



DNA Genetek would like to thank Dr. Collins Ouma, Associate Professor at Maseno University, Kenya, for contributing this article.

DNA from saliva is a reliable sample type for malaria detection

Posted on DNA Genetek's blog

Dr. Collins Ouma

Globally, malaria is still a major problem with approximately 3.3 billion people living in areas at risk of malaria transmission in 106 countries (Centers for Disease Control, 2012). Most of those affected by malaria are young children and pregnant women residing in sub-Saharan Africa. When I was growing up in Lake Victoria, in western Kenya, I would watch kids die of malaria. We lost so many children and adults. So my motivation all along has been to study malaria and get to the depth of this particular disease. Through my work as a professor, I have met and collaborated with several researchers in Kenya and globally (especially the United States) who have the same goals; to understand the genetic makeup of the human host, the mosquito vector and the malarial parasite, and ultimately work towards controlling the infection.

The genetics of malaria is still new – much is still unknown. While the genetic research continues, it is likely that the majority of the children residing in endemic regions in sub-Saharan Africa will be infected with malaria at some point in their lives. With the funding that I have been awarded, I hope to increase the presence of screening labs in these sub-Saharan regions, and to educate others about the disease. For example, in just three years of our initial research on malaria, we were able to reduce the morbidity and mortality rates of children in western Kenya.

But the standard methods of sample collection are still not ideal. We are able to collect blood samples from these children; however, this collection method presents a specific set of problems due to its invasive nature. If we are able to identify a non-invasive collection method that can remain stable in these conditions before the samples return to the centers, it will potentially allow us to collect a larger number of samples and reach further across to other affected regions.

I recently conducted a preliminary study in *P. falciparum* malaria regions in western Kenya, with the goal of determining if the malarial parasite can be detected in saliva. The use of saliva, if it presents high enough levels of the parasite in infected children, would offer us a very useful means of sample collection.



In this study we collected paired blood and saliva samples from children 4 years and older who presented clinical symptoms of malaria. We decided to use the OMNIgene®•ORAL self collection kits for our saliva samples as it was easy to use and would allow us to store the samples outside without the risk of compromising the sample. The DNA obtained was then compared and tested for both malaria parasite (by PCR using MSP-2 family- specific primers) and human high-throughput real-time SNP assays (using Applied Biosystems® assays).

Results from a subset of these samples show that DNA extracted from OMNIgene•ORAL saliva kits performed equivalently to the DNA extracted from blood in the detection of circulating *P. falciparum* parasites as well as in its performance on high-throughput SNP genotyping. The DNA quality obtained from the OMNIgene/saliva samples were tested using PCR amplification and demonstrated to have comparable high molecular weight to the paired blood samples. DNA yield was also equivalent to that extracted from blood.

It is becoming well known that malaria now causes hundreds of millions of infections worldwide and approximately 1 million deaths every year. In the labs that we set up in the rural areas, prompt diagnosis and treatment are critical factors in reducing morbidity and mortality. Given the results yielded in this preliminary study, I foresee the use of saliva and the OMNIgene•ORAL collection kits to assist in the detection of *P. falciparum* via saliva in children living in risk of infection. I recommend that future approaches should utilize OMNIgene•ORAL self collection kits to avoid invasive sample collections, improve patient recruitment, improve the patient experience, and enhance malaria diagnostics and research.

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