a response to the experimental situation is brought out by the observation that domestic rats show the fits with less regularity when allowed to run back and forth between the main cage and a small adjoining cage, even though the sound stimulus still follows them.[8] In the wild rat the strong aggressive behavior may serve as an energy outlet or a buffer, which prevents the organism from reaching an explosive level.

Whatever the reason for the absence of auditory fits in the wild rats and their presence in the tame domestic rats we have here an interesting example of behavior differences caused by domestication.

WILLIAM J. GRIFFITHS, JR.
PSYCHOBIOLOGICAL LABORATORY,
PHIPPS PSYCHIATRIC CLINIC,
JOHNS HOPKINS HOSPITAL

CHANGES IN ACID-SOLUBLE PHOSPHORUS COMPOUNDS IN THE BRAIN IN POLIOMYELITIS[1]

UNTIL very recently the study of chemical and metabolic pathology of the central nervous system in poliomyelitis was entirely neglected. Racker and Kabat[2] demonstrated that the brain tissue of mice infected with poliomyelitis virus showed a decreased rate of anaerobic breakdown of glucose while oxygen consumption was unimpaired. Recent metabolic studies[3] suggest that this change is specific for poliomyelitis and is not produced by other neurotropic viruses. A decreased lactic acid content of the brain in poliomyelitis has been reported.[4]

The present paper is a preliminary report on changes in acid-soluble phosphorus compounds in the brain in poliomyelitis.

Swiss albino mice four to six weeks of age were infected by intracerebral inoculation of poliomyelitis virus of the Lansing strain. When definite paralysis appeared, the mice were sacrificed by immersion in a mixture of solid CO_2 and ethyl alcohol. Normal mice were treated in a similar manner. The mice were stored in a dry ice box for from several days to two weeks and then the brains were carefully removed. Three brains were pooled for each determination to make a total weight of tissue of approximately one gram. Phosphocreatine, adenosine triphosphate and residual organic phosphate were determined by the method of Stone.[5]

The results are presented in Table I. It is evident that there are marked changes in these compounds in poliomyelitis: adenosine triphosphate increases, while phosphocreatine and residual organic phosphate decrease. The value for adenosine triphosphate for normal mouse brain is similar to that reported by Stone[5] while his normal values for phosphocreatine and residual organic phosphate are somewhat higher than those in Table I. Despite considerable variation, the differences between poliomyelitic and normal brain are clearly significant statistically by use of the "t distribution."[6]

TABLE I

THE EFFECTS OF POLIOMYELITIS ON ACID-SOLUBLE PHOSPHORUS COMPOUNDS OF THE MOUSE BRAIN*

	Phosphocreatine	Adenosine triphosphate	Residual organic phosphate
		NORMAL	
	10.8	16.3	23.2
	10.6	14.8	22.2
	9.46	17.0	22.3
	10.5	20.0	22.84
	2.1	17.5	5.2
	6.65	17.1	9.45
	6.83	15.9	25.97
Mean	8.13	16.95	18.74
		POLIOMYELITIS	
	5.55	23.9	0.80
	1.38	28.0	3.20
	2.38	26.5	7.47
	0.63	24.0	2.50
	0.46	22.1	4.14
	5.83	32.7	0.90
	4.59	33.3	1.11
	5.68	15.0	13.32
Mean	3.44	25.71	4.18
t	3.28	3.65	4.5
Per cent. change from normal	−56.6	+51.7	−77.6

* P per 100 grams of brain tissue.

The changes in acid-soluble phosphorus compounds observed in the brain in poliomyelitis can not be explained on the basis of greater autolysis in the infected tissue, since autolysis would decrease rather than increase the adenosine triphosphate content.[5] The intracellular parasite, the virus, might, in the course of its growth and multiplication, break down nucleoproteins of the cell or might interfere with dephosphorylation of adenosine triphosphate to produce an increase of the latter compound in the brain tissue. The marked changes in acid-soluble phosphorus compounds suggest the possibility of a considerable interference with energy mechanisms and carbohydrate metabolism of the neurons by the virus infection.

Summary: Preliminary studies indicate that the content of adenosine triphosphate is greatly increased in the brain of the mouse infected with poliomyelitis virus. On the other hand, phosphocreatine and residual organic phosphate are markedly decreased in the infected brain.

HERMAN KABAT
UNIVERSITY OF MINNESOTA

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