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8038 P

Insusceptibility of Young Puppies to Distemper Virus.

CHARLES A. SLANETZ. (Introduced by A. R. Dochez.)

*From the Department of Animal Care, College of Physicians and Surgeons,
Columbia University.*

That newborn infants possess an effective resistance or immunity to certain communicable diseases may be considered a well established fact. This state of resistance endures for variable periods of time but in many instances sooner or later is replaced by susceptibility to the diseases in question, perhaps by an almost universal susceptibility as seems to be the case in measles. The nature of this immunity has been studied by many investigators who have remarked that it may be due to either active or passive immunization during intrauterine life by the passage of antigen or antibody through the placenta, to the transmission of antibodies from mother to child through the medium of colostrum or milk, or to some peculiar insusceptibility of young actively growing tissues to certain types of infection. McKhann and Chu¹ have recently demonstrated considerable concentrations of certain kinds of antibodies in salt solution extracts of human placentas. The subject has not been extensively studied in animals but it is known that antibodies essential to the well-being of the young are transmitted in colostrum as in the protection of newborn calves from colon bacillus infection. Fiadeiro² was able to actively immunize newborn pigs by inoculating them with living commercial hog cholera virus within three weeks after birth. No symptoms appeared. In the present study the susceptibility of newborn puppies to experimental infection with the virus of dog-distemper has been investigated.

¹ McKhann, F., and Chu, F. T., *J. Infect. Dis.*, 1933, **52**, 268.

² Fiadeiro, J., *Rev. Med. vet., Lisboa*, 1934, **28**, 87.

Six litters of puppies were used in the experimental study. Five of the 6 mothers of these puppies after the birth of the animals were tested for immunity to distemper by an intradermal injection of 10 mg. of dried living distemper virus. All were found to be immune. Each litter was divided into 2 approximately equal groups, one to be inoculated and the other to serve as the uninoculated control. Thirteen puppies were injected intradermally at the age of one week with 10 mg. of living desiccated canine distemper virus (Lederle). Following these inoculations there was no rise in temperature nor were there any clinical signs of distemper. At the age of one month the same animals again received intradermally the same dose of distemper virus. Following this there was again neither a rise in temperature nor any apparent symptoms of distemper. At the end of 3 months the 2 groups of animals, consisting of the 13 previously inoculated and of 11 uninoculated controls received 10 mg. of living distemper virus intradermally. Following this procedure none of the previously inoculated animals displayed any signs of distemper. Of the 11 uninoculated controls, all developed distemper and 8 died. The remaining 3 had to be sacrificed after several weeks because of continuing bad condition. Because of heavy infestation with round worms 3 of the surviving inoculated animals were sacrificed 3 weeks after the last inoculation. At autopsy no evidence of infection with distemper was apparent. Of the original puppies inoculated with living virus a small number was kept under observation in the animal quarters for from one to 2 years. During this period they were exposed to contact infection with distemper but none contracted the disease.

In another group consisting of 4 puppies the effect of a single dose of living virus was tested. Two animals received 10 mg. of virus at the age of one week and 2 at the age of one month. At the age of 3 months these animals received 10 mg. of living virus intradermally. All 4 animals developed distemper but survived the disease.

During the course of these experiments the potency of the virus used was tested several times in ferrets. It was found that 10 mg. of the dried virus represented 10,000 lethal doses for ferrets.

An attempt was made to discover if invasion of the blood by distemper virus took place in the puppies originally inoculated with living virus. Two young animals were inoculated with virus intradermally and 2 days later 2 cc. of blood was withdrawn from the heart. This blood was injected into each of 2 ferrets subcutaneously. Neither of the ferrets developed signs of distemper. The

same ferrets proved susceptible 4 months later when they were injected with living canine distemper virus and died of distemper following the inoculation.

From these experiments one may draw the conclusions that inoculation of young puppies up to the age of one month with living distemper virus does not induce an attack of distemper. The nature of this insusceptibility is not known and may be due to inherited immunity, to immune substances taken in with the colostrum and milk or to some type of natural resistance. Five of the 6 mothers were immune to distemper at the time the litters were born. Administration by intradermal inoculation of living distemper virus to puppies during the first weeks of life in spite of producing no symptoms of disease seems to result in permanent immunity.

8039 C

Inactivation of Diphtheria Toxin *in vivo* and *in vitro* by Crystalline Vitamin C (Ascorbic Acid).*

CLAUS W. JUNGBLUT AND RAYMUND L. ZWEMER.

From the Departments of Bacteriology and Anatomy, College of Physicians and Surgeons, Columbia University, New York.

For some years one of us (C.W.J.) has been actively interested in the study of natural resistance to infectious diseases, particularly in relation to poliomyelitis. This work has brought to light certain evidence which argues against the concept of universal latent immunization and favors acceptance of the view that the mechanism of natural resistance to this disease is purely physiological, depending essentially upon the function of the normal endocrine balance. While it is obviously very difficult in a problem as fundamental as this to determine precisely the particular rôle played by any one of the several glands of internal secretion, some experimental facts pointed very definitely to the significance of the anterior pituitary and the adrenal. It was also found that there existed a peculiar relationship between resistance to diphtheria and to poliomyelitis, suggesting the operation of a common protective factor in both diseases.

Meanwhile, the other author (R.L.Z.), on the basis of blood chemical and other studies, had been led to the belief that the ad-

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