Nitric Oxide (NO) is thought to play an important role both in protection and pathology of malarial disease. The present studies investigate the possible role of NO in acute *P. vivax* infections.

The two study groups were *P.vivax* infected patients (n=17) from malarial non-endemic area (Colombo) and patients from endemic area (Kataragama) (n=9). Age and sex matched clinically healthy individuals (n=9) from each area who were blood film negative served as control groups. Blood was obtained before/during/after a paroxysm and also at random timing during the acute infection. Peripheral blood mononuclear cells (PBMC) were purified using sodium metrizoate on a density gradient basis. These cells were cryo-preserved till the measurement of NO production which was carried out based on the conversion of radio labeled arginine to citrulline by inducible isoform of NO synthase (NOS2) enzyme present in PBMC.

Malaria patients infected with *P. vivax* tended to have high NOS2 activity (147.75 $\pm$38.55 pmol / mg) when compared to healthy controls (136.45 $\pm$ 15.4 pmol /mg); ($p>0.05$). NOS2 activity in non-immune malarial patients a were significantly higher (mean = 174.9 $\pm$ 56.8 pmol /mg) when compared to the levels in endemic patients (mean = 120.6 $\pm$ 25 pmol /mg); ($p<0.05$). Most pronounced NOS2 activity was observed during paroxysms (mean = 251.5 $\pm$ 32.8 pmol /mg) of P. vivax infections in clinically non immune patients when compared with samples collected at random timing during acute stage of infection (164 $\pm$ 21.5); ($p<0.05$).

In conclusion, NO production is associated with clinical disease in *P. vivax* infections. It is likely that cytokines released following schizont rupture trigger the production of NO, the levels of which coincide with clinical paroxysms.

A 024

Immunogenicity of Merozoite Surface Protein-1 based malaria vaccine candidate antigen in combination with two novel adjuvants, MF59 and Montanide ISA 51

The *Plasmodium cynomolgi-toque* monkey *(Macaca sinica)* system which is highly analogous to the *P. vivax*-human system was used in this pre-clinical trial to test the immunogenicity and safety of baculovirus-expressed, His-tagged 19kDa C-terminal region of *P. cynomolgi* major merozoite surface protein-1 (MSP 1p 19) with two experimental adjuvants, MF59 and Montanide ISA51. This trial comprised four groups of animals. Groups 1 and 3, comprising three animals each, were immunized with MSP 1p 19+MF59 (Chiron) and Montanide ISA51 (SEPPIC) respectively in three doses. Groups 2 and 4, comprising two animals each, served as the respective adjuvant controls. No adverse reactions were observed as a result of immunization. After each immunization, anti- MSP 1p19 antibody responses were assayed by ELISA. Three weeks after the third immunization, the ELISA titers in group 1 had reached 3.7x103 and group 3 showed a higher titer of 5.3x105. Peripheral blood mononuclear cells were assessed for in vitro proliferative responses against the MSP 1p19 antigen. Although animals of all groups showed similar non-specific cellular proliferative responses observed in the two immunized groups. The levels of cytokines in these PBMC supernatants showed induction of specific cytokines following immunization. These results indicate that the two novel adjuvant tested are safe and, antigenic formulation with Montanide ISA51 was immunogenic. It is interesting to note that immunization of toque monkeys with MSP1p19+Montanide ISA51 resulted in a higher humoral immune response, similar to the responses earlier observed in combination with Freunds adjuvant. Whether, this vaccine-induced immunity is protective against a malaria infection remains to be evaluated.

A 025

Studies on entomological parameters in a typical malaria endemic area in Sri Lanka

Entomological parameters of malaria transmission were studied in 6 contiguous villages in Kataragama, a typical malaria endemic area of southern Sri Lanka. Sampling was carried out from August 2000 to April 2001 using five standard entomological techniques, namely, Cattle baited net and hut collections (CBNC & CBHC), human bait night collections (HBNC), Pyrethrum spray sheet collections (PSC), and larval collections. Out of the eleven anopheline species identified, *An.hyrcanus group* (49.3%), *An. Vagus* (24.5%). *An. Subpictus* (9.3%) and *An. Culicifacies* (6.0%) were most prevalent during the study period.

The average man-biting rate (MBR) of anophelines was 2.26man/night. *An. Culicifacies*, *An. tessallatus*, *An. Vagus* and *An. Annularis* had higher MBR and *An. Culicifacies* and *An .tessallatus* were more anthrophophilic than others. *An. Culicifacies* had higher MBR than other anophelines. *An. Subpicutus* and *An. Culicifacies* showed higher indoor resting rates (IRR) of 0.44 and 0.15 mosquitoes/ room respectively. Peak biting of *An. Culicifacies* occurred between 21:00 – 22:00hrs. During the 9 month period, the MBR and IRR of most anophelines was dependent on their density. However, in *An. Culicifacies* it appeared to be independent. The main breeding of the secondary vectors were rock pools and appeared to be independent. The main breeding sites of *An. Culicifacies* were rock pools and river margins where as higher larval densities of the secondary vectors were temporary ground water collections. The density of some anophelines significantly correlated with the rainfall. Fluctuations of densities of immature and mature forms of *An. Culicifacies* were associated with the malaria incidence and all these findings indicated the role of anophelines including *An. Culicifacies* in transmission of malaria in Kataragama.