PROCEEDINGS

OF THE

SOCIETY FOR EXPERIMENTAL BIOLOGY AND MEDICINE

VOL. 32. MARCH, 1935. No. 6.

New York Meeting

New York Academy of Medicine, March 20, 1935.

7870

Induced Resistance to Transmissible Leukemia in Mice.

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MacDowell, Taylor, and Potter[1] present evidence that mice which are naturally susceptible to transplantable leukemia may be rendered insusceptible by treatment with small numbers of leukemic cells. Bashford[2] and others have shown that mice which are naturally susceptible to a transplantable tumor may be immunized by treatment with suspensions of normal mouse cells. The experiments suggested the possibility of rendering susceptible mice refractory to transplantable leukemia by treatment with normal mouse cells.

A strain of transplantable lymphatic leukemia and a group of susceptible mice (AR strain) were obtained through the kindness of Dr. Jacob Furth of the Cornell Medical College. The mouse strain is one which is not abnormally prone to develop spontaneous leukemia. Suspensions of the spleens and lymph nodes of leukemic mice have been passed to normal susceptible mice on an average of

1 MacDowell, E. C., Taylor, M. J., and Potter, J. S., PROC. SOC. EXP. BIOL. AND MED., 1934, **32**, 84.

2 Bashford, E. F., Trans. XVIIth Internat. Cong. Med., London, 1913, Subsection III, a29.

TABLE I.

Experiment I. Induced resistance with cells of a different strain.

No. of Mice	Treatments with normal cells	Interval days	Route	Interval before leukemia transplantation days	No. injected with leukemia cells	Died of Leukemia	Survived	% resistant
11	4	1	Intravenous and Intraperitoneal	7	11	3	8	72.
8	4	1	"	12	8	0	8	100.
9	4	1	"	30	9	1	8	89.
18	Direct controls			—	18	18	0	0
	Experiment II. Induced resistance with cells of the same strain.							
14	3	2	Intravenous	2	14	3	11	78.5
15	3	2	"	7	13	4	8	53.5
12	Direct controls					12	0	0

once in 6 days. A standard suspension containing about 100,000 cells per mm.^{3} has been inoculated intravenously in 0.2 cc. amounts. Typical leukemia has resulted in 353 of 360 passage animals, a percentage susceptibility of 98.1.

In Experiment I the effect of treating the susceptible mice with normal mouse cells of another strain which was not susceptible to transplantable leukemia was tested. Twenty-eight susceptible animals were treated on 3 successive days by the intravenous injection of 0.2 cc. of a suspension of minced spleen and lymph-node tissue filtered through cotton from normal mice of the Rockefeller Institute strain. On the fourth day an intraperitoneal injection of 0.5 cc. of similarly prepared material was made. After an interval of 7 days, 11 mice of the group were injected intravenously with 0.2 cc. of a standard suspension of spleen and lymph-node cells from a leukemic mouse of the same strain. After 12 days 8 more, and after 30 days the remaining 9 were similarly treated. Of the first group, which received leukemic cells 7 days after the prophylactic treatment, 3 animals developed fatal leukemia and 8 survived, a survival percentage of 72.5. Of the second group, inoculated with leukemia 12 days after immunization, all survived. Of the 9 animals of the third group, injected with leukemic cells 30 days after immunization, 8 survived, a percentage of 89.

In a second set of experiments 29 susceptible mice were treated 3 times at 2-day intervals by the intravenous injection of 0.2 cm. of an emulsion of minced spleen and lymph-node tissue of normal mice of the same strain. Two animals died of intercurrent disease. Two days following the last immunizing treatment 0.2 cc. of a standard suspension of leukemic cells was inoculated intravenously in 14 animals. Seven days following the last immunizing treatment the remaining 13 mice were similarly treated. Of the first group 3 mice died with typical leukemia and the remainder survived. Of the second group one died of intercurrent disease without leukemia, 4 died with leukemia, and the remainder survived, a survival percentage of 53.5.

In the 5 experiments reported the average survival percentage was 78.6 as compared to failure of any of the controls to survive. Moreover, in routine passages of the same leukemia strain over a period of 8 months only 7 animals survived out of 360 inoculated, a survival percentage of 1.9. Although no conclusions can be drawn as to the effect of the route or cell strain used in the prophylactic treatment, the fact appears to be established that mice normally susceptible to transplantable leukemia can be rendered resistant by the intravenous injection of normal spleen and lymph-node suspensions.