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**Serological Distinctions Between the Viruses of Encephalitis in
St. Louis, 1933, Equine Encephalomyelitis, and
Vesicular Stomatitis.***

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The problem of the immunological relationship of the viruses of the encephalitis prevailing in St. Louis and Kansas City in 1933 and the viruses of equine encephalomyelitis and vesicular stomatitis has been studied by a series of cross-protection tests with the viruses associated with these diseases and their respective immune sera. A mouse strain of encephalitis virus obtained from Webster and Fite,¹ a neurotropic guinea pig strain of equine encephalomyelitis virus of the western type,² as well as similar mouse strains of the New Jersey and Indiana types³ of vesicular stomatitis virus were employed, together with antisera from a monkey convalescent from experimental encephalitis, antisera from a rabbit and a horse convalescent from encephalomyelitis of the eastern type,⁴ serum from a rabbit immunized against the western type of encephalomyelitis virus, and similar sera from rabbits immunized against the 2 strains of vesicular stomatitis virus.

Hormone broth suspensions of the stomatitis and encephalitis materials were mixed with equal volumes of antisera so as to make final dilutions of 10^{-3} , 10^{-4} , 10^{-5} , and 10^{-6} . In the case of encephalomyelitis material, final dilutions of only 10^{-3} and 10^{-4} were used. Normal rabbit serum was substituted for antisera in similar series as controls. The mixtures were incubated at 37.5°C. for 2 hours, placed in the icechest overnight, and then examined for the pres-

* We are indebted to Dr. Carl TenBroeck for samples of antisera for the eastern type of encephalomyelitis virus.

¹ Leake, J. P., *J. Am. Med. Assn.*, 1933, **101**, 928; *Am. J. Pub. Health*, 1933, **23**, 1140; Muckenfuss, R. S., Armstrong, C., and McCordock, H. A., *Pub. Health Rep.*, 1933, **48**, 1341; Webster, L. T., and Fite, G. L., *Science*, 1933, **78**, 463.

² Meyer, K. F., Haring, C. M., and Howitt, B., *Science*, 1931, **74**, 227; Meyer, K. F., *Ann. Int. Med.*, 1932, **6**, 645; Syverton, J. T., Cox, H. R., and Olitsky, P. K., *Science*, 1933, **78**, 216.

³ Cotton, W. E., *Vet. Med.*, 1927, **22**, 169; Cox, H. R., and Olitsky, P. K., *Proc. Soc. Exp. Biol. and Med.*, 1933, **30**, 653, 654.

⁴ TenBroeck, C., and Merrill, M. H., *Proc. Soc. Exp. Biol. and Med.*, 1933, **31**, 217.

TABLE I.
Summary of Neutralization Tests.*

Immune Serum Used	Virus				
	From	Stomatitis (New Jersey)	Stomatitis (Indiana)	Encephalitis (St. Louis)	Encephalo- myelitis (Western)
Vesicular stomatitis New Jersey strain	Rabbit	S	D	D	D
Vesicular stomatitis Indiana strain	Rabbit	D	S	D	D
Equine encephalomyelitis Western strain	Rabbit	D	D	D	S
Equine encephalomyelitis	Rabbit†	D	D	D	D
Eastern strain	Horset	D	D	D	D
Encephalitis St. Louis Type	Monkey	D	D	S	D
Normal serum					
Control	Rabbit	D	D	D	D

* = At least 84 mice or 24 guinea pigs were employed for each virus tested.

S = All animals inoculated with serum-virus mixture survived.

D = All animals inoculated with serum-virus mixture succumbed to experimental infection.

† = Both these antisera neutralized the eastern encephalomyelitis, but not the western type virus.⁴

ence of virus by intracerebral injection into animals.† For the stomatitis and the encephalitis virus mice were employed, and for the encephalomyelitis virus guinea pigs.

The results as tabulated showed that a particular virus was neutralized only by its homologous antiserum. Hence no cross-immunity reactions occur between any of the viruses studied. Webster and Fite¹ have stated that the results of animal inoculation tests indicate that encephalitis virus is not related to equine encephalomyelitis or vesicular stomatitis viruses. The results of the serological tests here reported are in accord with their observations.

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Metabolism Masks for Dogs.

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In energy metabolism experiments in which the same dogs are used for a year or more, it is desirable to have masks which are sufficiently durable to be used for all of the experiments, and which

† All operative procedures were performed under ether anesthesia.