

V-MAP assays. Laboratory-reared specimens were tested individually using 4,372 V-MAP assays. Assay performance depended on the species of *Plasmodium* and the number of sporozoites used as the cut-off. For *P. falciparum*, optimal performance was achieved using a cut-off of 150 sporozoites (sensitivity = 100%, specificity = 99.2%, and accuracy = 0.99). For *P. vivax* variant 210, optimal performance was also achieved using a cut-off of 150 sporozoites (sensitivity = 94.8%, specificity = 94.5%, and accuracy = 0.95). We were unable to develop a standard-curve for the CS-ELISA using *P. vivax* variant 247 because of a lack of sporozoites; however, using a cut-off of 30 pg *P. vivax* 247 antigen (mosquitoes with less than this amount of antigen were considered negative), assay performance (sensitivity = 94.3%, specificity = 99.2%, and accuracy = 0.99) was comparable to that achieved for *P. falciparum* and *P. vivax* 210. These results clearly demonstrate that the V-MAP assay performs at an acceptable level and offers practical advantages for field workers needing to make rapid surveys of malaria vectors.

J Med Entomol. 2004; 41(2): 209-14.

HEMATOLOGIC AND CLINICAL INDICES OF MALARIA IN A SEMI-IMMUNE POPULATION OF WESTERN THAILAND

Erhart LM, Yingyuen K, Chuanak N, Buathong N, Laoboonchai A, Miller RS, Meshnick SR, Gasser RA and Wongsrichanalai C

This study examines hematologic profiles of persons with acute *Plasmodium falciparum* or *P. vivax* infection in Maesod on Thailand's western border with Myanmar compared with febrile, non-parasitemic persons also reporting to malaria clinics. Nine hundred seventy-nine subjects were malaria-negative, 414 were infected with *P. falciparum*, and 646 were infected with *P. vivax*. Persons with patent parasitemia tended to have significantly lower white blood cell, red blood cell, platelet, and hemoglobin levels than those who were malaria-negative. For the first time, a parallel trend in thrombocytopenia with parasitemia was found to be associated with both *P. falciparum*, and *P. vivax* infection. Using logistic regression, persons with platelet counts < 150,000/ μ L were 12-15 times more likely to have malaria than persons with platelet counts \geq 150,000/ μ L. This study supplements previous literature on the hematologic effects of malaria and helps define those alterations for a semi-immune population. Thrombocytopenia is identified as a key indicator of malaria in these febrile patients.

Am J Trop Med Hyg. 2004; 70(1): 8-14.

HUMAN ANTI-SALIVARY GLAND PROTEIN ANTIBODIES: A NATURAL DEFENSE AGAINST MALARIA INFECTION

Waitayakul A, Somsri S, Prachumsri J, Looareesuwan S and Udomsangpetch R

Mosquito's salivary proteins can elicit antibody response in human. We demonstrated that anti-*Anopheles* salivary protein antibodies occurred strictly in the villagers living in malaria endemic area. Healthy persons from non-malaria endemic area had no antibody to the *Anopheles* salivary

protein although antibodies to *Aedes* salivary proteins were found. The antibodies to *Anopheles* salivary proteins were significantly higher during acute malaria infection by either *P. falciparum* or *P. vivax* compared with that of non-malaria infected villagers, and had no cross reactivity with the salivary proteins of other mosquitoes species. Immunohisto-staining using fresh frozen salivary glands of the *Anopheles* mosquitoes showed that the antibodies reacted strongly with the median lobe. The level of antibody reactivity was associated ($p < 0.05$) with the parasitemia and showed a weak correlation with the level of anti-sporozoite antibody. In contrast there was a negative correlation with the anti-erythrocytic stage antibody. Identification of the *Anopheles* salivary proteins eliciting these antibodies in human is ongoing. The results suggest that the antibody to mosquito salivary proteins may play role in protective immunity against malaria infection.

Abstract of the Joint International Tropical Medicine Meeting (JITMM). Bangkok, Thailand. 29 November-1 December 2004:203. (Poster)

INFECTIVITY OF ASYMPTOMATIC *PLASMODIUM*-INFECTED HUMAN POPULATIONS TO *ANOPHELES DIRUS* MOSQUITOES IN WESTERN THAILAND

Coleman RE, Kumpitak C, Ponlawat A, Maneechai N, Phunkitchar V, Rachapaew N, Zollner G and Sattabongkot J

The infectivity of *Plasmodium*-infected humans in western Thailand was estimated by feeding laboratory-reared *Anopheles dirus* Peyton and Harrison mosquitoes on venous blood placed in a membrane-feeding apparatus. Between May 2000 and November 2001, a total of 6,494 blood films collected during an active malaria surveillance program were checked by microscopy for the presence of *Plasmodium* parasites: 3.3, 4.5, and 0.1% of slides were *P. falciparum*-(Pf), *P. vivax*-(Pv), and *P. malariae* (Pm)-positive. Venous blood was collected from 70, 52, 6, and 4 individuals infected with Pf, Pv, Pm, and mixed Pf/Pv, respectively, with 167 uninfected individuals serving as negative controls. Only 10% (7/70), 13% (7/52), and 0% (0/6) of membrane feeds conducted on Pf-, Pv-, and Pm-infected blood yielded infected mosquitoes. One percent (2/167) of microscope-negative samples infected mosquitoes; however, both samples were subsequently determined to be Pf-positive by polymerase chain reaction. Gametocytes were observed in only 29% (4/14) of the infectious samples. All infections resulted in low oocyst loads (average of 1.2 oocysts per positive mosquito). Only 4.5% (10/222) of mosquitoes fed on the seven infectious Pf samples developed oocysts, whereas 2.9% (9/311) of mosquitoes fed on the seven infectious Pv samples developed oocysts. The probability of a mosquito becoming infected with Pf or Pv after a blood meal on a member of the human population in Kong Mong Tha was estimated to be 1 in 6,700 and 1 in 5,700, respectively. The implications toward malaria transmission in western Thailand are discussed.

J Med Entomol. 2004; 41(2): 201-8.