

alanine. The verification of this observation by chemical analysis will have to await the preparation of sufficient amounts of homogeneous catalase.

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THE ANTIGENIC STABILITY OF WESTERN EQUINE ENCEPHALOMYELITIS VIRUS

It has recently¹ been shown that an especially potent vaccine against equine encephalomyelitis can be prepared from formalinized chicken embryos. The solid immunity that can be conveyed both to guinea pigs and horses² with such a vaccine provides a simple way of studying many properties of the virus responsible for this disease.

It is possible to determine in this fashion whether the virus remains the same from year to year and whether it is greatly altered by passage through different animals' hosts. Such information is essential whenever we seek to protect by vaccination, either with live or killed virus vaccines. It is especially important in the case of encephalomyelitis, because two varieties are already known to exist in the United States. One is active east, the other west of the Appalachian mountains. By all tests these two strains are as unrelated antigenically as two different diseases; an animal immunized to one has not lost any of its susceptibility to the other. We have been studying the homogeneity and stability of the western strain virus by testing the immunity of vaccinated animals to virus derived from as widely different sources as possible.

The guinea pigs for these experiments have been vaccinated with two 0.5 cc doses of chick embryo vaccine injected subcutaneously at an interval of a week. Two weeks after the second injection their immunity has been tested by the intracerebral inoculation of 100 to 1,000 lethal doses of virus. Previous experiment¹ has shown that such animals are completely protected against massive intracerebral inoculation with the virus from which the vaccine was made. In our tests two vaccines have been employed. The viruses for both were derived from the brains of horses dying during the epidemic of 1933.³ One has been passed uninterruptedly through guinea pigs, the other has been through both guinea pigs and horses. No differences in behavior could be seen between the two vaccines. Guinea pigs vaccinated with them have been inocu-

lated with the following strains of virus: (1) Guinea pig passage virus from 1933 brains; (2) the same virus after 60 egg embryo passages; (3) virus⁴ from a 1933 brain after five years of uninterrupted mouse passage, and (4) 1937 field virus after several passages through guinea pigs. One of these 1937 viruses⁵ was from Iowa, the other from Texas. The vaccinated animals have been completely protected against each of these viruses. It is thus apparent that the virus of western encephalomyelitis has not been greatly altered in its antigenic structure by transfer to guinea pigs, mice and chicken embryos. The fact that a vaccine gave complete protection against viruses from localities as widely separated as Iowa and Texas proves that this disease is substantially the same in different parts of the country in which it occurs; since vaccine made with 1933 virus protects against 1937 viruses, we may be confident that vaccines made with previous years' viruses will be effective against the disease that is now epidemic in several mid-western States and Canada.

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⁴ We are indebted to Dr. P. K. Olitzky, of the Rockefeller Institute, for this strain of virus.

⁵ These virus brains have been obtained from the Bureau of Animal Industry, U. S. Department of Agriculture, through the kindness of Dr. L. T. Giltner and Dr. M. S. Shahan.

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¹ J. W. Beard, H. Finkelstein, W. C. Sealy and R. W. G. Wyckoff, *SCIENCE*, 87: 89, 490, 1938.

² B. M. Lyon and R. W. G. Wyckoff, *Veterinary Medicine*, 33: 408, 1938.

³ We are indebted to Dr. B. M. Lyon for these viruses.