

LEAGUE OF NATIONS

C.H./Malaria/216.

Geneva, May 8th, 1934.

HEALTH ORGANISATION

Malaria Commission

NOTE BY THE SECRETARIAT SUMMARISING A REPORT ON THE
PROGRESS OF WORK AT THE PERMANENT STATION FOR MALARIA-
THERAPY AND EXPERIMENTAL STUDIES IN MALARIA
(Rockefeller Institute) AT SOCOLA, JASSY, ROUMANIA,

UP TO 31/12/1933,

by Drs. M.Ciuca, L.Ballif, L.Chelarescu-Vieru and N.Lavrinenco.

The infection in man was produced almost exclusively by mosquito bites or by intravenous injections of a suspension of sporozoites. For quartan fever, infection was produced by inoculation of virulent blood.

The individuals in question are patients at the Socola Mental Hospital, coming from various regions which are mostly malarial. (The report classifies the results obtained, as regards infection, under five categories: the typical form of the disease, attended by attacks of fever and the presence of parasites, is designated by A + P + if the attacks exceeded four in number; it is designated by /A + P +/ if they numbered three or less. Infection without illness, attended by the presence of parasites without fever, is also divided into two groups designated respectively by the sign Ao P + if the presence of parasites exceeds seven days, and by /Ao P +/ if it is under seven days. Lastly, the negative result of experimental infection, as shown by the absence of illness and of parasites in the blood system, is designated by the sign Ao Po.

The percentages of positive infection in the A. maculipennis experimentally infected was:

strain BT^H 50%

BT^{AP} 54%

BT¹⁰² 46%

I.

EXPERIMENTS WITH A STRAIN OF PL.VIVAX OBTAINED FROM HORTON (BT^H)

In the use of this strain, which is the routine strain at Horton, obtained from Madagascar, exflagellation was noted in a large number of microgametes, when examining patients' blood before infecting the mosquito. As many as 400 exflagellating forms per cubic millimetre were found, whereas with the native strains exflagellating forms never exceed 200 per cubic millimetre.

The incubation period varied from 11 to 21 days; as a rule it was from 14 to 16, irrespective of the mode of infection adopted, even when the latter consisted of the inoculation of virulent blood, as employed in a small number of controls.

53 patients were infected with this strain, namely:

1) 42 "new" patients:

- A + P + :24
/A + P +/: 6
- Ao P + : 3
/Ao P +/: 2
- Ao Po : 7
- /A + P +/:3
- Ao P + :1
/Ao P +/:1
- Ao Po :3
- a) 30 contracted the disease (of these one only had a primary attack consisting of the three characteristic stages described by James; 8 began by daily attacks, and of these 4 subsequently developed into tertian; 5 cases exhibited tertian attacks from the outset. Half of these 30 cases had to be treated, the remainder being left to themselves in the hope of a spontaneous cure, which actually occurred.
- b) 5 individuals had no attack, though they became carriers of parasites for periods varying in length.
- c) 7 individuals did not contract the infection. Out of these 5 were subjected to a second infection with the same strain obtained from a different donor: 4 then contracted the disease with more or less numerous attacks, only one remaining immune.
- 2) 8 individuals previously immunised by repeated inoculations of virulent blood (at least 18 inoculations, native strain BT¹⁰²) and subsequently by the bite of infected mosquitoes, or by intravenous injections of a suspension of sporozoites of the same strain.
- a) 3 individuals contracted the disease which was of very short duration, consisting of less than three attacks.
- b) 2 exhibited parasites, without any attack.
- c) 3 exhibited no symptoms of infection.

This group suggests two interesting conclusions: first, that a strain of Pl.vivax produces, by repeated inoculations of virulent blood, immunisation which also resists sporozoites of the same strain. In point of fact, in 8 hyper-immunised patients the injection of sporozoites produced no attack, and parasites were found in the blood of two only of these individuals. Next, it tends to confirm the fact that each separate strain of one and the same species of parasite has antigenic properties peculiar to itself.

- A + P + :1
/A + P +/:1
Ao Po :1
- 3) 3 patients, having been subjected only once to infection of the local strain of benign tertian by mosquito bites and having recovered spontaneously, were given an intravenous injection of sporozoites of the Horton strain; 2 contracted the disease, which was cured spontaneously, and the third remained immune.

II.

EXPERIMENTS WITH THE PL. MALARIAE STRAIN OBTAINED FROM HORTON Q^H

Period of incubation: from 21 to 39 days, as a rule about 30 days. In one patient the incubation period was 56 days.

32 individuals were subjected to experimental infection by this strain, namely:

1) 28 "new" patients:

A + P + : 14.
/A + P +/- : 8/

a) 22 contracted the disease (none showed the typical form of primary attack; one patient exhibited quartan fever from the outset; the others frequently had irregular attacks, which in some cases subsequently developed quartan periodicity). It was necessary to treat 15 of these cases, as well as certain other patients who continued to be carriers of parasites notwithstanding the spontaneous disappearance of the fever.

Ao P + : 3.

b) 3 individuals contracted the infection, but without illness.

c) 3 individuals did not contract the infection.

Ao Po : 4

2) 4 individuals previously immunised with the local quartan strain by means of 10 to 17 inoculations of virulent blood were infected by this strain (Q^H): none of them had attacks of fever or showed parasites in the blood system.

This group shows that acquired immunity to the Roumanian native strain (Q.42) is not overcome by inoculation with the imported strain (Q^H). The latter appears at Socola to be inferior in virulence to the native strain.

III.

EXPERIMENTS WITH A STRAIN OF PL. VIVAX RECENTLY OBTAINED FROM A CASE OF NATURAL INFECTION, CASE APOSTOL (BT^{AF}).

The incubation period varied from 11 to 23 days; in the majority of cases from 14 to 18.

22 individuals were subjected to infection, namely:

1) 17 "new" subjects:

A + P + : 10
/A + P +/- : 2

a) 12 contracted the disease (none had a primary attack; one only suffered from tertian fever from the outset, the disease beginning in the others by quotidian attacks. 8 of these cases had to be treated.

AoP + : 3
/AoP +/- : 2

b) 5 individuals contracted the infection,
but without fever.

A+P+ : 2
AoP+ : 2
AoPo : 1

2) 5 individuals previously immunised with the native strain (BT¹⁰²) by 17 to 21 inoculations of virulent blood and subsequently by an intravenous injection of sporozoites or by the bite of mosquitoes infected by the same local strain and even, in certain cases, by the strain (BT^{II}) reacted as follows: 2 patients contracted the disease, which was spontaneously cured; 2 patients became carriers of parasites without fever, and the third did not contract the infection.

The report suggests that this group confirms the individual character of the different strains of any one species of parasites from the point of view of immunity.

IV.

PRACTICAL EXPERIMENTS WITH A MIXED INFECTION OF PL. OVALE AND PL. VIVAX.

The Pl. ovale had been brought from Horton for purposes of study in Roumania. Unfortunately the strain was subsequently found to have been contaminated by latent benign tertian infection in the donor, and the results obtained from 56 individuals inoculated with this mixture do not permit of definite conclusions.

V.

THE PROGRAMME OF RESEARCH ALSO INCLUDED A COMPARATIVE STUDY OF SYNTHETIC MEDICAMENTS IN EXPERIMENTAL MALARIA.

Experiments were made with different schemes of treatment, consisting either of 0.50 of quinine per day or 0.30 of atabrine - sometimes 0.10 - or these two medicaments administered in conjunction for the period of 5 to 7 days, or sometimes even less. But the number of cases is still too small and the period of observation has been too short for the results to be described here.
