

from 10 to 30% above the control level but this rise only lasted for from 1 to 4 days. The peak of the reticulocyte curve lagged from 4 to 8 days behind the rise of metabolism. Leucocytosis and increase of the polymorphonuclear neutrophils accompanied the anemia.

In the second group in which the blood was depleted by bleeding, the red blood cell count and hemoglobin concentration dropped more slowly than in the preceding group but eventually reached just as low a level and remained there for a long time, as long as the bleeding was continued. A reticulocytosis of about 40% also took place in the course of from 10 to 12 days. The oxygen consumption, on the other hand, showed no significant change throughout the experimental period, nor after the discontinuation of bleeding. No marked leucocytosis occurred in this group.

In these experiments strict parallelism did not exist between the oxygen consumption and the reticulocyte count. In the phenylhydrazine anemia the increase in metabolism was fleeting in character and was manifest before the reticulocyte response reached its climax while in the post-hemorrhagic anemia the energy exchange showed no significant deviation from normal, during or after reticulocytosis. In the light of Baldrige's work the explanation of this difference seems evident. That is, in phenylhydrazine anemia there is an enormous destruction of the red blood cells to account for the transient increase in metabolism. In both conditions active hematopoiesis and high reticulocytosis are present but these changes *per se* do not seem to result in any marked alteration of the respiratory metabolism. This clearly shows that the metabolism of the immature blood cells contributes very little to the total oxygen consumption and that the basal metabolic changes in various blood diseases are dependent upon some other factor, such as increase of nitrogen catabolism as a result of blood cell destruction.

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Experimental Virus Infections in Chinese Hamster.

II. Susceptibility to Street Rabies Virus.

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It has been noted¹ that the Chinese hamster is susceptible to fixed rabies virus, but its susceptibility to street rabies virus still remains to

¹ Yen, A. C. H., *PROC. SOC. EXP., BIOL. AND MED.*, 1936, **34**, 315.

TABLE I.
Showing Comparative Infectivity of Street Rabies Virus Introduced Through Different Routes.

Route of inoculation	Dilution of virus	No. of animals died/inoculated	Mortality in %	Incubation time, Days	Aver. incubation time, Days	Day of death	Aver. days of death
Intracerebral	1:4x10 ²	13/13	100	10, 11, 11, 12, 12, 12, 12, 12, 12, 13, 13, 14	12.0	11, 12, 12, 13, 13, 14, 14, 14, 14, 14, 15, 17, 17	13.9
	1:1x10 ⁴	10/10	100	12, 12, 12, 12, 12, 12, 12, 12, 13, 13, 14	12.4	13, 14, 14, 15, 16, 16, 16, 17, 18, 19	15.8
	1:1x10 ⁵	5/10	50	12, 13, 14, 14, 15	13.6	16, 16, 17, 17, 19	17.0
	1:1x10 ⁶	2/10	20	14, 14	14.0	17, 18	17.5
Subcutaneous	1:10	4/10	40	15, 18, 20, 20	18.3	18, 23, 23, 24	22.0
	1:1x10 ²	0/10	0	—	—	—	—
Intramuscular	1:10	6/10	60	14, 15, 15, 16, 16, 16	15.3	17, 19, 20, 21, 21, 23	20.2
	1:1x10 ²	2/10	20	18, 20	19.0	28, 30	29.0
Intraperitoneal	1:10	1/10	10	14	14.0	19	19.0
	1:1x10 ²	0/10	0	—	—	—	—

be determined. Observations on its behavior to infection by a strain of street rabies virus are, therefore, described here.

A fresh local strain of street rabies virus from dog was used in the present study. The original virus preserved in 50% glycerine was thoroughly ground in a sterile mortar and suspended in saline solution for inoculation. Chinese hamsters weighing 20-30 gm. were divided into several groups and each was separately inoculated with various dilutions of the dog brain virus through different routes as indicated in the table. The technique of inoculation was similar to that used previously.¹ The records of observations made on the incubation period, mortality, and days of death in relation to routes of inoculation and concentration of virus introduced are summarized in Table I.

Ten to 20 days after inoculation with the virus, the infected animals began to show increased excitability, which became very pronounced within 24 hours after its first appearance. The animals generally ran about constantly and bit the wire mesh of the cage. The movements of the body were shaky and unsteady. Fits of convulsion, especially when the animals were irritated, soon followed. Feedings were poorly taken and emaciation became noticeable. After 2 or 3 days of excitement, weakness or paralysis of the hind legs usually could be noted. In some animals, however, paralysis was observed to start from the front limbs. The animals usually died in 2 to 5 days after showing the first symptoms of excitement. When the course is acute as in animals inoculated intracerebrally with high concentration (1:400) of the virus suspension, death may result in 2-3 days after development of excitement without showing weakness of limbs.

The effectiveness of administration of the virus through different routes decreased in the following order: intracerebral, intramuscular, subcutaneous, and intraperitoneal. The first route was by far the most effective as fatal infection resulted with inoculation of virus suspension diluted as high as 1 to 1,000,000. The incubation time and day of death varied with two factors, namely the concentration of virus suspension and route of its introduction. When concentrated virus suspension was given, the incubation time and day of death tended to be shortened. They were also shortest when virus was introduced intracerebrally but were lengthened by 2 to 12 days when virus was introduced through other routes.

In brains of animals showing symptoms of the infection, Negri bodies were regularly found in the neurone cells of Ammon's horn and Purkinje cells of the cerebellum. The method used for the

preparation of the sections was the same as described before.¹ The size of the Negri bodies varies from $3 \times 4 \mu$ to $6 \times 8 \mu$. Not infrequently, 2 or 3 Negri bodies were seen in the cytoplasm of one neurone cell.

It is of interest to note that, from brains of hamsters dead of the infection, the virus (hamster passage virus) could be recovered, which was still infective for rabbits and white mice. But in contrast to the high infectivity of the original dog brain virus, the hamster passage virus, when inoculated intracerebrally in normal hamsters in concentration of 1:400, caused deaths of only 3 of 10 animals inoculated. These 3 animals died within 18-22 days with typical symptoms. The remaining 7 animals remained alive for over 5 weeks without showing any symptoms. Examination of the brains of the three dead animals and of three of the surviving animals killed by ether 4 weeks after inoculation of the virus, showed the presence of numerous Negri bodies only in the animals that died.

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Distribution of Precipitin in Serum Globulins of Different Species of Animals.

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Through the extensive investigations in different laboratories the antibodies in antipneumococcus horse serum (Type I) have been isolated in a relatively pure form,¹ and the chemical groupings responsible for the biological activities have been determined. Comparatively few studies have been made on the corresponding type of rabbit immune serum.

That immune rabbit and horse sera possess different immunological properties is well known, and their distinguishing characteristics have been summarized.² It is therefore of interest to find out whether the antibody is similarly distributed in the pseudo- and euglobulin fractions of the two sera. Thus globulins from the 2 immune sera, which contain all the antibody were fractionated into pseudo- and euglobulin portions. The amount and the biological activity, as measured by the maximum amount of protein precip-

¹ Chow, B. F., and Goebel, W. F., *J. Exp. Med.*, 1935, **62**, 179.

² Horsfall, F. L., and Goodner, K., *J. Exp. Med.*, 1935, **62**, 485.