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The lactic acid in the blood of dogs in exercise.

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In the course of our study of fatigue, it became desirable to make determinations of the concentration of lactic acid in the blood. Ryffel's method was used with the modification that the formaldehyde standard was tested against a known lactic acid solution in each experiment. The blood was obtained from the jugular vein of dogs which were exercised on a motor-driven treadmill. The results of typical experiments are given in Tables I and II.

It will be seen from Table I that severe exercise of short duration brought about a marked increase in the concentration of the lactic acid in the blood. The results given in Table II, however, show that when the exercise was of moderate intensity and long continued, the concentration of lactic acid in the blood was decreased. We believe that the increase of the lactic acid in the blood in the initial stages of severe exercise may be associated with the hyperpnea occurring at that time, and that its subsequent decrease, due perhaps to an increased efficiency of the oxidative processes, may be related to "second wind." In view of the fact that no increase has been found in the lactic acid in exercise however long continued, its significance as a primary factor in physiological fatigue, not carried to exhaustion, would seem open to question.

TABLE I.

THE EFFECT OF SEVERE EXERCISE OF SHORT DURATION ON THE CONCENTRATION OF LACTIC ACID IN THE BLOOD OF DOGS.

Dog.	Date.	Distance in Miles.	Rate in Miles/hr.	Lactic Acid in Mgm./100 c.c.	
				Before Exercise.	After Exercise.
A.....	March 10, 1921.....	0.28	9.3	5.3	17.3
B.....	February 9, 1921.....	0.24	8.0	12.4	19.9
C.....	March 16, 1921.....	0.23	7.7	11.7	55.3

TABLE II.

THE EFFECT OF MODERATE EXERCISE, LONG CONTINUED, ON THE CONCENTRATION OF LACTIC ACID IN THE BLOOD OF DOGS.

Dog.	Date.	Distance in Miles.	Rate in Miles/hr.	Lactic Acid in Mgm./100 c.c.	
				Before Exercise.	After Exercise.
A.	February 7, 1921.	11.0	4.9	4.9	2.9
	February 15, 1921.	27.0	4.5	7.8	6.2
B.	February 9, 1921.	10.8	5.0	12.4	6.3
	May 3, 1921.	5.2	5.2	24.2	16.7
C.	January 30, 1921.	13.7	5.5	13.4	9.6
	February 24, 1921.	22.8	4.6	13.2	7.8

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A case of metastatic calcification associated with chronic nephritis and hyperplasia of the parathyroids.

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The case was one of severe chronic nephritis in a man of twenty years. About the larger joints of the upper extremities and about the feet were many fluctuant tumor masses of various size, and distributed along the course of many of the peripheral arteries were innumerable bead-like nodules which could be felt, while x-ray plates showed extensive calcification of the peripheral arteries and large irregular deposits about the joints.

The aspirated contents of one of the tumors was found to be a thick, creamy fluid simulating pus in the gross, containing amorphous material without cells and a suspension of calcium phosphate of 30 per cent. Otherwise the analysis of the fluid resembled normal synovia.

A peripheral artery bearing the nodules was excised from the leg and was found to be stiff, very tortuous, and to have numerous small yellow and white deposits of calcium in the wall. Microscopically the media was largely replaced by calcium salts, the intima was much thickened, and in places there was little lumen.