

## Cross-Excitation Between Mammalian Medullated Nerve Fibers After Treatment with Veratrine.

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Dun and Feng<sup>1</sup> have demonstrated with amphibian preparations that contrary to general belief nerve fibers, but more particularly motor nerve endings after treatment with veratrine, give prolonged repetitive discharges to a single stimulus. We have extended their work and found that mammalian motor nerve endings after veratrinization likewise show prolonged repetitive discharges which can be readily recorded from the ventral root. We have furthermore ascertained that in a cat which has received an intravenous injection of a suitable amount of veratrine, such as 2 cc of 0.1% solution, the nerve fibers in the nerve trunk can also show prolonged repetitive firing. In the course of our work we had occasion to make various control tests, some of which dealt with possibilities which at first seemed very remote. One of the tests consisted of stimulating one ventral root bundle and leading off from another ventral root bundle of the same segment and side, both bundles being sectioned centrally at their exit from the cord. In a normal cat, in view of Blair and Erlanger's work,<sup>2</sup> one would naturally expect to lead off nothing but stimulus artifact in this way; but in a veratrinized animal one could not be so sure. In fact we have found that in a veratrinized cat in which the motor nerve endings and the nerve fibers in the sciatic nerve trunk were giving prolonged abundant after-discharges, some discharges could generally be led off from one ventral root when another ventral root was stimulated with a single shock. Such discharges have characteristic long and rather irregular delays in their onset; their shortest latency being about 4 msec and the longest exceeding 30 msec. This long latency, in addition to other reasons, excludes the possibility that the discharges might be due to the escape of the stimulating current from one root to the other; and there is left only one reasonable interpretation that they result from cross-excitation between nerve fibers. The phenomenon appears not so strange, if one recalls that cross-excitation between amphibian medullated nerve fibers in the sciatic nerve trunk after treatment with hypertonic solutions has

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<sup>1</sup> Dun, F. T., and Feng, T. P., *Chinese J. Physiol.*, 1940, **15**, 405.

<sup>2</sup> Blair, E. H., and Erlanger, J., *Am. J. Physiol.*, 1932, **101**, 559.

been shown by Kwassow and Naumenko.<sup>3</sup> The work of Jasper and Monnier<sup>4</sup> on the transmission of excitation between excised non-myelinated nerves may also be recalled here, and it is interesting to note that the transmission in this case is likewise attended by a long delay. For excitability changes in nerve fibers produced by impulses in adjacent nerve fibers see Otani<sup>5</sup> and Katz and Schmitt.<sup>6</sup> It is significant that in all cases so far known in which actual cross-excitation between nerve fibers takes place, the nerve fibers have a tendency to enter into rhythmical activity. This is true of the preparations used by Kwassow and Naumenko and by Jasper and Monnier; and it is also the case with our veratrinized mammalian nerve. An adequate discussion of the subject, however, can only be attempted later in the detailed report.

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**Effect of Foster-Nursing upon Inborn Resistance of Mice to St. Louis Encephalitis.**

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Previous studies from this laboratory have demonstrated that certain factors which regulate the resistance of mice to infectious disease are inherited.<sup>1</sup> Bittner's recent work, however, on the influence of mothers' milk on the susceptibility of mice to cancer indicates that the same sort of foster-feeding test should be applied to the problem of susceptibility to infection.<sup>2</sup>

Litters inherently susceptible to St. Louis encephalitis were placed with mothers of resistant litters and vice versa within 24 hours of birth. As controls, susceptible litters were likewise interchanged among susceptible mothers and resistant litters among resistant mothers respectively. Foster-nursing was continued 3 weeks and then each mouse of each litter was inoculated intranasally with 0.03 cc of a 1:10 or 1:100 suspension of mouse-brain St. Louis enceph-

<sup>3</sup> Kwassow, D. G., and Naumenko, A. I., *Pflugers' Arch.*, 1936, **237**, 576.

<sup>4</sup> Jasper, H. H., and Monnier, A. M., *J. cell.-comp. Physiol.*, 1938, **11**, 259.

<sup>5</sup> Otani, T., *Japanese J. Med. Sciences: Biophysics*, 1937, **4**, 355.

<sup>6</sup> Katz, B., and Schmitt, O. H., *J. Physiol.*, 1940, **97**, 471.

<sup>1</sup> Webster, L. T., *J. Exp. Med.*, 1937, **65**, 261.

<sup>2</sup> Bittner, J. J., *Am. J. Cancer*, 1940, **39**, 104.