

## Evaluation of *Macaca fascicularis* as a Laboratory Model for Malaria and Hepatitis Research

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**BACKGROUND :** The world-wide shortage of rhesus monkeys (*Macaca mulatta*) resulting from the moratorium on the export of this species by the Indian Government has spawned the search for alternate animal species to conduct research in certain areas. The malaria drug development program is among those areas. Indeed, a large portion of the VII Congress of the International Primatological Society held in Bangalore, India, 8-12 January 1979 was devoted to finding alternative subhuman primate species to use in medical research. Other papers, describing the breeding and raising of rhesus by various laboratories around the world, were given. Ironically, it was the consensus of the delegates that destruction of the habitat was the major cause of the declining population of the wild rhesus and that the few (relatively speaking) monkeys used for medical research was of only minor significance in the problem.

As a result of these developments two projects were initiated during the year. The first was an experiment in breeding the cynomolgus monkey (*Macaca fascicularis*) in our Laboratory. The second was using purchased cynomolgus monkeys in pilot studies in the areas of malaria and hepatitis research,

**RESULTS :** On 30 November 1978, two breeding groups of cynomolgus monkeys, *Macaca fascicularis* (Crab eating Macaque) were received. One breeding group consisted of one male and nine females and the other breeding group contained one male and seven females. To date a total of 15 offspring have been born from both groups. See Table 1 and Table 2. The January and February and March offspring (7) have been weaned and are adjusting very well to their surroundings.

On 20 March 1979, ten additional cynomolgus monkeys were purchased. Five of the monkeys were laboratory-reared and five were wild caught. Two of the wild caught (#14, #6) died on 6 April 1979 and 15 April 1979 respectively. Cause of death was enteritis and dehydration. Four of the remaining eight monkeys were issued to the Virology Department and placed on Hepatitis A Studies. (#7, #8, #20, #21). Results of these studies are reported elsewhere in this report. Subsequently, cynomolgus #7 died as a result of pneumonia the diagnosis being based on gross necropsy lesions. Definitive diagnosis is awaiting histopathological examination of the tissues.

The other four cynomolgus monkeys (#4, #10, #9, #13) are being utilized in anticipation of their eventual use in the anti-malaria drug testing program. Initially, the study called for a determination of whether or not *Macaca fascicularis* (Cynomolgus monkey) could be infected with *Plasmodium cynomolgi*.

Cynomolgus monkeys #4 and #10 were inoculated with  $5 \times 10^5$  sporozoites on 5 June 1979. The two monkeys developed parasitemias at 9 and 10 days post inoculation respectively. Based on the experience gained from the rhesus monkey model, a decision was made to feed mosquitoes on the second peak in the parasitemia. The parasitemias that developed initially were far lower than that seen in the rhesus model. (3,500 to 12,000 as compared to 200,000 to over 300,000). Likewise, the second peak in the parasitemia was of such limited magnitude and of such short duration that the chance to feed mosquitoes was missed. Consequently, when the mosquitoes were fed, they did not become infected.

Cynomolgus #9 (wild caught) and #13 (laboratory reared) were then infected in the same manner as the rhesus monkeys and in this trial, mosquitoes were fed on both the first and second parasitemic peaks. In this second trial we were able to infect the mosquitoes.

Subsequent trials using the cynomolgus monkey model will have to await a decision to purchase additional monkeys. This work will be continued if the results are promising enough to warrant such further investigation and investment of time, money and laboratory space.

Table 1. Summary of Births by Month of Cynomolgus Monkeys

1979 Month	Number born
January	2
February	3
March	2
April	1
May	0
June	0
July	5
August	2
Total	15 (13 ♂, 2 ♀)

Table 2. Summary of cause of deaths within the cynomolgus monkey breeding colony

Cause of Death	Number
Stillborn	2
Parasitism*	1

\* Overwhelming infestation of *Strongyloides* sp.