

LABORATORY OBSERVATIONS ON THE INSUSCEPTIBILITY OF RACCOONS TO *Dirofilaria immitis* 1

Author: CHRISTENSEN, BRUCE M.

Source: Journal of Wildlife Diseases, 14(1) : 22-23

Published By: Wildlife Disease Association

URL: <https://doi.org/10.7589/0090-3558-14.1.22>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

LABORATORY OBSERVATIONS ON THE INSUSCEPTIBILITY OF RACCOONS TO *Dirofilaria immitis* [□]

BRUCE M. CHRISTENSEN, Department of Entomology

MARY E. SHELTON, Department of Veterinary Anatomy, Pharmacology, and Physiology, Iowa State University, Ames, Iowa 50011, USA

Abstract: Two raccoons, *Procyon lotor*, were exposed to *Dirofilaria immitis* by subcutaneous injection of infective third stage larvae obtained from experimentally-infected *Aedes trivittatus*. Nematodes were not recovered from either raccoon when examined at necropsy 223 and 254 days postexposure. Large numbers of adult *D. immitis* were found in six dogs used as controls. These data indicate that raccoons cannot support the development of *D. immitis*.

INTRODUCTION

Dirofilaria immitis has been recovered from the domestic dog (*Canis familiaris*), timber wolf (*C. lupus*), coyote (*C. latrans*), red fox (*Vulpes fulva*), domestic cat (*Felis domestica*), muskrat (*Ondatra zibethicus*), sea lion (*Zalophus californianus*), orangutan (*Pongo pygmaeus*), black bear (*Ursus americanus*), beaver (*Castor canadensis*), wolverine (*Gulo luscus*), domestic horse (*Equus caballus*) and man (*Homo sapiens*).^{3,4,5} These reports in hosts other than dogs are, almost exclusively, natural infections; the only exception has been the experimental infection of domestic cats.² Their role in the natural transmission of *D. immitis* is uncertain, but the majority are aberrant hosts in which this parasite does not become sexually mature.

Procyon lotor has never been recorded as a host for *D. immitis*, but its ability to support a related filarioid nematode, *D. tenuis*, and its close association with the Canidae of the Carnivora suggest that it might function as a reservoir host for dog heartworm. Raccoons also live near urban areas, in close proximity to large concentrations of domestic dogs.

This certainly justifies an experiment to determine the ability of raccoons to function as definitive hosts for *D. immitis*.

MATERIALS AND METHODS

Two laboratory-reared female raccoons, each two years old, were used in the experiment. They had been previously exposed to infection with a strigeoid trematode (*Fibricola cratera*) on several occasions. They were never exposed to, nor detected as having any other helminth infection. Six mongrel dogs, whelped during the winter and maintained in mosquito-proof mammal rooms, were used as controls.

Aedes trivittatus were maintained as previously described¹ and served as the source for *D. immitis*. Mosquitoes had become infected by feeding on an infected dog. At 16 days postexposure mosquitoes were dissected in Hank's balanced salt solution and infective third stage *D. immitis* recovered from the head and labium were injected subcutaneously into the inguinal region of both the dogs and the raccoons with a tuberculin syringe and 20-gauge

[□] Journal Paper No. J-8930 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa. Project No. 1955.

needle. The syringe and needle were rinsed several times to insure an accurate count of the number of *D. immitis* injected.

Beginning 5 months postexposure, 1-ml blood samples were drawn approximately every 14 days and examined by a modified Knott's technique. Animals were examined at necropsy 213 to 291 days postexposure.

RESULTS AND DISCUSSION

Both raccoons were consistently negative for microfilariae; therefore, raccoon G was examined at 223 days, and raccoon B at 254 days postexposure. The heart, lungs, and entire length of the postcava within the thorax were removed and examined thoroughly. All major arteries and their branches were opened and examined for nematodes and lesions. The surface of the lungs was examined and the lungs were palpated. Numerous

transverse incisions were made through each lobe, to facilitate examination of the pulmonary parenchyma. *D. immitis* were not recovered from either animal, nor were any cardiovascular or pulmonary lesions evident on gross examination.

The method employed for the exposure of animals was reliable because all control animals became infected, and the number of adult *D. immitis* recovered in relation to the number of juveniles injected was quite high. Thirty-six to 40 infective third stage *D. immitis* were injected into each of six dogs and from 9 to 25 adult *D. immitis* were recovered from each animal when examined at 213 to 291 days postexposure. Raccoons G and B were exposed to 43 and 46 infective third stage *D. immitis*, respectively.

These data strongly suggest that raccoons cannot function as hosts for *D. immitis*.

Acknowledgements

We thank Tom Cook for supplying the raccoons. The infected dog used in this study was provided by the U.S.-Japan Cooperative Medical Science Program-NIAID.

LITERATURE CITED

1. CHRISTENSEN, B. M. 1977. Laboratory studies on the development and transmission of *Dirofilaria immitis* by *Aedes trivittatus*. Mosq. News 37: 367-372.
2. DONAHOE, J. M. R. 1975. Experimental infection of cats with *Dirofilaria immitis*. J. Parasit. 61: 599-605.
3. KLEIN, J. B. and E. D. STODDARD. 1977. *Dirofilaria immitis* recovered from a horse. J. Am. vet. med. Ass. 171: 354-355.
4. FOIL, L. and T. C. ORIHIEL. 1975. *Dirofilaria immitis* (Leidy, 1856) in the beaver, *Castor canadensis*. J. Parasit. 61: 433.
5. WILLIAMS, J. F. and A. W. DADE. 1976. *Dirofilaria immitis* in a wolverine. J. Parasit. 62: 174-175.

Received for publication 29 August 1977