EFFECTS OF ANTIMALARIAL DRUGS ON MOVEMENT OF *PLASMODIUM FALCIPARUM*

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Abstract. *In vitro* antimalarial drug susceptibility is conventionally assessed by the concentration dependent growth inhibition of *Plasmodium* in an *in vitro* culture system. Inhibition of the kinetic properties of the parasites could provide an alternative method to assess *in vitro* antimalarial drugs sensitivity. In this study we used a novel real time microscopic technique, which does not require fixation and staining of the parasite, to study the effects of antimalarial drugs on the intracellular movement of *Plasmodium (P.) falciparum* trophozoites. Using real time microscopy movement of *P. falciparum* pigment within erythrocytes was investigated before and after antimalarial drugs exposure (artesunate, quinine, and piperaquine). For artesunate, the 50% inhibition concentration (IC_{50}) at which movement in half of the trophozoites was abolished was estimated by sigmoid curve fitting. Intra- and inter-observer agreements were also assessed. Healthy unexposed *P. falciparum* trophozoites in culture showed very active movement of malaria pigment. Quinine and piperaquine had no effect but artesunate did reduce pigment movement which started after 2.5 hours exposure to the drug. The mean (SD) IC_{50} for artesunate regarding abolishment of pigment movement was 54 (14) ng/ml. Assessments of intra- and inter-rater agreement showed good reproducibility of the technique (Kappa value 0.82 to 0.91). Abolishment of active movement of malaria pigment is an alternative approach to assess drug sensitivity for artesunate. Malaria pigment movement is abolished by artesunate early after exposure, but at concentrations higher than those inhibiting growth.

Keywords: *Plasmodium falciparum*, antimalarial drugs, pigment movement

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