# MINK DISEASES

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# A Further Note On the Relationship of Feline Panleukopenia To Mink Virus Enteritis*

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Schofield was the first to demonstrate that a virus was the cause of what is now called mink virus enteritis (MVE).[1] Consistent with the Canadian findings, intestinal contents and pieces of intestine collected from mink dying of the disease in the Wisconsin outbreaks of 1950, 1951, and 1952 reproduced the malady after passage through a filter designed to remove bacteria.[2]

Following Schofield's lead, Wills suggested that mink virus enteritis and a similarly appearing disease of cats — feline panleukopenia (FLV) — were caused by related viruses.[3] Experimentally, commercial anti-FLV serum administered to mink before they received challenge exposure with pathogenic MVE virus gave protection; control mink which received no serum succumbed. Mink virus enteritis inoculum prepared from mink and injected into young cats usually produced a drop in the white blood cell count. Later, Wills and Belcher[4] reported that feline panleukopenia virus vaccine protected mink against MVE.

Another experiment was apparent, **vis,** vaccinate young cats with mink virus enteritis vaccine and find out whether they would be protected against feline panleukopenia. We readily admit that this is not particularly exciting research but it behooves research workers to fill in the gaps once in a while. This is often called "pot boiler research."

## Methods

**Experimental cats:** All cats were purchased from widely dispersed Eastern Washington farms with no history of FLV. Every effort was made to vaccinate them as soon as possible to prevent spontaneous panleukopenia. All cats, both males and females, were at least 12 weeks old at the time of vaccination. They were fed commercially canned food and housed in a colony pen.

**Field use:** Evaluation of vaccine was studied at two locations: (1) College of Veterinary Medicine, Washington State University (Pullman study) and (2) Animal Facility, Stanford University Medical School (Palo Alto study—directed by Dr. Orland Soave, Department of Preventive Medicine).

**Vaccines:** MVE vaccines (inactivated preparations containing an adjuvant) were purchased from 3 commercial laboratories: American Scientific Laboratories, Madison, Wisconsin; Biological Specialties, Middleton, Wisconsin; Lederle Laboratories, Pearl River, N. Y.

**Challenge virus:** Pullman isolate of pathogenic panleukopenia virus was used. The serial passage line was initiated by mixing spleens and intestines with mesenteric lymph nodes of cats which had succumbed to panleukopenia.

## Results

**Laboratory study (1961):** To minimize misinterpretaion of results, the "split litter" procedure was used. Generally, the immune status for FLV does not vary within litters of newly weaned kittens but the susceptibility between litters varies markedly. Three laboratory trials using 3 vaccines were conducted (Table 1).

Even though no vaccinated cat in Trials 1 and 2 succumbed to FLV following challenge, results were not clear-cut as 6 of 11 unvaccinated controls survived. It must be assumed that some vaccinated cats were also immune at the time of immunization.

Results of Trial 3 were more impressive. All susceptible controls succumbed, but only 1 of 14 vaccinated litter mates died. It should be emphasized that the virulent panleukopenia challenge was administered 6 days post-vaccination. A slightly longer interval appears necessary to confer immunity in all vaccinates.

**Pullman field use (1961, 1962, 1963):** Approximately 600 cats, 10 to 16 weeks

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Table 1

Results of Challenge with Feline Panleukopenia Following Vaccination with Inactivated Mink Virus Enteritis Vaccine

| Trial No. | No. of cats | Vaccine (one subcutaneous injection) | No. of days before challenge | Results* |
|---|---|---|---|---|
| 1 | 6 | A | 21 | 0/6 |
| | 7 | | | 3/7 |
| 2 | 4 | B | 10 | 0/4 |
| | 4 | | | 3/4 |
| 3 | 14 | C | 6 | 1/14 |
| | 13 | | | 13/13 |
| | 2** | | | 0/2 |

* Numerator=number of cats dying of panleukopenia. Denominator=number of exposed cats.
** Known immune cats from previous trial.

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old, were vaccinated with no immunization failure attributable to the vaccine. In almost all instances, each cat received 2 injections 10 to 14 days apart.

**Palo Alto field use (1962, 1963):** Approximately 300 cats of all ages were given one injection of MVE vaccine. Many cats were infected with panleukopenia and/or respiratory disease when admitted. Although no statistics were collected, a marked decrease in the incidence of FLV, when compared to its usual prevalence in this colony, was reported.

We are aware of the risk in drawing conclusions from either this uncontrolled trial or the Pullman investigation. On the other hand, no data suggest that these MVE vaccines were not effective.

We consider mink virus enteritis and feline panleukopenia as distinct—but immunologically related[5]—entities. The present work supports this thesis.

**Summary**

Inactivated mink virus enteritis vaccines containing an adjuvant protected experimental cats against challenge exposure with virulent panleukopenia virus. Field use of these vaccines supported laboratory findings.

**REFERENCES**

1. Schofield, F. W.: Virus Enteritis in Mink. North Am. Vet. 30:651 (1949).
2. Gorham, J. R., and Hartsough, G. R.: Virus Diseases of Mink, "Proceedings Book," American Veterinary Medical Association, Ninety-First Annual Meeting, Seattle, Aug. 23-26, 1954, p. 244.
3. Wills, C. G.: Notes on Infectious Enteritis of Mink and its Relationship to Feline Enteritis. Canad. J. Comp. Med. and Vet. Sci. 16:419 (1952).
4. Wills, G., and Belcher, J.: The Prevention of Virus Enteritis of Mink with Commercial Feline Panleukopenia Vaccine. J.A.V.M.A. 128:559 (1956).
5. Burger, D.: The Relationship of Mink Virus Enteritis to Feline Panleukopenia Virus. Masters Thesis, Washington State University, 1961.

## Bill Riddel

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raised. (This was not unexpected as I have done some heavy culling.)

Most of the work in this area is of a seasonal nature. During the early spring months, employment is difficult to obtain and a number of people are forced to rely on unemployment compensation. I, too, fall into this category.

I leased an acre of land about a block out of city limits which has sewage and water for a trailer house hook-up, and a few buildings which I bought. I pay $50.00 a year on the lease and consider this an exceptional deal as compared to paying at least $600.00 a year for a rental in town. It not only affords room for my family and mink, but it also gives my two children room to play. Most trailer courts in this area charge about $30.00 a month or more to park trailers.

There are no other mink ranchers in this area and everyone has the misconception that if you have mink, dead or alive you must be wealthy. The Nebraska Employment Bureau contends that the land lease is strictly for the raising of mink, and that as long as I have mink I am ineligible to draw any benefits.

As you are recognized as being one of the prominent representatives of the mink industry, I would like to trouble you for the actual facts on a national scale and on a percentage basis, the amount of time an individual (with the assistance of his wife) would be required to devote to the mink each day. (I grind and mix my own feed) and the net profit one can expect to make on 40 females (Pearl).

To be quite frank with you, I am having a hard time of it, and would appreciate your comments as soon as possible. If you would, please send me two additional copies. I intend to give one copy to the County Employment Bureau and one to the State Employment Bureau.

I would suggest that you make allowances for the intelligence of these people in the bureau, and send me a simple reply in four and five letter words to eliminate any confusion.

Thank you very much for your cooperation.

(name withheld)
Scottsbluff, Nebraska

**A. I am sorry but I am not an attorney to give any legal advice on what the unemployment rules can or will do for you, but I am sure you can't forego the unemployment compensation for raising a few mink. I don't think you could make $150.00 per year's work on 40 females with exceptional good luck.**

**If you expand it will cost an outlay of $80.00 to $100.00 per additional female for additional five pens plus cost of feed, etc. without labor.**

**With today's prices you would need about 600 females to make wages and that, I think, would be less than you could make working out.**

**The amount of time spent per day would vary as to the equipment you have but I don't think you would be earning over $3.00 per week. The cost of raising a pelt is from $11.00 to $13.00 without labor cost. The average selling price for Pearl is about $15.00.**

**You can show this or have copies made of this letter as it is not a secret document. However, in the position I'm in, I don't think I could furnish special copies.**



## Effect of Feeding Thyroid-Active Material

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**Summary and Conclusions**

(1) The feeding of mink during the reproductive season of naturally occuring thyroid active compounds from beef by-products at levels previously used by mink ranchers in the New York-Pennsylvania area resulted in a marked decrease in number of females whelping, smaller kits at birth, increased kit mortality and smaller kit size at two weeks of age.

(2) The feeding of thyroid-active compounds in the form of triiodothyronine and sodium-L-thyroxine pentahydrate at equivalent levels gave similar results as the feeding of the naturally occuring thyroids.

(3) Samples of mammary glands, thyroids, and reproductive tracts have been collected for histological study to determine the specific causes of reproductive failure.

(4) A warning was given to mink ranchers not to feed thyroids until safe levels for feeding can be determined.

**References**

(1) Hartsough, G. R. 1962. Personal Communication.
(2) Travis, Hugh F., Sperling, Gladys, Bassett, Charles F., and Warner, Richard G. Some effects of feeding gullet trimmings to rats during the reproductive cycle. American Fur Breeder, 36:11, 38, 1963.