

Zeitschrift: Acta Tropica
Herausgeber: Schweizerisches Tropeninstitut (Basel)
Band: 25 (1968)
Heft: 2

Artikel: Miscellanea : "Plasmodium gallinaceum" as antigen in immunofluorescence antibody studies
Autor: Kielmann, A. / Weiss, N.
DOI: <https://doi.org/10.5169/seals-311535>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 04.08.2025

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Plasmodium gallinaceum as Antigen in Immunofluorescence Antibody Studies

A. KIELMANN and N. WEISS

Swiss Tropical Institute, Basle

Recently TODOROVIC et al. (1) and FERRIS et al. (2) have shown that, using the slide gel precipitation test, a soluble antigen obtained from the sera of chickens infected with *Plasmodium gallinaceum* reacted with a variety of heterologous malarial antisera.

In this study we describe cross reactions between an erythrocyte-bound antigen of *P. gallinaceum* and sera recovered from patients with acute *P. falciparum* and *P. vivax* infections, by use of the indirect immunofluorescent antibody technique.

Method

The method employed was essentially the one described by KUVIN et al. (3). Blood smears from chickens with *P. gallinaceum* infection were made from the 7th to 10th day post infection at which time 80% to 90% of erythrocytes were found to be infected. The films were air dried then stored at -20°C until use.

Sera from five patients with acute Malaria (three with *P. vivax*, two with *P. falciparum*) were reacted with the slide antigens in dilutions ranging from 1/10 to 1/160. Tests were carried out before and after treatment, which consisted of Chloroquine \times 5 days and Primaquine \times 14 days. Titers were derived from the final dilution still giving a definitive fluorescence as compared to the non-fluorescence of a preparation using the serum of a healthy individual as anti-serum.

In a second group of tests, the erythrocytes from a heavily parasitized chicken were separated from the serum, washed three times in physiological saline and resuspended in serum from a nonparasitized healthy animal. The serum from the parasitized chicken in turn was then mixed with the erythrocytes of the healthy chicken. Blood films were subsequently made as above and allowed to react with *P. falciparum* and *P. vivax* antisera.

Results

In four cases of acute Malaria initial reciprocal titers ranging from 80 to 160 were obtained (Table 1). In one case with *P. falciparum* infection, the initial

TABLE 1

Patient	Antisera to Plasmodium	titer prior to treatment	titer after 5 d. chloroquine	titer after 5 d. Chl. + 14 d. Primaquine
A *	<i>P. falciparum</i>	80	—	—
B	<i>P. falciparum</i>	10	160	± 10
C	<i>P. vivax</i>	160	—	20
D	<i>P. vivax</i>	80	—	10
E	<i>P. vivax</i>	80	—	20

* Patient succumbed prior to treatment.

reciprocal titer was only 10. The diagnostic blood smear taken at the same time as the serum, showed in this case only few trophozoites (0–2 per field when enlarged $300\times$). This serum was retested 5 days later, the patient meanwhile having received a total of 2100 mg Chloroquine (Nivaquine). This time the reciprocal titer had risen to 160.

By the 20th day of treatment (radical and consolidation cures) the titers had fallen rather markedly, as also demonstrated by COUDERT et al. (4).

When sera B (after 5 days of Chloroquine treatment) and C (prior to treatment) were allowed to react with the antigen preparation containing serum from a chicken heavily parasitized with *P. gallinaceum* and red blood cells from a healthy animal, no fluorescence could be detected. By contrast, identical results to the first experiment were obtained when the antigen consisted of parasitized red blood cells suspended in serum of a nonparasitized animal (Table 2).

TABLE 2

Patient serum	Antiserum to Plasmodium	Titer	
		Antigen from infected RBC and noninfected serum	Antigen from non- infected RBC and infected serum
B	<i>P. falciparum</i>	160	0
C	<i>P. vivax</i>	80	0

Additional sera from 10 healthy human individuals as well as antisera to Amoeba, Bilharzia, Filaria, Leishmania, Trypanosoma, Ancylostoma and Ascaris gave no fluorescence.

Discussion

As these preliminary results indicate, an antigen from *P. gallinaceum* appears to react serologically with heterologous antisera to *P. falciparum* and *P. vivax*. Although as has been shown by VOLLER (5), the reverse does not seem to hold true. Thus he could detect no serologic activity when he reacted *P. gallinaceum* antiserum with smears of a variety of malaria parasites as antigen. In accordance with TOBIE (6) the titers obtained were lower than those obtained by VOLLER & BRAY (7) with a homologous system, but compare well with the results obtained by COUDERT et al. (4), who tested *P. vivax* antiserum against films of *P. cynomolgi bastianelli* as antigen.

In contrast to TODOROVIC (1), who, on the basis of his experiments, has shown the erythrocyte antigen to be species specific and the serum antigen to be genus specific, our findings seem to indicate an erythrocyte-bound genus specific antigen, the nature of which is unclear as yet.

Investigations are under way to:

- determine the degree of reaction with more and other human plasmodia as well as eventual cross reactions with different protozoa;
- establish the specificity of the reaction and elaborate, if possible, a procedure for the serologic diagnosis of malaria by means of the indirect immunofluorescence antibody technique using *P. gallinaceum* as source of antigen;
- try to determine the nature of the antigen in question.

References

1. TODOROVIC, R., RISTIC, M. & FERRIS, D. (1968). Soluble antigens of *Plasmodium gallinaceum*. — Trans. roy. Soc. trop. Med. Hyg. 62, 51-57
2. FERRIS, D. H., TODOROVIC, R. & RISTIC, M. (1968). Factors associated with immunization of mice with soluble serum antigens of *Plasmodium gallinaceum*. — Z. Tropenmed. Parasit. 19, 109-121
3. KUVIN, S. et al. (1962). Antibody production in human malaria as determined by the fluorescence antibody technique. — Science 135, 1130-1131
4. COUDERT, J. et al. (1966). Perspectives nouvelles sur l'immunologie paludéenne. — Bull. Soc. Path. exot. 59, 558-570
5. VOLLER, A. (1964). Comments on the detection of malaria antibody. — Amer. J. trop. Med. Hyg. 13, 204-207
6. TOBIE, J. E. (1964). Detection of malaria antibodies-immunodiagnosis. — Amer. J. trop. Med. Hyg. 13, 195-202
7. VOLLER, A. & BRAY, R. S. (1962). Fluorescent antibody staining as a measure of malaria antibody. — Proc. Soc. exp. Biol. Med. 110, 909-910