6076

Protection of the Rat Against Infection with a Larval Tapeworm by Serum from Immune Rats.*

HARRY M. MILLER, JR., AND MARGARET L. GARDINER.

From the Department of Zoology, Washington University, St. Louis.

No successful attempt to inhibit or prevent development of a metazoan parasite by injection of immune serum has been recorded. It has previously been shown that the rat can be artificially immunized against infection by onchospheres of the tapeworm *Taenia taeniaeformis* by injections of worm material[1]; and that rats infected with the larval stage of this worm, *Cysticercus fasciolaris* are thereby protected against superinfection.[2] Serum from artificially immunized rats was later found to confer a high degree of protection against infection by onchospheres of this cestode.[3] The results of 2 experiments show that complete protection has now been secured by the injection of serum from rats infected with cysticerci.

In the first experiment 36 rats from 4 litters were evenly divided into 3 groups of 12 each. All animals were given equal portions of a uniform suspension of onchospheres by stomach tube. The 12 rats of group C were reserved for controls; 2 hours after feeding onchospheres the animals of group A received pooled serum from infected rats, and those of group B serum from artificially immunized rats. In the 2 latter cases 1 cc. of serum per 25 gm. of body weight was injected intraperitoneally. All rats were autopsied 37 days later; summarized data are shown in Table I.

Similar results were obtained in Experiment 2, in which 31 rats

TABLE I.

12 rats in each group. Figures give the average number of cysts in liver.

Group	Injected with	Living (2 to 6 mm. diam.)	Small dead
A	Serum from infected rats	none	none
B	Serum from artificially immunized rats	0.5	6.0
C	Controls	22.2	18.7

* These investigations were in large part carried out with the aid of a grant for research in science made to Washington University by the Rockefeller Foundation.

[1] Miller, H. M., Jr., PROC. SOC. EXP. BIOL. AND MED., 1930, **27**, 926; *J. Prev. Med.*, 1931, **5**, 429.

[2] Miller, H. M., Jr. PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 467; *J. Prev. Med.*, 1931, **5**, 453.

[3] Miller, H. M., Jr., and Gardiner, M. L., *Science*, 1932, **75**, 270.

from 4 litters were used. Sixteen control animals received injections of serum from uninfected rats, and 15 experimental animals received pooled sera from infected rats. One cc. of serum was given per 25 gm. of body weight before, and again immediately after feeding onchospheres. All animals were autopsied 32 days later; the data are summarized in Table II.

TABLE II.

Figures give the average number of cysts in liver.

No. of Rats	Injected with	Living (2 to 6 mm. diam.)	Small dead
15	Serum from infected rats	none	none
16	Serum from uninfected rats	52	1.5

Further experiments are in progress to determine the minimum amount of immune serum necessary, and the duration of the protection conferred by such serum.