Short Communications

THE PREPATENT AND INCUBATION PERIOD OF THE VS STRAIN OF PLASMODIUM MALARIAE

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Abstract. The VS strain of *P. malariae* was subinoculated into non-immune subjects during the prepatent period of a donor who had been impaludated with sporozoites, with the following results: 1. Subinoculated patients became infected from the 15th day onwards. 2. The duration of the primary exoerythrocytic stage is thus assumed to be 15 days. 3. A further 2–3 days incubation is necessary before parasites are demonstrable in the blood of the subinoculated patients.

The prepatent or "silent" period of a malaria infection represents the phase of the evolution of sporozoites in the liver as exoerythrocytic schizonts, and it ends with the invasion of the blood by merozoites. During the first days of erythrocytic schizogony, parasites are invisible in thick drops by microscopical examination; nevertheless, they can be demonstrated by subinoculation of samples of blood and the duration of the tissue cycle may thus indirectly be established.

Ciucă et al. (1937) inoculated patients with sporozoites of *Plasmodium falciparum*, and demonstrated the moment of appearance of the first erythrocytic merozoites by daily subinoculations, starting 4 hours after impaludation. Such subinoculations, performed during the prepatent period, yielded positive results only on and after the 6th day; six days was thus shown to be the prepatent period of this species. Bray (1960) in experiments on chimpanzees infected with sporozoites of *P. malariae*, found that the exoerythrocytic stages lasted at least 12.5 days. Garnham (1951) carrying out experiments on monkeys infected with sporozoites of *P. inui*, found that the exoerythrocytic stage lasted 12 days.

In our researches, one non-immune subject (8656) was impaludated with sporozoites of the VS strain of *P. malariae* by multiple bites of 37 experimentally infected *Anopheles labranchiae atroparvus*. Samples of blood were then taken daily from the 11th to the 18th day and 20 cc citrated blood of each sample were inoculated intravenously into non-immune subjects. These 8 subjects were examined daily by the thick drop method and, after the onset of parasitaemia, the parasites were counted in thin smears.
RESULTS

The original patient (8656) showed parasites by thick drop examination 25 days after inoculation with sporozoites. Of the 8 subinoculated patients, the first four (i.e. from the 11th until the 14th day inclusive) remained consistently negative during the following 60—90 days; the patient subinoculated on the 14th day was examined for a further 220 days and still remained negative. Of the remaining 4 patients, those which were inoculated on the 15th, 17th and 18th days became infected after 17, 17 and 18 days respectively.

DISCUSSION

The incubation period of the VS strain of *P. malariae* is 25 days. Earlier work had shown that this period might vary between 18 and 25 days, irrespective of the number of mosquitoes used or the quantity of sporozoites inoculated (3).

Subinoculation at different intervals of the “donor’s” blood showed that it became infective on and after the 15th day of prepatency and erythrocytic parasites were microscopically visible in the recipients from the 17th-18th days.

In impaludation with sporozoites of *P. falciparum*, the blood becomes infective on the 6th day of prepatency and from the 8th day, the erythrocytic forms are microscopically demonstrable. Thus, with both species of *Plasmodium*, there is an interval of 2—3 days between the invasion of the blood by merozoites and the microscopical appearance of erythrocytic forms.

The demonstration by subinoculation that the blood becomes infective on the 15th day after the introduction of sporozoites of the VS strain of *P. malariae*, proves that the primary exoerythrocytic cycle of this strain occupies this interval of time and we conclude that 15 days represents the true prepatent period. Subsequent work involving inoculation of sporozoites of this strain of *P. malariae* into a chimpanzee confirmed that 15 days was the precise time that sporozoites took to grow into mature exoerythrocytic schizonts (LUPAŞCU et al. 1967).

REFERENCES


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