A-34: Transmission blocking immunity in relation to relapse infections of *Plasmodium cynomolgi ceylonensis* infections in the Sri Lankan toque monkey, *Macaca sinica sinica*

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Relapses were studied in toque monkeys infected with Plasmodium *cynomolgi ceylonensis*. Four sporozoite-induced infections gave rise to relapses, the number ranging from 2 to 6.

The parasite densities and durations of each successive blood infection gradually decreased in the frequently relapsing monkeys suggesting an increasingly effective host immunity against blood stages. Infectivity of gametocytes to mosquitoes during the primary infections and relapses was also studied using *Anopheles tessellatus* mosquitoes, which were directly fed on infected animals. A gradual decrease in infectivity was observed with each successive relapse. The last relapses were not infective or extremely low in infectivity.

We have found that the loss of infectivity is due to serum- mediated transmission blocking immunity, which gets boosted with each successive relapse. Post-infection sera collected after each infection of relapsing monkeys, were tested for their effects on infectivity in membrane feeding experiments. Infective gametocytes from donor monkeys were fed to mosquitoes in the presence of each of the test sera and as controls, non- malarial monkey serum. Mid guts of the fed mosquitoes were examined for oocysts after 8 days. The infectivity suppressive effects of post-infection sera of monkeys which relapsed within periods ranging between 38 and 91 days, gradually increased, beginning from the primary infection (% relative infectivity range:77.7%-205.3%); the post-last relapse serum blocked infectivity almost completely (% relative infectivity range:0%- 27.3%).

In one monkey which had relapse after long intervals (137-139 days) the post-last relapse serum had low blocking activity. These results confirm our previous finding that transmission blocking immunity is boosted by repeated blood infections, only when they occur at frequent intervals of less than 4 months.