RealAmp Loop-Mediated Isothermal Amplification as a Point-of-Care Test for Diagnosis of Malaria: Neither Too Close nor Too Far

To the Editor—Patel et al [1] investigated the usefulness of the real-time fluorescence loop-mediated isothermal amplification (LAMP) assay, RealAmp, as a point-of-care test in diagnosing malaria. In an accompanying editorial, Hsiang et al [2] highlighted some advantages and limitations of LAMP as a point-of-care test. Molecular techniques are well known for their high sensitivity and specificity [3]. The same characteristics apply in the diagnosis of submicroscopic malaria by molecular techniques, compared with conventional microscopy or antigen-detection methods [4]. LAMP provides results rapidly and uses relatively inexpensive equipment for amplification, compared with conventional polymerase chain reaction (PCR) [5]. However, for validation of DNA extraction methods, it is essential to amplify housekeeping genes and to include positive and negative controls during each run. Because LAMP amplifies genomic DNA several fold, slight contamination during processing may result in false-positive findings, as highlighted by Hsiang et al [2]. Thus, it is essential to analyze the results of RealAmp, along with the quality-control results, with caution.

Another important factor that requires consideration is the DNA-extraction method of boil and spin, which has been used by Patel et al for onsite extraction of DNA. Briefly, this method requires boiling and centrifugation steps. Therefore, certain equipment and uninterrupted electricity supply are required if many samples have to be screened. Although the authors mentioned that equipment used for performing RealAmp can be run with the help of a rechargeable battery, in remote areas the supply of electricity may be insufficient for recharging the battery [6]. Moreover, whether a rechargeable battery can be used for long periods to power the equipment required for DNA extraction has not been investigated. For performing good-quality molecular work without contamination, separate workstations, along with sterile autoclaved tips and PCR tubes, are required. Before the use of PCR workstations, UV light exposure is required for decontamination. Thus, a regular electricity supply is essential to run an autoclave and for performing RealAmp, which may be the most limiting factor in remote areas. Innovations are required whereby DNA can be isolated by enzymes or reagents without sophisticated equipment, and LAMP can be performed in the same vial by adding reaction mixtures to it so that chances of contamination are minimized and amplification of DNA is achievable [7]. Further, automated systems can be developed in which all steps, starting with DNA extraction and isothermal amplification and continuing through the analysis of results, can be performed quickly, so that contamination can be avoided and the assay made more user friendly [8].

Thus, we are today neither too far nor too close to using LAMP as a point-of-care test for the diagnosis of malaria.

Note

Potential conflicts of interest. All authors: No reported conflicts. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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