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Malaria parasite hides undetected in the liver for long time before reawakening to cause disease

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Eliminating malaria in the Asia-Pacific could prove more challenging than previously thought, with new research showing that most childhood malaria infections in endemic areas are the result of relapsed, not new, infections.

An international study found that four out of five children in Papua New Guinea (PNG) aged five to 10 years old were susceptible to recurring infection with the malaria parasite *Plasmodium vivax*, which can 'hide' undetected in the liver. *P. vivax* is the most widespread malaria parasite worldwide, and the predominant cause of malaria in the vast majority of countries outside Africa.

The discovery has significant repercussions for the country's - and region's - malaria control program, as well as other areas globally where *P. vivax* is a significant cause of malaria, such as Central and South America, South and South-East Asia and the Middle East.

The research study was led by Dr Leanne Robinson from the Walter and Eliza Hall Institute and Papua New Guinea Institute of Medical Research and Professor Ivo Mueller from the Walter and Eliza Hall Institute and Barcelona Centre for International Health Research, Spain.

Dr Robinson said the research showed relapsing infections with *P. vivax* were responsible for 80 per cent of infections in PNG children aged five to 10 years.

"Our research has shown that one of the biggest problems in realising malaria eradication is relapsing *P. vivax* infections, which are critical for sustained transmission in the region," Dr Robinson said. "Children treated with drugs that targeted the liver and blood stages of infection had 80 per cent fewer malaria infections than those treated with drugs that only targeted the blood stage of infection."

Dr Robinson said *P. vivax* malaria was problematic for global malaria control efforts, especially in PNG and the Asia-Pacific where it is the major cause of infection and illness in young children. "*P. vivax* parasites are able to hide in the liver for long periods of time before 'reawakening' to cause disease and continue the transmission cycle," she said. "Mass drug administration that includes a drug that kills parasites in the liver is likely to be a highly effective strategy for eliminating malaria in PNG."

Professor Mueller said mathematical modelling showed current programs would be unable to achieve elimination because the programs could not identify and treat children with dormant liver infections. "We need a better way of identifying children who are chronically infected with malaria so that they can be treated," he said. "It is the only way to stop the malaria transmission cycle in PNG, and is likely to be the case for eliminating malaria in other parts of the Asia-Pacific and Americas."

Professor Mueller and an international team of collaborators successfully secured a AUD\$1.15 million grant through the Global Health Innovative Technology (GHIT) Fund to accelerate development of a test that identifies people with dormant malaria parasites in their liver. GHIT is a public-private partnership between Japanese pharmaceutical companies, the Japanese government and the Bill & Melinda Gates Foundation to leverage Japanese biotechnology capabilities to fight neglected disease.

The team will work with Japan's Ehime University, Switzerland's Foundation for Innovative New Diagnostics (FIND), and Japanese biotech CellFree Sciences Co. Ltd. to develop biomarkers for *P. vivax* malaria that could drive the development of new diagnostic tools. This is only the second diagnostic project supported by the GHIT Fund and the first to be led by an Australian institute.

Professor Mueller said the GHIT Fund was a great model for bringing together the best minds, technologies and resources to develop new diagnostics and treatments for diseases that are devastating the developing world, such as malaria. "The funding will support development of a diagnostic test to identify people with chronic malaria infections so that we can effectively treat them, which will be critical for achieving malaria eradication in PNG and in the Asia-Pacific region," he said.

Source:

Walter and Eliza Hall Institute
