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Distribution of Diastase in Serum, Plasma, Whole Blood and Red Blood Cells.*

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The development of an accurate and simplified procedure for the determination of blood diastase has given a new impetus to the study of the diastatic activity of human blood. There is considerable literature concerning diastatic activity of the blood, but it contains no record of any intensive studies on the distribution of diastase in human blood. In view of this it was thought worth while to present the results of our studies in diastase distribution.

Procedures. Blood specimens were obtained by venepuncture, in most cases before breakfast. Whole blood was transferred to a Sanford-Magath hematocrit tube containing either dried sodium oxalate, or purified heparin. The type of anticoagulant used had no effect upon the diastatic activity. The tube containing the well-mixed blood specimen was centrifuged at 3,000 rpm for 30 minutes. The volume of packed red cells was recorded and the red cell volume calculated; the supernatant plasma was used for the determination of diastase activity. Serum was obtained from an additional sample of blood taken simultaneously.

The method employed for the determination of the diastase was essentially that of Somogyi,[1] with the exception that the Benedict[2] 1931 copper method for the estimation of sugar in the tungstic acid filtrates was used. All of our determinations were made on 0.5 ml of serum, plasma, whole blood and red cells. In one subject, No. 187741, several estimations were made at intervals after the patient had undergone treatment.

Discussion. The distribution of diastase between serum, plasma, whole blood and red cells was studied in 26 subjects, see Table I. There was a wide range of diastase values in the cases selected, varying in the serum between 39 and 204. It will be observed that the diastase of the plasma tends to approach that of the serum, although in general it is lower. In 17 instances the plasma value was lower, in 3 exactly alike, and in 6 somewhat higher. The diastase of whole blood is considerably lower than either the serum or plasma.

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1 Somogyi, M., *J. Biol. Chem.*, 1938, **125**, 399.

2 Benedict, S. R., *J. Biol. Chem.*, 1931, **92**, 141.

In our opinion the diastase values of whole blood are too low to be of any diagnostic value. The red cells contain no diastase, the values obtained being between 0 and 13, which are well within the experimental error of the procedure used. The values are independent of the red cell volume. That the red cells contain no amylase has also been reported by Morse[3] in experiments on dogs.

If we multiply the plasma diastase by a factor (1 minus the red cell volume, expressed as a decimal) we obtain the value of the corresponding whole blood diastase. This checks rather well with the actual results of the whole blood estimations, and furnishes further corroboration of our observation that the red cells contain no diastase.

Summary. Distribution studies of diastase in serum, plasma, whole blood and red blood cells from the same specimen of human blood were made in 26 subjects. It was shown that the plasma values approach those of the serum, while the whole blood values are considerably lower. The red cells contain no diastase.

TABLE I.
Distribution of Diastase in Human Blood.

History No.	Serum	Plasma	Whole blood	Red cells	Red cell volume, %
187741	84	61	38	9	32
,,	71	80	43	0	43
,,	87	90	45	3	41
187527	68	76	36	0	43
72512	48	47	32	4	40
80100	27	23	10	8	19
184694	99	83	47	4	40
187878	74	61	15	2	—
187558	64	59	37	4	42
169972	88	78	57	13	37
—	72	50	16	7	47
180516	70	70	46	1	45
187982	62	54	38	4	37
125164	39	36	20	4	40
154578	43	35	24	3	45
187458	73	75	42	4	46
97582	89	89	53	7	—
80619	204	159	91	6	30
188213	63	69	41	4	49
80975	103	80	47	2	39
186834	44	39	18	1	31
170867	61	61	36	1	28
81157	104	90	46	1	37
42155	75	86	65	7	48
97436	69	82	45	2	42
188409	115	111	60	0	47
60100	154	127	59	3	32
57655	121	109	92	1	13

[3] Morse, W., *Proc. Am. J. Biol. Chem.*, 1923, **55**, 27.