

Infectivity of Gnathostoma spinigerum Fully Developed Larvae and  
Gnathostoma hispidum Advanced Third—Stage Larvae in Primates

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**OBJECTIVE:** This study was undertaken to determine whether or not direct infection of primates by Gnathostoma spinigerum larvae in cyclops is possible and whether or not infection of primates with G. hispidum advanced third—stage larvae can be established.

**DESCRIPTION:** A preliminary attempt was made to determine the development of G. spinigerum in a primate by feeding (polyethylene tube) G. spinigerum fully developed larvae in cyclops to a splenectomized adult gibbon (#1) provided by the SEATO Veterinary Medicine Department; to determine also the susceptibility of an adult monkey #17 (Macaca irus) with G. hispidum advanced third—stage larvae found in some cold blooded experimental food animals commonly consumed by people (catfish, frogs), living larvae freshly obtained from experimental catfish (10 larvae) and from frogs (14 larvae) were fed to the animal (Total 24 larvae). Concurrent weekly examinations of blood samples drawn from the femoral vein were made to determine the changes in total and differential white blood cell counts and for liver function tests. Intradermal tests with G. spinigerum advanced third—stage larvae unfractionated antigen in modified Coca's solution (kindly prepared by Dr. Savanat Taravaniz, Acting Chief Department of Microbiology and Immunology, the Faculty of Tropical Medicine, Mahidol University) were done weekly to determine skin sensitivity. One control gibbon and one control monkey were also provided for the same tests. In addition, one adult monkey (#86) was fed with 22 G. hispidum advanced third—stage larvae removed from infected white mice to determine the susceptibility of the primate to larvae removed from a warm blooded animal, and to follow the course of migration of the worms after penetrating the stomach wall.

**PROGRESS:** (1) G. spinigerum in primates. Infections of primates (Macaca speciosa and Macaca irus) developed larvae obtained from cyclops (see Annual Progress Reports of 1967 and 1968). During this reporting period an adult female splenectomized gibbon was fed 510 G. spinigerum infective larvae from 238 cyclops. At autopsy, 118 days after exposure, 16 (3.0%) living G. spinigerum third—stage larvae were found in various organs. Ten were encysted in the musculature of the legs, 2 in the muscles of the back, 1 in abdominal fat, 1 in the omentum and one each in the diaphragm and/the liver. Three of these encysted larvae measured from 5.2—6.8 mm in length by 0.4 to 0.6 mm in width. The sizes of 11 cysts ranged from 1.3—2.0 mm × 1.7 mm. The larvae were almost double the size of third—stage larvae found in the second intermediate host, the fresh water snake—headed fish. These results indicate that the gibbon is a comparatively good paratenic host for this parasite.

During the course of the infection in this gibbon, the differential white blood count was determined weekly without a significant change being observed. Weekly skin sensitivity tests using 1:50,000 and 1:16,000

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1 Worked for some months during the year before resignation for further education.

2 Replacement for 1.

dilutions of G. spinigerum larval antigen in modified Coca's solution showed positive skin reactions from 50 days after infection until sacrifice of the animal. The total serum protein was unchanged, but the globulin increased from 3.9 mg% to 4.9 mg% after the first 16 days of the infection and remained elevated until the experiment was terminated. The liver function tests showed a change in the zinc turbidity (1.9 units pre-infection to 6.0 units 37 days after the experimental feeding) and remained elevated throughout the balance of the experiment.

The experiment will be repeated. (2) G. hispidum in primates. This experiment was designed to determine whether or not G. hispidum third-stage larvae from cold blood food animals of man (fish and frogs) would further infect primates. Previously 2 adult monkeys (Macaca irus) were infected with G. hispidum larvae from experimentally infected white mice (see Annual Report, 1968). During the present reporting period the latter findings were confirmed, when 1 larva was found in a muscle of a monkey fed 22 G. hispidum larvae 13 days prior to autopsy.

An adult Macaca irus was fed 24 G. hispidum third stage larvae obtained from a catfish (10 larvae) and from frogs (14 larvae). On autopsy, 92 days after the feeding, no worms were found. Throughout the course of the experiment weekly tests were performed for differential white blood count, liver function and skin sensitivity using G. spinigerum larval antigen. No significant findings were noted. This apparent failure of larvae from cold blooded animals to infect a primate warrants further investigation.

SUMMARY: An adult splenectomized gibbon was fed infective larvae from cyclops and a 3.0% recovery of third stage larvae from various sites was achieved. The larvae were larger than those recovered from fish, suggesting that the gibbon may be a good paratenic host for the parasite. The gibbon became skin test positive 50 days after exposure to the larvae, showed a rise in globulin level and an increased value in the zinc turbidity test.

An attempt to infect a monkey with G. spinigerum obtained from cold blooded animals was unsuccessful. It was confirmed that the same species recovered from white mice, however, will infect primates.

REFERENCE: Golovin, O.V. 1956. Biology of nematode Gnathostoma hispidum. Doklady. Akad. Nauk. S.S.S.R. 1956, III (I), 242-244. (in Russian) and Helminthological Abstracts 25: 265-266.