

# CHLOROQUINE RESISTANT PLASMODIUM FALCIPARUM MALARIA CONFIRMED BY IN-VITRO TESTING IN A DISTRICT HOSPITAL

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## Summary

The occurrence of chloroquine resistant malaria in the Eastern Province of Zambia is reported. It was possible for a laboratory technician, experienced in parasitology, to undertake tests for chloroquine resistance in a District Hospital. It is, however, unlikely to become a laboratory routine, because of the costs and time factor. It has been suggested that a knowledge of the extent of chloroquine resistance in Zambia would be helpful in formulating a national policy on the treatment of malaria.

## Introduction

Chloroquine resistance malaria occurs in several countries in Africa, including Zambia (Kofi et al, 1983, Allen, 1983), Namibia (Isaacson et al, 1984), Angola (Kyronseppa, 1984) and Kenya (Sixsmith, 1984). The first reported Zambian case was from the Northern Part of the country and the initial investigations were performed at the Tropical Diseases Research Centre in Ndola. We set out to test whether chloroquine resistance occurs in the Eastern Province of Zambia and whether the WHO standard in-vitro macro test could be a useful screening tool within the capacity of a District Hospital.

## Methods

During May, 1984, a time of intense malaria transmission, blood was taken from patients who had a severe clinical attack of malaria and who had not received treatment with chloroquine in the preceding four weeks. The test kit gives clear instructions for the defibrination of

the blood, followed by inoculation into test wells primed with chloroquine in different concentrations. After 24 hours incubation thick films are made and mature schizonts are counted against leucocytes. The chloroquine concentration, which inhibits growth of schizonts, can thus be determined.

## Results

13 tests were performed in which schizonts failed to develop on nine occasions. These were technical failures. In 4 tests schizonts of *Plasmodium falciparum* did develop satisfactorily. The results for these tests are shown in the Table.

## Discussion

Chloroquine sensitive parasites should be completely inhibited by chloroquine concentrations of 0.75 n.mol/ml. Growth of parasites at chloroquine concentrations of 1.5 n.mol/ml. Growth of parasites at chloroquine concentrations of 1.5 n.mol/ml or above indicated chloroquine resistance. (WHO Test Kit, WHO reports). In the case of patient A.C. the number of parasites growing in the presence of 2.0 n.mol/ml of chloroquine was 22.7% of the number in the control well with no chloroquine; there was no remission of his symptoms after a course of chloroquine, clinically suggesting an R III type of resistance. The high technical failure rate is disappointing but other more sophisticated laboratories have also experienced this kind of problem. The test kits come complete with instructions.

We found that each test took about five hours of working time for one laboratory technician. Laboratory technicians, who are experienced in parasitology work, should have

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the necessary skills to perform these tests. Tests for chloroquine resistance will not become part of our laboratory routine because of the cost and time factors.

**Conclusion**

Chloroquine resistance malaria does occur in

the Eastern Province of Zambia. Tests for chloroquine resistance in *Plasmodium falciparum* can be carried out in well staffed District Hospitals. Evidence of the extent of chloroquine resistance within Zambia is necessary for the formulation of a national policy on malaria treatment.

**TABLE**

Patient	Age	Sex	Pre-treatment Parasite count	Highest concentration of Chloroquine at which growth occurred.
M.P.	15	F	32.5x10 <sup>9</sup> /litre	0.25 n.mol/ml
D.B.	20	M	42.7x10 <sup>9</sup> /litre	0.5 n.mol/ml
A.L.	14	M	3.9x10 <sup>9</sup> /litre	2.0 n.mol/ml
A.P.	20	M	20.7x10 <sup>9</sup> /litre	2.0 n.mol/ml

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