FAILURE TO TRANSMIT RABIES TO RATS AND MICE BY INGESTION AND CONTACT

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SUMMARY

Mice and rats failed to develop rabies after eating brains and carcases of rabid mice. Mice and rats failed to become infected during contact with rabid mice and rats respectively.

It would appear from these observations that mice and rats are not important in the transmission of rabies.

INTRODUCTION

One of the possible methods by which rabies might be maintained by feral carnivores and rodents is the eating of animals which have died of rabies. Soave (1966) fed rabies-infected mouse brains to 75 mice, eight of which died of rabies after incubation periods of 6 to 12 days.

In Zambia there are considerable populations of wild mice and rats and it was felt important to study whether they might be involved in maintaining rabies virus. At the Rabies Laboratory here the author confirmed rabies in 73 cases in 1970 and in 215 cases in 1971. It had been intended to carry out the biological test in every case but with the increased incidence it was decided in late 1970 to restrict the biological test to those cases in which a suspected rabid dog had bitten a person. Five mice were injected intracerebrally with 0.03 ml of a 10 per cent suspension of brain in 50 per cent glycerine saline. In each mouse which died of rabies the disease was confirmed by demonstration of Negri bodies in fresh smears stained by Seller's method.

In 1970, 137 biological tests were carried out and 40 were positive, while in 1971 80 were carried out and 62 were positive.

Following routine biological tests rabid mice were left in contact with normal mice and a few ingestion tests were carried out.

MATERIALS AND METHODS

Experiment No. 1 (Ingestion)

During May, 1971, the fresh brain of a rabid mouse was presented on filter paper to each of five mice, caged singly. Food pellets were removed until the mouse had eaten the brain. These mice were observed daily over the next 5–6 months.
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Experiment No. 2 (Ingestion)

Six rats, caged singly, were fed a total of 40 rabid mouse carcases between 10th May and 28th August, 1971.

- Rat No. 1: 6 mice between 10th May and 28th August.
- Rat No. 2: 8 mice between 10th May and 28th August.
- Rat No. 3: Refused to eat mice.
- Rat No. 4: 6 mice between 24th June and 28th August.
- Rat No. 5: 12 mice between 30th June and 13th August.
- Rat No. 6: 1 mouse on 7th July.
- Rat No. 7: 7 mice between 28th July and 16th August.

Food pellets were removed until the rat had eaten the carcase. The rats were observed daily over the next 4–6 months.

Experiment No. 3 (Contact)

To find whether a colony of mice would maintain an outbreak of rabies, mice showing symptoms of rabies were caged with groups of normal mice.

- Cage No. 1—One prostrate rabid mouse was caged on 31st May with 8 normal mice.
- Cage No. 2—One rabid mouse showing lack of coordination and four other mice incubating rabies were caged with five normal mice on 31st May.
- Cage No. 3—On 22nd June two rabid mice were caged with 14 normal mice.
- Cage No. 4—On 22nd June two further rabid mice were caged with 14 normal mice.
- Cage No. 5—On 30th June three mice, thought to be incubating rabies, were caged with 12 normal mice.
- Cage No. 6—On 30th June four rabid mice were caged with four normal mice.

Experiment No. 4

(Testing for presence of rabies virus in mouse salivary glands.)

Four mice were killed in extremis on day 9 after injection. Negri bodies were found in smears of each brain. The salivary glands were dissected out from each mouse. The parotid glands were distinctive but the submaxillary and sublingual glands were inseparable from adjacent muscles.

The salivary glands from each mouse were ground up separately in a mortar with a pestle and sterile sand and a 10 per cent suspension in 50 per cent glycerine saline was obtained. Five mice were injected from each of the 4 suspensions. Five other mice were injected with a suspension of pooled brains of the four mice.

Experiment No. 5 (Contact)

To test possible spread of rabies in colonies of rats 0.05 ml of suspension of brain from a rabid dog (Case No. 7806) was injected into each of seven rats, 28 days old. When they became sick they were caged with eight normal rats.

Experiment No. 6

(Testing for the presence of rabies virus in rat salivary glands.)

Two rabid rats in extremis were chloroformed on day 12 after injection. The salivary glands were dissected out and prepared separately as described above.

Five mice were injected from each of the two suspensions.

RESULTS

Experiment No. 1

Each of the five mice ate the rabid mouse brain within 24 hours. Mouse No. 2 died on day 14, but smears of its brain stained by Sellers' method and by fluorescent antibody showed no Negri bodies. During the next 5 to 6 months the other four mice remained healthy.