

Leprosy: Test Kit Tackles A Disease That Is Forgotten But Not Gone

A*STAR's Genome Institute of Singapore



Characterized by deformed body parts and painful itches, leprosy is still prevalent in parts of the world. From the labs of A*STAR's Genome Institute of Singapore (GIS), scientists have developed a genetic testing kit to identify the potential for dangerous adverse reactions to leprosy medication provided by the World Health Organization (WHO) as a Multidrug Therapy (MDT) treatment regime for those who need it the most.

In 2005, the WHO declared leprosy wiped-out worldwide, reporting instances of the disease down to less than 1 case for every 10,000 people.

“ In places like Papua, Indonesia, however, 5 in 10,000 cases are reported annually among the province's 3 million inhabitants. In the neighboring province of West Papua (home to more than 800,000 people), leprosy's presence is twice as high.

Leprosy causes significant nerve damage and muscle paralysis, causing body parts – from eye lids to legs - to stop working. The disease spreads through repeated contact with untreated patients making it more prevalent in specific regions.

Indonesia's health authorities have been distributing free anti-leprosy medication to remote villages in Papua with the hope of eradicating the disease. But antibiotics do not work for everyone – a significant number of Papuans have potentially deadly adverse drug reactions to the medication.

“If 1 percent of the villagers have dapsone (1 of the 3 drugs used in the WHO MDT) hypersensitivity syndrome, which can cause organ damage or death local health authorities stop MDT distribution altogether in the entire village, preventing effective treatment and the reduction of leprosy,” said Dr. Astrid Irwanto, an Innovation Fellow at the Genome Institute of Singapore (GIS), one of A*STAR's research institutes.

Once Irwanto and her colleagues successfully identified a genomic biomarker that determines dapsone hypersensitivity, they worked to utilize the findings in Papua communities. Bringing the lab-based kit to Indonesia, however, proved to be a challenge. Leprosy's prevalence in rural and remote areas meant that the kit had to be cheap yet robust and easily deployable.

With support from A*ccelerate, A*STAR's commercialization arm, Dr. Irwanto's kit is now quick, easy to use and affordable – it costs \$5 per sample.

Papua's Institute for Research and Development for Biomedicine (IRDBP) is confident about the potential of this technology. Distribution began in mid-2018 under a pilot study to five districts across three provinces. The pilot is currently testing whether the genetic test will significantly reduce the incidence of dapsone hypersensitivity. After a few months of use, 20 percent of the patients were found to be a positive carrier of the predictive biomarker, much higher than expected.

Irwanto's team will receive regular updates from their collaborators. The progress serves as a great reminder of the impact they are making, but it also reminds them how much work is left to be done.

The technology is now licensed to Singapore start-up Nalagenetics, co-founded by Dr. Irwanto to grow the impact of pharmacogenomics in Asia.

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