THE AAS IMPACT

DELTAS Africa: Researchers discover new technique for culturing malaria parasites

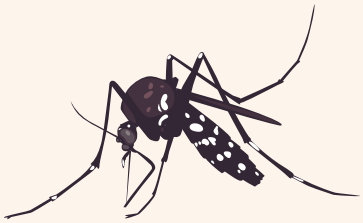
WACCBIP at a glance

The Developing Excellence, Leadership and Training in Science in Africa, a programme of The African Academy of Sciences, supports the West African Centre for Cell Biology of Infectious Pathogens (WACCBIP), which focuses on providing advanced level postgraduate and postdoctoral training and research excellence in cell and molecular biology with the aim of improving the diagnosis, prevention and control of tropical diseases in sub-Saharan Africa. Collaborating with over 30 local, regional and international partners, WACCBIP provides a dynamic, multicultural environment for state-of-the-art research training in the biosciences.

Background

Despite appreciable gains made since the turn of the millennium, malaria remains a major public health challenge, particularly in sub-Saharan Africa which accounts for 90% of malaria cases and deaths. Though curable and preventable, the emergence of drug resistant parasites and vectors thwart malaria control efforts. There is currently no effective malaria vaccine largely due to the limited understanding of the parasite biology and its interactions with the host.

Parasite genetic polymorphisms, resulting in phenotypic variations impact negatively on accurate diagnosis, drug efficacy, and remains one of the major bottle-neck towards efforts to the development of effective malaria vaccines. It is critical to identify variant parasites and understand the molecular basis in order to develop effective malaria control strategies.



90%

of malaria cases and deaths occur in Africa

Description of study

The WACCBIP adapt parasites to different growth conditions in a lab to find out how parasites respond to different environments. This system is used as proxy to understand parasite adaptation to changing host environments. The most commonly used technique requires that scientists culture, grow the parasite in a lab setting, using enzyme-treated red blood cells in static incubators.

A simpler technique was discovered while observing changes in the invasion mechanism of the Dd2 strain of the malaria parasite, Plasmodium falciparum, after it was left to shake for several weeks during culturing. Extending the method to other strains, researchers found that, unlike the parasites cultured in static conditions, those that were cultured with gentle shaking, after two weeks, spontaneously and progressively switched their invasion mechanisms.

Through this study researchers were able to show that some of the malaria-causing parasites change the molecules they use to enter human red blood cells when they are grown while shaking instead of being kept static. This approach is simple, cheap and easy to use, particularly in resource-limited laboratories.

Impact

- This newly developed culturing method makes it possible to study parasite phenotypic variations in resource-limited laboratories such as those found in most parts of Africa where malaria is endemic
- The study adds a new dimension to understanding of parasite adaptation to different environmental conditions
- This study challenges the current protocols used for parasite phenotyping and calls for a comprehensive overview of methods to adopt for the studies of parasite phenotypes.

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