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Clinical Experience with Globin Insulin.

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A clinical trial of globin insulin¹ was made on approximately 25 patients suffering from diabetes of varying degrees of intensity. The preparation was given in a single dose, usually 30-45 minutes before breakfast. Whenever possible, its action was compared with standard and protamine zinc insulin. The sugar in the urine was usually determined in 2-hour periods. Four finger blood sugars taken before breakfast, lunch, dinner and 10 P.M. respectively were also recorded at frequent intervals. The maximum single dose was 145 units. Skin reactions were never encountered. We were using a water-clear solution. When hypoglycemic reactions occurred, the time was usually in the late afternoon, whereas protamine zinc in-

TABLE I.
H.D. Age 42. History No. 354588. Diabetes discovered in 1933.
Data of Previous Admissions.

Dates	Diet, Calories			Insulin Units			Regulation
	Carb.	Prot.	Fat	A.M.	M	P.M.	
9/17/33-9/27/33	100	60	50	30 "S"	0	18 "S"	Excellent
4/30/37-5/13/37	250	75	100	44 "S"	0	22 "S"	Good
5/17/37-5/17/37	250	75	100	40 "S"	0	40 "S"	"

Dates	Insulin Units "G"	Diet			Blood Sugars Before				Urine Sugars		
		C.	P.	F.	Break-fast	Lunch	Dinner	10 P.M.	11 A.M.	4 P.M.	7 A.M.
1937		250	100	75							
12/3	70										
12/7	70				149	309	233	229	0	±	±
12/8	70				148	322	204	274	0	0	+
12/10	85								0	0	0
12/11	85				104				0	0	0
12/13	85				71				0	0	0
12/14	82								0	0	0
12/15	82				67	145	118	96	0	0	0
12/16	82				110	172	106	95			

Note: Since discharge about 11 months ago she has visited the clinic about 21 times. Regulation has been very satisfactory on a single dose of globin insulin given one-half hour before breakfast.

"S" = Standard Insulin.

"G" = Globin Insulin.

¹ Reiner, L., Searle, D. S., and Lang, E. H., *PROC. SOC. EXP. BIOL. AND MED.*, 1939, **40**, 171.

sulin shocks usually occur in the early morning hours. It was found that in practically every case a single dose of globin insulin would regulate the moderately severe and mild cases. In several severe cases, uncontrollable with protamine insulin, fair regulation was obtained with the globin compound. An illustrative table is included.

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Insulin Preparations with Prolonged Activity. I. Globin Insulin.

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It is believed that an insulin preparation with prolonged activity is usually in the form of a suspension insoluble at the pH of the blood. When insulin was mixed with globin, the solution remained clear at about pH 4 or less, and precipitated between pH 5 and 8. Both the clear and precipitated globin insulin combinations produced a prolonged hypoglycemia when injected into normal animals. The duration of this hypoglycemia is longer in dogs and humans than in rabbits. When 0.2-0.3 mg of zinc was added to a preparation containing 3.8 mg of globin per 100 units of insulin, the duration of the hypoglycemia was more than twice as long as that produced by standard insulin containing the same amount of zinc. As a rule the presence of zinc in the globin mixture intensified and prolonged the hypoglycemia. It was found that the most convenient way to test insulin preparations was to inject into fasting rabbits an amount that failed to produce convulsions in at least 90% of the animals. For comparison the same dose of standard insulin was injected in 2 portions 5 hours apart. The duration of hypoglycemia after injection of globin insulin was not as long as that produced by protamine zinc insulin, but the development of hypoglycemia was very much faster. The characteristic blood sugar curves for rabbits indicate that the hypoglycemia is most intense a few hours after injection and that it disappears gradually.