical technology and healthcare standards have improved significantly over the past century, tropical diseases continue to pose a major threat to human health. At present, vaccines are unavailable for many major tropical infections such as dengue fever and hand, foot and mouth disease. Increased exploration of tropical rainforests, international air travel, tourism to tropical regions and human migration have also led to a rising incidence of tropical diseases. Accordingly, the rapid and accurate detection of such diseases is more important than ever to facilitate prompt treatment and prevent potential pandemics.

In collaboration with Veredus Laboratories Pte Ltd, a leading supplier of innovative molecular diagnostic tools, a team of researchers from the A*STAR Singapore Immunology Network (SIgN) have created the VereChip, a biochip that can identify 13 different major tropical diseases—including dengue fever, chikungunya, hand, foot and mouth disease, and malaria—from a single blood sample.

The biochip itself forms the core of the VereTrop diagnostic kit. Lisa Ng, the project's lead virologist at SIgN, explains that the kit's high level of automation and efficiency are the reasons why VereTrop is poised to revolutionize the quality of testing for tropical infectious diseases. "Tropical diseases often reflect common symptoms like fever and may not be accurately diagnosed at an early stage by doctors. This portable diagnostic kit allows accurate testing of multiple pathogenic targets from just one blood sample in a matter of hours—compared to days or even weeks for current methods," says Ng.

Together with Laurent Renia, an expert in the immunobiology of malaria at SIgN, the team successfully validated the kit with patient samples collected and tested in rural regions of the Thai–Myanmar border in northern Thailand. Due to its highly-automated nature, laboratory personnel can be trained to operate the VereTrop kit in just one day. "This innovation opens up new possibilities for the accurate and rapid diagnosis of important infectious diseases that remain the major causes of illness in the tropics," says François Nosten, director of the Shoklo Malaria Research Unit in Thailand and clinical expert on the team. "VereTrop's versatility and ease of use will no doubt change the approach to diagnostics at the periphery of the health care system."

The VereTrop diagnostic kit is the latest in a line of success stories borne of the relationship between Veredus Laboratories and A*STAR. "We have worked on several collaborative projects, including diagnostic technology for influenza and malaria, dating back to 2004," says

Rosemary Tan, CEO of Veredus Laboratories. "VereTrop is another testament to the fruitful collaboration." The partners are now planning to register the biochip as an in vitro diagnostic product as early as next year.

Philip Lim, CEO of Exploit Technologies Pte Ltd (ETPL), the technology transfer arm of A*STAR, praises the success of the project and describes the novel biochip as the perfect example of a public–private partnership. "After a journey of more than three years, we are glad that such a compelling, technologically advanced product with global healthcare benefits is ready to be launched onto the market. The creation of the VereTrop™ kit is proof that local companies can work with A*STAR to achieve a competitive edge globally."

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