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Microfluidic Platforms For Malaria Detection

Tech ID: 21078 / UC Case 2010-603-0

BRIEF DESCRIPTION

Diagnostic device for detecting malaria infection by blood sample testing.

FULL DESCRIPTION

Among current approaches in malaria diagnoses, those based on polymerase chain reaction (PCR) provide the highest sensitivity at 0.004 to 5 parasites per ul of blood. However, the most common PCR instruments are not portable and, therefore, inaccessible in most rural regions. Giemsa-stained thick and thin blood films are the most sensitive and specific methods available besides PCR. It exhibits sensitivities between 5 to 20 parasites per ul of blood (0.0001% parasitaemia). However, it requires a carefully prepared sample examined by a specialist, in which malaria infected red blood cells are identified from 100 to 200 microscopic fields under 1000X magnifications. Traveler's kits, like ICT Malaria Pf/Pv®, Parasight®-F, and OptiMAL®, provide travelers rapid and portable tool to perform self-tests in the field. However, they are limited in sensitivity and specificity and, therefore, inadequate for early-stage malaria detection.

What we have developed is a microfluidic platform invented for the purpose of detecting malaria infection in blood samples. The key innovation is the novel use of microfluidic technology that differentiates and immobilizes malaria infected red blood cells. It is based on the fundamental principle that malaria infected red blood cells flow differently than non-infected red blood cells. Because of this characteristic of the infected red blood cells, they can be differentiated and immobilized. Our experiments demonstrated that we can adjust parameters in the microfluidic technology so as to only immobilize malaria infected red blood cells. We can then examine the device and can determine the presence and quantity/degree of malaria infection in the blood sample. The optical detection of immobilized red blood cell can be automated using sensors, eliminating the need for human labor.

SUGGESTED USES

This is a microfluidic platform invented for the purpose of detecting malaria infection in blood samples.

ADVANTAGES

This invention represents a much lower-cost and convenient alternative while offering the potential to match the sensitivity of PCR-based approach. It does not require experienced specialists as is the case for Giemsa-stained method. It has the potential to exceed the performance and accuracy of Traveler's kits.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	8,628,972	01/14/2014	2010-603

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OTHER INFORMATION

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