

to the ordinary Shwartzman phenomenon in order to obtain more information about the relationship existing between malignancy and rapidity of growth on the one hand, and ability to react to bacterial toxins on the other hand.

Summary. Whereas rapidly growing transplantable malignant tumors in rats and mice are very susceptible to blood-carried *B. coli* toxin, slow-growing malignant spontaneous or transplantable tumors, malignant tumors rapidly growing in heterologous hosts, embryomas, and granulomas are practically non-susceptible.

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Contribution to the Etiology of Encephalitis. Differentiation of Encephalitis by Protection Tests.

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Muckenfuss, Armstrong, and McCordock^{1, 2} and Webster and Fite³ have reported that the encephalitis epidemic in St. Louis during the summer and autumn of 1933 is communicable, by inoculation, to monkeys and mice. In addition, Webster and Fite³ reported that the encephalitis prevailing in Kansas City at the same time is likewise communicable to mice; that the infectious agent from the St. Louis and Kansas City cases is filterable, is readily transmissible to mice, is highly virulent when instilled into the nasal passages of mice, and is neutralized by the serum of encephalitis convalescents from the 1933 epidemic.

We have continued our studies of the effect on the encephalitis virus of various sera derived from cases of encephalitis and from immunized monkeys, and will report the result of these tests in the present paper.

Monkeys injected with the virus develop in their sera protective properties similar to those in the sera of convalescent St. Louis and Kansas City encephalitis cases. Again, serum from a monkey injected with one strain of virus from a St. Louis case protects not only against that strain of virus but against 2 other strains from St.

¹ Leake, J. P., *J. Am. Med. Assn.*, 1933, **101**, 928.

² Muckenfuss, R. S., Armstrong, C., and McCordock, H. A., *Pub. Health Rep.*, 1933, **48**, 1341.

³ Webster, Leslie T., and Fite, George L., *Science*, 1933, **78**, 463.

Louis and 1 from Kansas City. Finally, the monkey serum prepared with our St. Louis strain of virus protects against 2 strains of the Muckenfuss, Armstrong, McCordock virus.*

Sera from one monkey immunized with poliomyelitis virus and one monkey convalescent from experimental poliomyelitis† did not protect against the encephalitis virus. Serum from a patient with herpes likewise showed no protective properties.‡

Sera from 34 cases in the encephalitis ward in the St. Louis City Isolation Hospital, August to October, 1933, have been tested.§ Of these, 30 were definitely diagnosed encephalitis and 4 questionable encephalitis complicated by schizophrenia, hysteria, hypertension, and malaria, respectively. These 4 later cases were negative when tested. Of the 30 with a definite diagnosis of encephalitis, 3 from whom sera were obtained within 7 days of onset of symptoms were negative; 5 of 12 from whom sera were drawn 7 to 14 days after onset were positive, 41%; and 14 of 15 from whom sera were drawn 7 to 41 days after the recorded onset of symptoms were definitely protective, 93%. Sera from 4 of 5 tested convalescent cases of encephalitis in Kansas City showed protective properties.**

Sera from 2 convalescent cases of meningoencephalopathy in Indianapolis, studied by Kempf, Gilman, and Zervas,⁴ did not protect. Sera from 13 cases in New York, New Jersey, and Connecticut, diagnosed acute encephalitis in September, 1933, showed no protective properties.†† Sera from 16 cases, diagnosed chronic epidemic encephalitis with Parkinsonian sequelae, tested 1 to 13 years after onset of symptoms, did not protect.††

* Two strains of the Muckenfuss, Armstrong, McCordock virus in mouse brains were sent to us by Dr. Muckenfuss for comparative tests. Both strains set up a disease in our mice similar to that produced by our virus.

† We are indebted to Dr. Simon Flexner for these sera.

‡ This serum, as well as sera from chronic cases diagnosed epidemic encephalitis, was obtained from the Medical Service of the New York Hospital through the courtesy of Dr. Du Bois.

§ We are indebted to Dr. Muckenfuss for the brain tissue and to Drs. J. W. Eschenbrenner, Jr., and S. Weisman for sera from cases of encephalitis in St. Louis.

** We are indebted to Dr. Paul Stookey for sending sera from convalescent cases and brain tissue from fatal cases of encephalitis prevailing in Kansas City in 1933.

⁴ Kempf, G. F., Gilman, L. H., and Zervas, L. G., *Arch. Neur. and Psych.*, 1933, **29**, 433.

†† We thank Drs. Frissell and Green of the St. Luke's Hospital, Dr. Josephine Neal and the Matheson Commission, Dr. Marine and the Neurological Service of the Montefiore Hospital, Dr. Raynor and Bloomingdale Hospital, Dr. Von Oehsen of Bradley Beach, N. J., and Drs. F. Blake and J. Fox of the New Haven Hospital for these sera.

On the other hand, sera from 5 tested cases of encephalitis in an outbreak in Paris, Illinois, occurring in the summer of 1932 and described by Conklin,⁵ did show protective properties. And finally, serum from 1 case of acute encephalitis, September, 1933, in Dr. L. F. Frissell's service at St. Luke's Hospital, New York, thought by him to resemble clinically the St. Louis type, and from 1 case of acute encephalitis, September, 1933, seen by Dr. H. T. Chickering in New York, showed protective properties against the virus.

The results indicate, first, that the filterable virus obtained from fatal cases of encephalitis in St. Louis and Kansas City is the specific agent responsible for the encephalitis epidemics in St. Louis and Kansas City during the summer of 1933 and the epidemic in Paris, Illinois, during the previous summer; second, that the cases of meningoencephalopathy in Indianapolis were probably different from the encephalitis in St. Louis; third, that cases of the St. Louis type of encephalitis occurred in New York during September, 1933; and finally, that chronic cases of so-called epidemic encephalitis thus far tested do not show protective properties in their sera against this encephalitis virus.

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On the Motility of the Colon of the Dog.

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A new technique was devised, for the purpose of studying separately the movements of the 2 coats of the intestine of the unanesthetized dog. The results obtained necessitate a revised statement of the "Law of the Intestine", at least for the colon of the dog.

A section of the colon about 10 cm. long was exteriorized; opened along its anti-mesenteric border, and grafted onto the subcutaneous tissue of the anterior abdominal wall. The mucosal surface now presents outward, so that stimuli may be applied to it in imitation of intra-colonic conditions. The motility of the coats of the graft is recorded by modified enterograph levers. The principle involved is that of recording the change in distance between two clips attached to the mucosa, either longitudinally or transversely to the graft.

⁵ Conklin, W. E., personal communication.