

**Studies in the Diastatic Activity of the
Blood, With a Consideration of Its
Value in Clinical Diagnosis**

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STUDIES IN THE DIASTATIC ACTIVITY OF THE BLOOD, WITH A CONSIDERATION OF ITS VALUE IN CLINICAL DIAGNOSIS*

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In 1917, Myers and Killian¹ published a simple, delicate and accurate method for estimating the diastatic activity of the blood. Briefly, the method consists in allowing a known quantity of blood (2 c.c.) to act on a known quantity of pure soluble starch (1 c.c. of a 1 per cent. solution = 10 mg.) for a definite length of time (fifteen minutes) in a water bath at 40 C. The glucose thus produced by the blood diastase is then determined by the Myers and Bailey method.² A control is run in a second tube to determine the original glucose contained in the 2 c.c. of blood, which is deducted from the total glucose found in the first tube. The results are recorded in terms of the percentage of the starch (10 mg.) transformed to reducing sugar (calculated as glucose) by the 2 c.c. of blood employed. Thus, by a "diastatic activity of 15" is meant that 15 per cent. of the 10 mg. of starch was converted into glucose by the diastase in the 2 c.c. of blood used.

In introducing their method, Myers and Killian state that, concerning the question of blood diastase in human diabetes, "Foster, Bainbridge and Beddard, Schlesiner, Wynhausen, Ghedini, and Stocks, were unable to come to any conclusions, though Loewi regarded the diastase of considerable importance, and Moeckel and Rost state, apparently from meager data, that the diastatic activity of the blood in human diabetes is almosts always higher than normal." In a study of blood diastase, on a series of normal and miscellaneous hospital cases, Myers and Killian found that in normal blood the diastatic activity, as estimated by their method, varied from 15 to 25. In a series of thirteen cases of diabetes they found the diastase much increased, the figures varying from 39 to 74. In eleven of 23 cases of nephritis they found the diastase to range from 30 to 52. The fact that these cases, in which a high blood diastase was noted, also showed a hyperglycemia, suggested to the authors the idea "that the increased diastatic activity in both diabetes and nephritis (as shown by the analyses of the blood) may be

*From the Medical Clinic of the Peter Bent Brigham Hospital, Boston.

1. Myers, V. C., and Killian, J. A.: Studies on Animal Diastases, *J. Biol. Chem.* **29**:179 (March) 1917.

2. Myers, V. C., and Bailey, C. V.: The Lewis and Benedict Method for the Estimation of Blood Sugar with Some Observations Obtained in Disease, *J. Biol. Chem.* **24**:147 (Feb.) 1916.

the important factor in the production of the hyperglycemia in these conditions." As a result of their studies, Myers and Killian concluded that "a fall in the blood diastase would appear to afford a more reliable guide to the efficacy of the dietetic treatment in diabetes than either the blood sugar or urine sugar. Furthermore, an increase in blood diastase may constitute a very early sign of impending diabetes."

DeNiord and Schreiner³ failed to confirm the findings of Myers and Killian. Using the Myers and Killian method for blood diastase estimation, DeNiord and Schreiner reported their observations on six cases of diabetes, all of which showed a low or normal blood diastase. Since these cases were syphilitic, and the results so opposed to the work of Myers and Killian, DeNiord and Schreiner suggested that a low diastatic activity in diabetes was possibly indicative of an associated syphilitic infection.

Block,⁴ after summarizing the literature on the subject, arrived at the conclusion that the determination of the diastatic activity of the blood was of but limited clinical significance; that the normal variations were exceedingly great, and that unless the diastatic activity of the blood was increased to a value of 100⁵ or more it could not be regarded of diagnostic import. However, in Block's opinion, an increase in blood diastase to 100 or more is indicative of pancreatic disease. Block included in this connection, diseases of the neighboring organs affecting the pancreas secondarily, such as a duodenal ulcer perforating into the pancreas or obstructing the pancreatic duct; but he did not include diabetes. In the latter instance he found the reports conflicting, and his own observations did not warrant him to regard the blood diastase of any significance in this disease.

The present study was undertaken in order to establish the clinical value of blood diastase determinations, made according to the method of Myers and Killian, in diabetes, nephritis and diseases of the pancreas. For this purpose the following plan of investigation was carried out.

3. DeNiord, H. H., and Schreiner, B. F.: Diastatic Activity of the Blood in Cancer, Syphilis and Diabetes, *Arch. Int. Med.* **23**:484 (April) 1919.

4. Block, W.: Die praktische Verwertbarkeit der Amylase- (Diastase-) Bestimmung in Blut und Urin für die Diagnostik der verschiedensten pathologischen Zustände, *Ztschr. f. klin. Med.* **93**:381, 1922.

5. Block does not state clearly what unit of diastatic activity he used; but from the text one may infer that he employed Wohlgemuth's (*Biochem. ztschr.* **9**:1 [Jan.] 1908) colorimetric method, which is based on an iodine starch reaction, and the figure 100 refers to the number of cubic centimeters of 1 per cent. starch solution that could be converted into dextrin by 1 c.c. of blood serum in twenty-four hours at 40 C. From a comparative study of the results on Block's normal subjects, obtained by this method, and my normal figures obtained by the Myers and Killian method, I regard the value of 100 by Wohlgemuth's method to be equivalent to about 50 or 60 by the Myers and Killian method.

METHOD OF INVESTIGATION

1. The diastatic activity of normal human blood was determined in thirty-five cases in order to establish a normal standard. These estimations included observations on the effect of food and time of day on blood diastase in normal subjects.

2. The diastatic activity of diabetic blood was determined in twenty-five cases. Observations were also obtained on the immediate effect of food and insulin on the blood diastase in diabetes.

3. The diastatic activity of dog's blood was determined in four normal and two depancreatized dogs.

4. The diastatic activity of human blood was determined in one case of carcinoma of the pancreas.

5. The diastatic activity of human blood was determined in five cases of nephritis.

The results of this study are tabulated.

DIASTASE IN NORMAL HUMAN BLOOD

For the purpose of establishing an accurate normal standard two groups of cases were studied. One group consisted of thirteen normal

TABLE 1.—*The Diastatic Activity of Normal Human Blood**

Case	Diagnosis	Blood Sugar	Units of Diastatic Activity	Remarks
1	R Normal.....	0.113	10	
2	I Normal.....	0.140	10	
3	C Normal.....	0.130	11	
4	S Normal.....	0.140	6	
5	A Normal.....	0.112	7	
6	Student Normal.....	0.091	19	
7	Student Normal.....	0.090	12	
8	Student Normal.....	0.099	16	
9	C Normal.....	0.110	8	
10	K Normal.....	0.123	11	
11	D Normal.....	0.100	6	
12	S Normal.....	0.109	12	
13	D Normal.....	0.102	8	
14	C Duodenal ulcer.....	0.114	14	
15	B Duodenal ulcer.....	0.117	12	
16	R Duodenal ulcer.....	0.091	9	
17	S Duodenal ulcer.....	0.109	17	
18	Y Duodenal ulcer.....	0.099	9	
19	B Rheumatic pericarditis.	0.113	14	Convalescent. Practically well
20	J Typhoid.....	0.107	24	Convalescent. Practically well
21	B Duodenal ulcer.....	0.100	11	
22	F Chronic diarrhea.....	0.113	15	
23	L Duodenal ulcer.....	0.125	18	Diagnosis questionable
24	H Duodenal ulcer.....	0.104	23	
25	L Duodenal ulcer.....	0.099	13	Diagnosis proved at operation and at necropsy
26	N Pneumonia.....	0.130	21	Convalescent. Practically well
27	G Medical observation....	0.099	16	
28	P Neurosis.....	0.094	14	
29	Ch Respiratory infection...	0.107	13	Convalescent. Practically well
30	Ch Pulmonary tuberculosis	0.107	18	Inactive process
31	Sh Asthma, bronchial.....	0.084	16	No recent attacks
32	G Pelvic tumor.....	0.097	15	Proved to be carcinoma
33	X Coma.....	0.174	6	Due to illuminating gas poisoning
34	X Acute diarrhea.....	0.192	18	Young child
35	De Medical observation....	0.124	2	

* Cases 14 to 35 represent a group of miscellaneous hospital cases, which for the purpose of this investigation may be regarded as essentially normal.

persons composed of students and members of the hospital staff. The other group consisted of twenty-two miscellaneous hospital patients, of whom all but two showed a normal blood sugar. The results are recorded in Table 1.

As can be seen from examining the figures in this table, the diastatic activity in normal blood may vary between 2 and 24. Myers and Killian,⁶ give from 15 to 25 as the normal limits. In repeating blood diastase estimations on the same person at intervals of a week or more, I obtained much more constant figures, five units being the highest variation noted. It appears, therefore, that, although in different persons blood diastase may vary between wide limits, in the same subject the variations are much less marked.

TABLE 2.—*The Effect of Food on the Diastatic Activity of Normal Human Blood*

Time	Case 1		Case 2		Case 3		Case 4		Case 5		Case 6	
	Blood Sugar	Units of Diastatic Activity	Blood Sugar	Units of Diastatic Activity	Blood Sugar	Units of Diastatic Activity	Blood Sugar	Units of Diastatic Activity	Blood Sugar	Units of Diastatic Activity	Blood Sugar	Units of Diastatic Activity
Fasting.....	0.102	8	0.100	6	0.117	11	0.107	24	0.125	18	0.130	21
½ hour after meal.....	0.137	9	0.108	4	.....	..	.....	..	.....	..	.....	..
1 hour after meal.....	0.136	4	0.108	6	.....	..	.....	..	.....	..	.....	..
1½ hours after meal.....	0.113	8	0.124	2	0.122	12	0.103	23	0.140	22	0.115	20
2 hours after meal.....	0.113	7	.....	..	.....	..	.....	..	.....	..	.....	..

Table 2 gives the results of experiments which were made to show the effect of food on the diastatic activity of the blood in normal subjects. The figures obtained in these experiments seem to indicate that normal blood diastase is not affected by food or time of day. Those findings are in accord with the observations of Carlson and Luckhardt,⁷ who performed similar experiments on animals.⁸

6. Myers, V. C.: Practical Chemical Analysis of Blood, Ed. 2, St. Louis, C. V. Mosby Co., 1924, p. 84.

7. Carlson, A. J., and Luckhardt, A. B.: On the Diastase in the Blood and the Body Fluids, Am. J. Physiol., **23**:148 (Dec.) 1908.

8. Carlson and Luckhardt studied blood diastase in a variety of animals, including dogs, cats, rabbits, pigs, sheep, goats and pigeons. They measured the concentration of the diastase in the serum "by (1) the rate of clearing and (2) by the rate of complete disappearance of erythro-dextrin in the starch solution. The starch solution and serum or lymph were usually mixed in the proportion of from 5 to 0.1 c.c. and kept in thermostat at 38 C." The unit of diastatic activity used by these authors is not clearly defined. The concentration of the blood diastase was recorded as "equal," "greater" or "less" than some assumed standard, thus indicating respectively an equal, shorter, or longer time required to clear the starch solution at the given temperature (38 C.) and at the given proportion of starch serum mixture (5 to 1 c.c.).

BLOOD DIASTASE IN DIABETES

Table 3 shows the results obtained in a series of twenty-five cases of diabetes. They were all typical cases with the exception of one patient (Case 25) who came in to the hospital with symptoms of acromegaly and pituitary disease. An examination of the results recorded in this table reveals the fact that, with the exception of the

TABLE 3.—*The Diastatic Activity of the Blood in Diabetes*

Case	Blood Sugar	Units of Diastatic Activity	Remarks
1	C	0.149	12* Urine sugar + (mild case)
2	O.D.	0.214	12 Urine sugar ++
3	L	0.256	11* Urine sugar ++
4	R	0.380	15* Urine sugar +++
5	B	0.310	14* Urine sugar ++++
6	F	0.295	14* Urine sugar +
7	R	0.245	3* Urine sugar + (trace)
8	W	0.185	10* Urine sugar ++
9	P	0.221	18 Urine sugar +++
10	R	0.425	19 Urine sugar ++++
11	McL	0.136	9* Urine sugar +
12	Sh	0.250	17* Urine sugar 1.8 per cent.
13	W	0.240	6* Urine sugar 6 per cent.
14	K	0.390	25* Urine sugar 1.4 per cent.
15	R	0.250	26* Urine sugar ++
16	H	0.221	16* } Under treatment with insulin
17	C	0.367	18* } Only traces of sugar in urine
18	T	0.198	18* } Urine sugar 7 per cent.
19	X	0.353	14 Urine sugar 6 per cent.
20	G	0.363	10* Urine sugar 5 per cent.
	G	0.375	10.6* Urine sugar +
21	S	0.263	10* Urine sugar +++
22	B	0.540	12 Urine sugar neg.
	B	0.222	17 Urine sugar ++
23	Bl	0.185	23 Urine sugar ++++
24	P	0.340	15 Evidence of pituitary tumor with acromegaly symptoms. Urine sugar ++
25	R	0.230	32

* Blood drawn during fasting state. Others were examined in from 1 to 2 hours after meals.

TABLE 4.—*The Effect of Food on the Diastatic Activity of the Blood in Diabetes*

Time	Case 1		Case 2	
	Blood Sugar	Units of Diastatic Activity	Blood Sugar	Units of Diastatic Activity
Fasting.....	0.363	10	0.300	14
One-half hour after meal..	0.425	9.4	.....	..
1 hour after meal.....	0.483	11.4	.....	..
1½ hours after meal.....	0.487	7	0.540	12

one typical case, the diabetics in this group yielded figures for blood diastase essentially like those obtained in our series of normal persons. Syphilis was excluded as a factor, since the histories justified such exclusion in all cases but one, and the Wassermann reaction was negative in every instance.

Table 4 records the results of experiments which were made to show the effect of food on the blood diastase in diabetes. The results obtained in this study are much like those seen in similar experiments

on normal persons. It is interesting to note that although the blood sugar rose considerably after the patient had taken food, the blood diastase remained either unaffected or was even lowered. These results speak against any relationship between hyperglycemia and increased diastatic activity of the blood.

EFFECT OF INSULIN

Table 5 records the results of experiments made to demonstrate the effect of insulin on the diastatic activity of the blood in diabetes. It will be seen from an examination of these figures¹ that although the blood sugar showed a marked and steady reduction in each instance,

TABLE 5.—*The Effect of Insulin on the Diastatic Activity of the Blood in Human Diabetes*

	Case 1			Case 2	
	Blood Sugar	Units of Diastatic Activity		Blood Sugar	Units of Diastatic Activity
Dec. 17, 1923. Six weeks before the insulin experiment, Case 1 was examined in the Outdoor Department with these findings.....	0.300	14			
Experiment: Jan. 29, 1924:					
Before insulin	0.540	10	Before insulin	0.353	14
½ hour after 10 units of insulin...	0.465	16	20 units given	.....	..
1 hour after 10 units of insulin....	0.395	17	1 hour later	0.166	19
1½ hours after 10 units of insulin..	0.387	17	1½ hours later	0.102	14
2 hours after 10 units of insulin....	0.353	13		.....	..
2½ hours after 10 units of insulin..	0.342	12	2½ hours later	0.111	14
Feb. 6. After receiving one week's careful dietary treatment in the ward, with a sugar free urine, Case 1, on reexamination showed.	0.220	17			

there was no corresponding change in the blood diastase. On the whole, the variations noted were not unlike those seen in similar serial determinations in both normal and diabetic subjects who had not received insulin; and the results suggest that insulin is without significant influence on the diastatic activity of the blood in diabetes. Myers,⁶ on the other hand, reported a similar experiment in one case, noting a slight reduction in the blood diastase after insulin.

BLOOD DIASTASE IN NORMAL AND IN DEPANCREATIZED DOGS

The blood diastase in four normal dogs was estimated by the Myers and Killian method. The pancreas was then removed in two of these dogs, and their blood again examined for the diastatic activity. The results of these experiments are recorded in Table 6. As may be seen from an examination of these results, the diastatic activity of normal dog's blood is from three to six times as high as the diastatic activity of normal human blood. The blood diastase estimations made in the

depancreatized dogs yielded figures slightly lower than those obtained in the same dogs before the operation or in the other normal dogs.

These findings correspond with the observations of Carlson and Luckhardt,⁷ who performed similar experiments on two cats. Carlson and Luckhardt were able to keep these animals alive for eight and eleven days respectively. Frequent diastase determinations on these animals showed, in one animal, a slight reduction in the diastatic activity during

TABLE 6.—*The Diastatic Activity of the Blood in Normal and in Depancreatized Dogs*

Experiments	Blood Sugar	Units of Diastatic Activity
Dog 1. Normal	0.097	73
Dog 2. Normal	0.107	87
Dog 3. Normal	0.107	77
Dog 4. Normal	0.116	77
Dog 1. Immediately after total extirpation of pancreas.....	0.222	65
Dog 2. Immediately after total extirpation of pancreas.....	0.200	72
Dog 2. Five hours after operation. Dog has completely recovered.	0.193	67
Dog 1. Two days after operation. Dog apparently completely recovered from operation and is running around like a normal dog.....	0.346	55

the first five days after the operation, with a return to normal on the eighth day; in the other animal the diastatic activity remained normal till its death on the eleventh day after the operation. However, Myers and Killian report a decided increase in the blood diastase in one depancreatized dog, and Milne and Peters⁹ report increases in the blood serum diastase in a large series of dogs after complete or partial removal of the pancreas.¹⁰

BLOOD DIASTASE IN DISEASE OF THE PANCREAS

It has been seen that pancreatectomy did not immediately affect the concentration of the blood diastase to any extent in two dogs. To

TABLE 7.—*The Diastatic Activity of the Blood in Pancreatic Disease*

Experiments	Blood Sugar	Units of Diastatic Activity
1. Human: Carcinoma of head of pancreas. Determination made 2 days after operation.....	0.125	13
2. Same as 1, four days after operation.....	0.130	10
3. Dog *: Pancreatic ducts ligated 10 weeks before.....	0.098	73
4. Same as 3, two days later.....	0.111	98

* The animal went through the usual period of emaciation with recovery and is now well nourished, lively, and behaves like a normal dog, with the exception of having large bulky stools.

9. Milne, L. S., and Peters, H. LeB.: Observations of the Glycolytic Power of the Blood and Tissues in Normal and Diabetic Conditions, *J. M. Res.* **26**:415 (July) 1912.

10. The method for diastase estimations employed by Milne and Peters is similar to that of Myers and Killian, but not so accurately standardized with respect to quantity of reagents and time of incubation.

determine the effect of a diseased pancreas on the diastatic activity of the blood, estimations of the blood diastase were made in one human case of pancreatic carcinoma found at operation, and in one dog in which the pancreatic ducts had been ligated ten weeks before. The results of these experiments are recorded in Table 7.

It will be seen that no significant changes in the blood diastase were noted in these two instances. However, Myers and Killian,⁶ reported a moderate increase in the blood diastase in two cases of pancreatic carcinoma and in two cases of pancreatitis; and it has also already been stated that Block⁴ regarded a marked increase in the blood diastase as indicative of pancreatic disease. The diagnostic value of blood diastase determinations in suspected pancreatic disease is therefore at present uncertain.

BLOOD DIASTASE IN NEPHRITIS

Myers and Killian report a decided increase in the blood diastase in eleven of twenty-three cases of nephritis in human beings. Fitz,¹¹ experimenting on rabbits in which he produced an acute nephritis by

TABLE 8.—*The Diastatic Activity of the Blood in Nephritis*

Case	Diagnosis	Blood Pressure	Phthalein Excretion per Cent.	Blood Urea Nitrogen per 100 C.c.	Blood Sugar	Units of Diastatic Activity
1	Chronic nephritis with hypertension.....	250/145	0	134	0.187	34
(7 days later)	Uremia.....	.....	0	203	0.166	55*
2	Chronic nephritis.....	140/95	Trace	...	0.136	25
3	Subacute nephritis with features of nephrosis (Epstein).	126/90	35	11	0.111	18
4	Chronic nephritis with hypertension.....	180/120	15	33	0.150	15
5	Chronic nephritis with hypertension.....	230/140	Trace	12	0.115	22

* Died 2 days after this determination.

means of uranium nitrate, obtained an increase in the blood diastase (estimated by the Wohlgemuth method) in five out of seven rabbits in which kidney lesions were demonstrated histologically. In the present study the diastatic activity of the blood was estimated in five cases of various types and degrees of nephritis, and the results are recorded in Table 8.

It will be seen that only in one case was a marked increase in the blood diastase found. Two estimations were made in this case at an interval of seven days. At the time of the second examination the patient was in uremic stupor. Although the blood diastase rose from 34 to 56, the blood sugar, at the same time fell from 0.187 to 0.166.

11. Fitz, R.: The Relation Between Amylase Retention and Excretion and Non-Protein Nitrogen Retention in Experimental Uranium Nephritis, Arch. Int. Med. 15:524 (April) 1915.

Here again the figures speak against any relationship between glycemia and blood diastase. The results, however, seem to indicate that while blood diastase determinations can be of but limited value in the diagnosis of nephritis, they may prove of prognostic value, a steady rise in blood diastase pointing to an unfavorable progress of the disease. Further studies along this line seem desirable.

INCIDENTAL OBSERVATIONS

During the progress of this investigation several problems arose in connection with the technic, which suggested certain experiments. Occasionally it was found necessary to keep a blood specimen from half to one hour before it was possible to begin the diastase determination. In order to ascertain what effect such delay had on the diastatic activity, several experiments were carried out, the results of which are recorded in Table 9. It will be seen from these results that, although

TABLE 9.—*The Stability of the Diastatic Enzyme and its Distribution in the Various Blood Components*

Experiments	Blood Sugar	Units of Diastatic Activity
1. Determination immediately after drawing blood from vein...	0.425	19
2. Same blood as 1, kept 24 hours in refrigerator.....	0.415	11 = 40% loss
3. Immediate determination	0.353	15.4
4. Same as 3, kept 24 hours in refrigerator.....	0.323	15.4 = no loss
5. Immediate determination	0.125	18
6. Same as 5, kept 2 hours in refrigerator.....	0.115	18 = no loss
7. Immediate determination	0.337	17
8. Same as 7, kept 1 hour at room temperature.....	0.337	15 = 12.5% loss
9. Whole oxalated blood.....	0.222	17
10. Same as 9 without oxalate.....	0.222	17
11. Whole oxalated blood.....	0.187	34
12. Plasma from same blood as 11.....	0.166	34
13. Serum from same blood as 11.....	0.166	37
14. Whole oxalated blood.....	0.540	10
15. Serum from same blood as 14.....	0.520	23

a delay of one hour is not likely to result in serious error, it is best to begin the determination within fifteen minutes to half an hour after drawing the blood from the vein.

Another question arose concerning the method of collecting blood, with special reference to the effect which oxalate might have on the enzyme action. Table 9 shows that the oxalate used in this work was without effect on the diastatic action of the blood. Two interesting observations, however, were made concerning the difference in diastatic activity of whole oxalated blood, blood plasma (derived from oxalated blood), and blood serum (derived from clotted blood). Equal quantities (2 c.c.) were used from each of these blood mixtures, and the samples subjected to the same laboratory conditions at the same time.

It will be seen that, although the blood plasma (oxalated) yielded the same results as the whole oxalated blood, yet the blood serum showed a higher diastatic activity than the corresponding whole blood. The

degree of increased activity varied from a very slight gain to more than twice the activity of the corresponding whole blood. This latter observation is interesting, as it suggests the possibility that new diastase may be produced during the process of clotting, perhaps from diastatogenic enzymes which become activated during the process of clotting. It was noted that the degree of increased activity in serum diastase depended on the method of separating the serum, whether the blood was centrifuged immediately on clotting, or whether the serum was permitted to separate slowly. In the latter instance the increase in diastase was greater. Similar observations were noted by Carlson and Luckhardt,⁷ although the variations reported by these investigators were less striking. It appears, from these findings, that serum diastase may vary with factors not entirely under control, and is, therefore, less desirable for comparative studies.

SUMMARY AND CONCLUSIONS

1. The diastatic activity of normal human blood was estimated by the Myers and Killian method in thirty-five cases. The figures obtained varied between 2 and 24.

2. The diastatic activity of diabetic blood was estimated, by the same method, in twenty-four cases of human diabetes. The figures obtained were essentially similar to those observed in the normal series, varying between 3 and 26. In one atypical case of diabetes a blood diastase of 32 was observed. The results, furthermore, indicated that a low blood diastase in diabetes was in no way suggestive of an associated syphilitic infection.

3. No significant changes were noted in the diastatic activity of the blood, in serial determinations, on either normal or diabetic subjects, before and after they had taken food.

4. The injection of insulin in two diabetic subjects produced no significant change in the concentration of their blood diastase.

5. There was no correlation noted between the concentration of the blood diastase and the blood sugar concentration in either diabetic or nephritic subjects.

6. The diastatic activity of the blood in two depancreatized dogs was slightly lower than normal during the first two days after the operation.

7. A normal blood diastase was observed in one case of carcinoma of the head of the pancreas. A normal diastatic activity was also obtained in the blood of a dog, in which the pancreatic ducts had been ligated ten weeks before, and in which symptoms of pancreatic insufficiency had been noted.

8. A decided increase in blood diastase was obtained in one case of severe nephritis. The results suggested the possibility that serial determinations in severe nephritis might prove of prognostic value.

9. Estimation of the diastatic activity of the blood, as determined by the method of Myers and Killian, yielded no information of clinical value in the cases of diabetes and in the one case of pancreatic carcinoma studied.

In conclusion, I wish to express my gratitude to Dr. Henry A. Christian for allowing me to use his wards and laboratories in this investigation.
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