tissue cultures contain 2 viruses (a sarcoma and a leukosis virus) and both grow equally well in the presence of the sarcoma cells; (b) the culture contains one virus that stimulates to neoplastic growth both reticular and endothelial cells, as well as primitive erythroblasts.

Summary. A pure culture of chicken sarcoma is described (Strain 13) that elaborates a highly virulent virus or viruses capable of producing both sarcoma and erythroleukosis.

7690 C

Blood Amylase Response to Acetylcholine and its Modification by Physostigmine and Atropine.

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In the course of some experiments on glycogen deposition, it occurred to us that the vagus, which is thought to influence the deposition of glycogen in tissue,[1] might do this through action on the blood amylase. With this in mind, we have studied, in dogs, the variations in blood amylase titre after the intramuscular administration of acetylcholine,* the so-called vagus substance. For the determinations, we have used the viscosimetric method of Elman,[2] employing the same stock solution of starch for all the determinations in each individual experiment. Determinations were done at intervals varying from 15 minutes to 24 hours. Marked increases in blood amylase values, at times more than 4 fold, were found in 8 experiments on 7 dogs. Table I illustrates these findings.

The fasting blood amylase titre varied between 24 and 60 units, which is in accord with the values found in the literature. For control, determinations were performed on 13 fasting dogs at intervals varying from 15 to 24 hours. It was found that on the same day, using the same stock solution of starch, the variations in the individual dogs did not exceed 3 units. Further, the adminis-

[1] Debois, G., *Compt. rend. Soc. biol.*, 1930, **103**, 546.

* The beta methyl derivative of acetylcholine (Mecholin-Merck) was used throughout these experiments.

[2] Elman, R., Arneson, N., and Graham, E. A., *Arch. Surg.*, 1929, **19**, 943.

TABLE I.
Influence of Acetylcholine on Blood Amylase in Dogs.

Dog	Wt. kg.	Total dosage of acetylcholine mg.	Blood Amylase Units After: Fasting	¼	1	3	6	24 hr.
L	30	20	54	98	240			105
L	30	25	32	141	143		139	
38	30	20	46		67	71		51
33	19	10	50			178	167	
I	11	10	28		160			
II	14	10	60		184			
III	12	10	28		63			
15	13	10	29		67			

tration of saline, 0.5 mg. of epinephrine, or 3 mg. of histamine did not cause a significant change from the fasting blood amylase level.

Loewi and his coworkers[3] have demonstrated that physostigmine inhibits the physiological destruction of acetylcholine. Hence, the action of physostigmine, given alone and in conjunction with acetylcholine, was next studied in order to determine its influence on the blood amylase response to acetylcholine administration in dogs. When physostigmine alone was injected intramuscularly, there was no appreciable change in the blood amylase titre. However, with the administration of acetylcholine after physostigmine, the rise in blood amylase was far in excess of that obtained with a similar dose of acetylcholine alone. This was found in all of 7 experiments on 4 dogs. (In one case it was over 13 times the fasting blood amylase

TABLE II.
Influence of Administration of Physostigmine 1 Hour Before Acetylcholine.

Dog	Wt. kg.	Fasting amylase units	Dose of physostigmine mg.	Blood amylase units 1 hr. later	Dose of acetylcholine mg.	Blood amylase units after: 3	4	6	24 hr.
L	30	42	3.5	38	0	41			
L	30	38	3.0	28	10	244		276	86
L	30	48	6.0	54	5	555	680		128
15	12	25	3.0	35	10	114	109		
90	12	26	3.0	75	10	200			

Simultaneous Administration of Physostigmine and Acetylcholine

Dog	Wt. kg.	Blood amylase units fasting	Dose of physostigmine. mg.	Dose of acetylcholine mg.	Blood amylase units after: 1	3	24 hr.
L	30	44	3.5	20	171	525	79
30	14	38	0.85	5	96	222	57

[3] Engelhardt, E., and Loewi, O., *Arch. exp. Path. Pharmak.*, 1930, **1**, 150.

level.) In this group of experiments, smaller doses of acetylcholine were used than in Group I. This was necessary because the original dosage of acetylcholine when combined with physostigmine frequently proved lethal. In spite of this reduction in dosage, the blood amylase reached even higher levels than in Group I. Table II illustrates these findings. (Note that dog L in Table II is the same dog as L in Table I.)

Since atropine is known to abolish the vagus response, we next studied the effect of atropine injection preceding acetylcholine administration in dogs. When atropine alone was injected intramuscularly, there was no appreciable change in the blood amylase titre. The subsequent administration of acetylcholine in effective doses failed to produce appreciable change in the blood amylase. Table III summarizes these results on 3 dogs.

TABLE III.
Blood Amylase Response to Acetylcholine After Administration of Atropine.

Dog	Wt. kg.	Fasting blood amylase units	Dose of atropine mg.	Blood amylase units just prior to injection of acetyl-choline	Interval between atropine and acetyl-choline min.	Dose of acetyl-choline mg.	Blood amylase units 3 hr.
L	30	49	2	52	15	20	47
I	11	25	1.2	24	45	10	26
III	12	24	1.2	22	45	10	26

Note: These dogs are the same as dogs L, I, and III of Table I.

Summary. 1. Intramuscular administration of acetylcholine in dogs results in an increase in the blood amylase titre. 2. Physostigmine markedly increases the blood amylase response to acetylcholine. 3. Previous atropine administration inhibits the blood amylase response to acetylcholine.