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Distribution of Protein Fractions in the Serum of Kala-azar Patients.

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By applying Ray's "hemolytic" test,[1] Sia[2] found that the blood of Kala-azar patients always hemolizes to a cloudy solution which on standing deposits a flocculent precipitate, whereas in normal subjects and in other patients studied, including severe anemia, it hemolizes to a clear solution which remains clear. Later Sia and Wu[3] showed that the turbidity is due to serum globulin and that Ray's "hemolytic" test is really a globulin precipitation test for Kala-azar. They also found that there is, in the blood of Kala-azar patients, an absolute decrease of serum albumin and an absolute increase of serum globulin. Since the test is performed by adding 20 cmm. of blood to 0.6 cc. of distilled water,[4] and since euglobulin is precipitated simply by dilution with water, it is desirable to know whether the turbidity and precipitate are determined by the amount of euglobulin in the serum. We have, therefore, made quantitative determinations of different fractions of serum protein in normal subjects and in Kala-

TABLE I.
The distribution of the protein fractions in normal human serum.
Gm. in 100 cc. of serum.

Subject No.	Albumin (a)	Euglobulin (b)	Pseudoglobulin		Total globulin (e) (b+c+d)	Euglobulin	Total protein		Globulin
			I (c)	II (d)		Total globulin (b:e)	Determined	Calculated (a+e)	Albumin (e:a)
1	4.310	0.294	1.042	0.698	2.034	0.144	6.344	6.344	0.472
2	4.309	0.305	1.224	0.768	2.297	0.132	6.606	6.606	0.533
3	4.391	0.300	1.169	0.667	2.136	0.140	6.525	6.527	0.486
4	4.137	0.323	0.969	0.646	1.938	0.166	6.075	6.075	0.468
5	3.950	0.323	1.007	0.797	2.127	0.152	6.077	6.077	0.538
6	4.194	0.284	1.158	0.676	2.118	0.134	6.312	6.312	0.505
7	4.010	0.234	0.919	0.590	1.743	0.134	5.754	5.753	0.435
8	4.665	0.333	1.087	0.514	1.934	0.172	6.598	6.599	0.415
9	4.009	0.323	0.969	0.736	2.028	0.159	6.035	6.037	0.506
10	4.086	0.326	1.161	0.646	2.133	0.153	6.218	6.219	0.522
Average	4.206	0.305	1.071	0.674	2.049	0.149	6.254	6.255	0.487

[1] Ray, C. B., *Indian Med. Gaz.*, 1921, lvi, 9.

[2] Sia, R. H. P., *China Med. J.*, 1921, xxxv, 397.

[3] Sia, R. H. P., and Wu, H., *China Med. J.*, 1921, xxxv, 527.

[4] Sia, R. H. P., *China Med. J.*, 1924, xxxviii, 35.

azar patients. In all cases of Kala-azar the globulin test by Sia's method was positive and stained smears made from splenic pulp showed Leishman-Donovan bodies.

The serum proteins were fractionated with different concentrations of sodium sulphate according to the technic of Howe.[5] Tables I and II give the results of determinations on normal subjects and

TABLE II.

The distribution of the protein fractions in the serum of Kala-azar.

Gm. in 100 cc. of Serum.

Hospital No.	Albumin (a)	Euglobulin (b)	Pseudoglobulin		Total globulin (e) (b+c+d)	Euglobulin	Total protein		Globulin	"Globulin test"
			I (c)	II (d)		Total globulin (b:e)	Determined	Calculated (a+e)	Albumin (e:a)	
22348	3.049	2.353	1.324	0.627	4.304	0.547	7.353	7.353	1.412	+
5166	2.451	1.050	1.697	0.754	3.501	0.299	5.952	5.952	1.428	+
24659	1.191	2.269	2.372	0.748	5.389	0.421	6.579	6.580	4.524	+
24753	1.250	2.982	2.704	0.417	6.103	0.488	7.353	7.353	4.882	+
25242	2.745	0.960	1.468	0.359	2.787	0.344	5.532	5.532	1.015	+
24736	2.712	1.510	2.166	0.551	4.227	0.357	6.939	6.939	1.558	+
25573	1.838	2.153	1.806	0.563	4.522	0.476	6.358	6.360	2.460	+
25547	2.370	2.088	1.500	0.481	4.069	0.513	6.438	6.439	1.717	+
25638	3.231	3.583	1.553	0.505	5.641	0.635	8.873	8.872	1.745	+
26043	1.639	3.969	1.910	0.518	6.397	0.620	8.036	8.036	3.903	+

[5] Howe, P. E., *J. Biol. Chem.*, 1921, xlix, 109.

on patients with Kala-azar respectively. By comparing the figures in these 2 series it will be seen that euglobulin in Kala-azar serum is increased 3 to 13 times and amounts to 30 to 63% of the total serum globulin; the pseudo-globulin I is nearly twice, in some cases more than twice, as much as in normal serum. There is a considerable increase of total serum globulin and an absolute decrease of serum albumin, so that the globulin:albumin ratio, which is normally about 0.49, is greatly raised, being in some cases over 4. Findings somewhat similar to these were made by Lloyd and Paul[6] who found, in 8 cases of Kala-azar, euglobulin to be 1.5 to 2.5 gm. per 100 cc. of serum, but apparently without change in pseudo-globulin. In view of these results such a precipitation in the globulin test may be considered as due to increase of euglobulin, or some special euglobulin, in the Kala-azar serum.

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Cytological Changes in Thyroid Apparatus and Spinal Ganglia of Rats Treated With Thallium.

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Buschke[1] and others believe that thallium acetate acts chiefly on the thyroid gland and the nervous system. Balbi,[2] however, is of the opinion that it does not have such action. Since the Golgi apparatus and the mitochondria are the most vital cellular elements known so far, it is suggested that a study of the action of thallium acetate on these elements in the 2 tissues in question should yield more definite information than ordinary histological examination of the tissue as a whole. The following observations have been made:

Eighteen albino rats of about the same age (3.25 to 3.5 months) and sex (male) were injected with a single injection of 8 mg. of thallium acetate per kilo of body weight and killed at weekly in-

[6] Lloyd, R. B., and Paul, S. N., *Indian J. Med. Res.*, 1928, xvi, 529.

[1] Buschke, A., Langer, E., and Peiser, B., *Dermat. Wchnschr.*, 1926, lxxxiii, 971.

[2] Balbi, E., *Gior. ital. di dermat. e. sifil.*, 1928, lxix, 28. (Abstract, *Brit. J. Dermat. and Syph.*, 1929, xli, 78.)