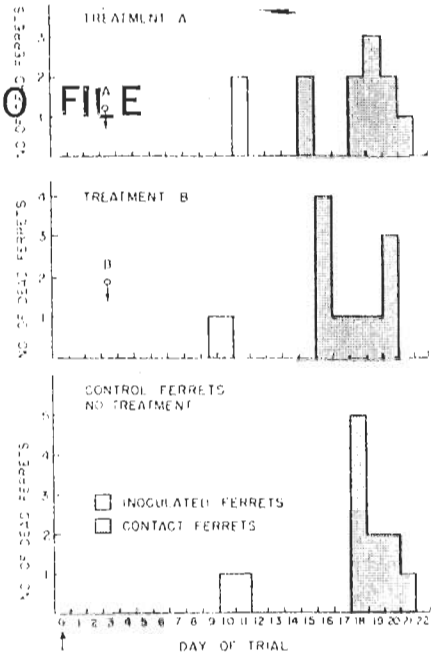
MINK DISEASES

JOHN GORHAM, D.V.M.



THE TREATMENT OF DISTEMPER VIRUS INFECTION

By J. R. Gorham and R. K. Farrell

THE control of most bacterial diseases with antibiotics and sulfa drugs has shifted the emphasis of study in the conquest of infectious diseases to the viruses. Many viral infections such as distemper and mink virus enteritis can be prevented by immunization with a vaccine. However, after an animal is infected, most virus diseases are nearly impossible to treat effectively.

We have conducted a few unsuccessful trials in which we have attempted to treat distemper virus infection in mink. The techniques and the results of the tests are of sufficient interest to warrant a short communication.

The Problem

Viruses cannot grow outside living cells. The problem of treatment of virus diseases is complicated inasmuch as both the virus and the cells of the mink depend upon the same fundamental biologic processes for life. This makes it nearly impossible to attack the virus without damaging the cells. This would be like burning down a house to get rid of the termites!

By the time a mink farmer is sure a mink is infected with distemper, the amount of virus in the organs of the mink is near maximum.[1] Unless the animal is treated soon after infection, the treatment will be at a disadvantage because it will have to cope with high virus concentrations.

The Use of the Interference Phenomenon

The central problem in mink distemper is the so-called "screaming fit" or neurotropic episode. After recovering from the catarrhal phase (eye and nose signs), the mink suddenly screams, froths at the mouth and tumbles about the pen in convulsive seizures. The mink almost always succumbs after a few such attacks.

This sequence occurs because the distemper virus passes from the blood vessels into the brain, causing irreparable damage and eventually death. Our co-worker, Dr. John Peckham, is attempting to elucidate this mechanism.

We thought we could prevent the virulent virus invasion of the brain and subsequent fatal encephalitic attack by utilizing a principle known as the interference phenomenon.[2] In essence, the interference phenomenon occurs when two viruses infect an animal at about the same time. If one of the viruses is given an advantage either in time (inoculation before the other) or in quantity (given in a larger amount), it may outgrow, interfere with, and block out the other.

Accordingly, 69 mink were given injections of virulent distemper virus; 9 days later, regular chick embryo vaccine was injected directly into the brain of 37 of these animals—the idea being to get a large amount of vaccine virus "growing in the brain" before the virulent virus could invade the brain. But the experiment failed and we had only dead mink to show for our efforts (Table 1). All but one inoculated control succumbed and every "treated" mink died. About 80% of the mink in both groups showed nervous signs. . . . Back to the drawing board!

TABLE 1. The Results of Intracerebral "Treatment" of Distemper in Mink Using Egg-Adapted Distemper Virus

No. of mink	Days between exposure and treatment	No. showing catarrhal signs	No. showing nervous signs	Deaths from distemper	No. surviving
37	9	36 (97%)	31 (83%)	37 (100%)	0
32	Controls—not treated	29 (91%)	25 (78%)	31 (97%)	1

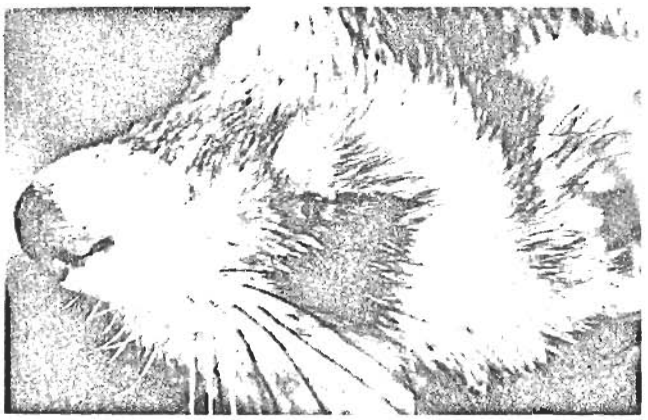
The Use of Chemical Compounds

Two chemical compounds were obtained which had previously been shown to have activity against certain mouse viruses. The purpose of this trial was to attempt to eliminate or slow down the growth of distemper in ferrets. The accompanying bargraph represents one trial. The treatments were designated as A and B.

One of the major problems in virus treatment studies is to give a "natural" dose of the virulent virus to the animals under treatment and not overwhelm them. We decided to inoculate two animals in each of the three groups with virulent distemper virus and let them expose the remaining 10 ferrets of each group naturally. One

Continued on page 24

From the Animal Disease and Parasite Research Division, Agricultural Research Service, U. S. Department of Agriculture.



Ferret 11 days after experimental distemper virus inoculation. The eye lids are stuck together with a pussy exudate.