

TABLE II.
SEASONAL TIDE OF BLOOD PHOSPHATE (INORGANIC).

	1921 June } July }	Dec.	Jan.	Feb.	Mch.	Apr.	May ½ Mo.
Protein M.....	4.45	3.91	3.86	3.64	3.48	3.45	} 3.95
Dry M.....	4.21	3.87	3.77	3.68	3.30	3.46	
Raw M.....	4.33	3.98	3.83	3.81	3.52	3.67	

186 (1933)

Localized lesions in the corpora striata produced by buried radium emanation.

By D. J. EDWARDS and H. J. BAGG

[From the Department of Physiology and the Memorial Hospital,
Cornell University Medical College, New York City.]

When a small glass capillary tube, containing about one millicurie of radium emanation, is imbedded in living tissues definite localized destructive reactions occur, mainly due to the relatively intense beta-ray radiation given off in the immediate vicinity of the tube.

Bagg has shown that when normal brain tissue is thus treated, and examined after a period of about two weeks, the tissue about the tube is completely necrotic, and is surrounded by a broad zone of polynuclear leukocytes beyond which there is some hyperemia. The entire lesion is limited to an area 1 cm. in diameter. The lesion is well localized, the brain cells beyond the one-centimeter zone retain their normal morphological character. That the lesion is practically entirely due to the irradiation of the radium emanation, and not to the presence of the glass tube, or the traumatism incident to its insertion, has been satisfactorily proven by control experiments.

The lesion just described is not produced at the time the small tube is placed in the tissues. From previous data obtained by examining various radiated areas at different periods after the time of insertion, it was found that the lesion slowly increased in size. At the end of 24 hours the zone of necrosis about the tube

was only 1 mm. wide, and the maximum area of destruction (1 cm. in diameter) was reached at about the end of two weeks. The radium emanation loses its activity at the rate of 16 per cent. per day, and in clinical usage the tubes, when used as in this method, are said to have an effective period of irradiation equal to 132 hours.

In our experiments similar slow-growing, localized lesions were experimentally produced in the corpora striata of normal adult dogs. It was our aim to produce such lesions and to study the general physiological, and especially the neurological reactions that might occur as a result of such destruction. Although we were unable to produce at will the well-known clinical symptoms associated with lesions of the lenticular or caudate nuclei, our results are of interest in showing that an extensive amount of destruction of the basal ganglia is compatible with apparently normal neurological reaction, and that the organization of the brain is associated with marked compensatory ability.

Well-grown dogs were used as subjects. Morphine and novocain were used for anesthesia. The radium emanation tubes were from 2.5 to 3.5 mm. in length, about 0.4 mm. in diameter and with walls about 0.1 mm. thick. Each tube contained on the average one millicurie of radium emanation.

After anesthesia, a small incision was made in the scalp of the treated animal, about one centimeter lateral to the median line of the head, and just above the region of the coronal suture. A 2 mm. hole was drilled in the skull at about the intersection of the superior temporal line with the coronal suture. Through this hole the radium tube was inserted to the proper depth by means of a long, fine steel trocar, 0.8 mm. in outside diameter. The tube was left permanently in place.

Fifteen dogs were treated. In six, unilateral destruction of portions of the corpus striatum was performed, and the animals were killed at varying periods, the maximum being about 8 months after the operation. Four dogs were treated similarly, but at the end of 2, 3 and 4 weeks respectively a similar lesion was produced on the opposite side of the brain. In five animals a simultaneous bilateral destruction was made of portions of the corpus striatum on each side of the brain.

Our results have mainly shown that considerable portions of the corpora striata of dogs may be destroyed by our method without producing marked neurological disturbances. Following considerable destruction of the caudate and lenticular nuclei we have seen animals remain apparently normal for several months. This has occurred even when portions of the nuclei on each side of the head were simultaneously destroyed. However, three to five days following the treatment we have noted in several cases, hypertonicity, tremors, and a certain clumsiness in locomotion. Following these symptoms we have noted prompt compensatory adjustment, so that within a short time the animal is apparently again normal and remains so.

Clinically, the function of the corpus striatum is believed to be the control of automatic associative movements, and we believe that the symptoms we observed in our dogs are manifestations of disturbances in that mechanism.

We believe that our method of destruction due to radium emanation will prove of considerable value to the study of localization of functions in the basal ganglia of the brain.

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An hypothesis of the mechanism by which normal rhythm is restored in atrial fibrillation.

By HUBERT MANN.

[*New York City.*]

The abrupt change from atrial fibrillation or flutter to normal sinus rhythm has become rather familiar to us since the use of quinidin. In spite of our greatly improved knowledge of the mechanism of fibrillation and flutter the exact way in which normal rhythm supersedes these arrhythmias is still a matter of speculation. The most prominent explanation, offered by Lewis,¹ has recently been considerably modified² and is still rather unsatisfactory because it fails to take into consideration events that may be taking place in the region of the sinu-atrial node.

¹ Lewis, T., *Brit. Med. Jour.*, 1921, 514.

² Lewis, T., *Heart*, 192, ix, 55.