

Influence of Increased Environmental Temperature on Blood Sugar of Dogs Following Administration of Carbohydrate.

M. A. RAFFERTY AND P. L. MACLACHLAN. (Introduced by E. J. VanLiere.)

From the Department of Biochemistry, School of Medicine, West Virginia University, Morgantown.

Studies concerning the effect of increased environmental temperature on the blood sugar content of different animals have led to widely varying conclusions. Schear¹ found in albino rats that the concentration of the blood sugar and the environmental temperature stand in an inverse relation to each other. As the temperature rises the blood sugar level lowers, and vice versa. On the other hand, Weyl² found that neither long nor short exposure to high temperature caused either hypoglycemia or hyperglycemia in dogs, and concluded that the statement that the blood sugar level is lower at high temperatures than at low temperatures is untenable. Flinn and Scott³ likewise found no change in the blood sugar content of dogs exposed to increased temperatures.

The present work was undertaken to determine the effect of exposure to high environmental temperature on the blood sugar content of dogs following the administration of varying amounts of carbohydrate in order to gain a better knowledge of the specific effects of high temperature on digestion and absorption.

Four adult female mongrel dogs were maintained on a diet of table scraps supplemented with Purina dog chow for at least 2 weeks prior to the experiment. Following a 24-hour fast the experimental dog was placed in a respiratory chamber (connected to a pump which provided adequate ventilation and removal of CO₂) at a temperature of 100°-104° and an average humidity of 77.5% for 1½ hours before the fasting blood sample was drawn. An aqueous solution of glucose or suspension of starch was then given by stomach tube in varying amounts per kg body weight (Table I). The dog was returned to the respiratory chamber and blood samples for glucose determination were drawn from a leg vein at hourly intervals for 3 to 4 hours. The control dog was treated similarly at a room temperature of 68°-77° and an average barometric pressure

¹ Schear, E. W. E., *Am. J. Physiol.*, 1932, **99**, 555.

² Weyl, P., *Biochem. Z.*, 1929, **206**, 485.

³ Flinn, F. B., and Scott, E. L., *Am. J. Physiol.*, 1923, **66**, 191.

TABLE I.
Effect of Environmental Temperature on the Blood Sugar of Dogs Following the Administration of Glucose or Starch.

Dog No.	Body wt, kg	Carbohydrate		Blood sugar					Environmental Temperature °F
		Kind	g/kg	Fasting mg%	1 hr mg%	2 hr mg%	3 hr mg%	4 hr mg%	
1	8.0	Glucose	1.75	Control.	92	66	72	—	70
1	8.0	"	1.75		124	71	55	—	68
1	8.0	"	1.75		119	70	—	—	73
1	8.0	Starch	1.75		85	67	65	—	69
2	7.0	"	6.00		104	106	86	89	75
2	7.0	"	6.00		106	105	111	89	77
3	4.7	"	6.00		95	95	90	94	77
4	5.0	"	16.00		94	105	90	93	74
Avg					102	86	81	91	73
				Experimental.					
4	5.0	Glucose	1.75		89	67	70	—	100
4	5.0	"	1.75		87	79	78	—	102
4	5.0	"	1.75		125	72	—	—	101
4	5.0	Starch	1.75		79	80	74	—	100
1	8.0	"	6.00		85	120	107	97	102
1	8.0	"	6.00		68	101	97	77	101
1	5.0	"	6.00		74	103	108	101	104
3	4.7	"	16.00		107	99	118	97	103
Avg					95	90	93	93	102

of 740 mm. Blood sugar determinations were made by standard procedures, Folin and Wu.⁴

The experimental dogs were subjected to an environmental temperature of approximately 29 degrees higher than the controls. The average rectal temperature of the control animals was 101.4 degrees. As a result of the higher environmental temperature the rectal temperature of the experimental animals increased from approximately 101 to 105 degrees. However, the results, Table I, show that there were no significant differences between the blood sugar values of the control and the experimental animals following the administration of either glucose or starch. In both control and experimental animals the blood sugar level was more sustained when larger amounts of carbohydrate were given.

The fasting blood sugar level of the experimental dogs, which was determined after 1½ hours of heat treatment, showed no difference from the normal fasting level. This is in agreement with the observations of Flinn and Scott³ and Weyl,² that increased temperature is without effect on the blood sugar content.

Summary. These findings indicate that exposure to high environmental temperature does not influence the digestion and absorption of carbohydrate in the dog, as far as the blood sugar content is concerned. Moreover, no relation is apparent between the blood sugar level and increased environmental temperature.

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Effect of Hepatic Injury on Vitamin C Excretion in Fasting Dogs.*

A. T. MILHORAT, W. E. BARTELS AND V. TOSCANI.

From the Russell Sage Institute of Pathology in Affiliation with the New York Hospital and the Departments of Medicine and Psychiatry, Cornell University Medical College, New York City.

Fasting dogs normally excrete a urinary substance that appears to be identical with Vitamin C. This substance reduces 2:6 dichlorophenol indophenol and gives the color reaction used in the estimation of the vitamin. Moreover, it was established in these investigations that the reducing substance further resembles vitamin

⁴ Folin, O., and Wu, H., *J. Biol. Chem.*, 1920, **41**, 367.

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