mediate marked albuminuria. There were no erythrocytes, but a few hyaline casts were found occasionally in the urinary sediment. The histological picture of the kidneys was uniformly that of a moderate degree of acute glomerulonephritis, with increased cellularity, avascularity and swelling of the basement membrane of the glomerular tufts. The kidneys of rats A-4 and A-5 showed slightly more severe glomerular involvement, and the tubules in these two rats were moderately dilated. All the rats given ACTH and cortisone showed some edema and ascites, which was very marked in rats A-4, A-5 and CO-1. In these 3 rats the spleen was greatly decreased in size.

Discussion. The present findings are similar to those recently reported by Knowlton, *et al.*(4), who found that cortisone did not prevent the development of cytotoxic serum nephritis in the rat. Our data further indicates that ACTH, in the large dosage necessary to give a continued depression in the eosinophile count, also did not prevent the lesions from developing. ACTH has been shown to affect the experimental cardiovascular lesions in rabbits produced by anaphylactic hypersensitivity to horse serum(2). The failure to prevent the renal lesions produced by the injection of nephrotoxic serum suggests that, in this condition, a different mechanism may be involved.

Conclusion. Both ACTH and cortisone failed to inhibit the development of renal lesions in the rat produced by the injection of rabbit anti-rat kidney serum.

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4. Knowlton, A. I., Loeb, E. N., Stoerk, H. C., and Seegal, B. C., PROC. SOC. EXP. BIOL. AND MED., 1949, v72, 722.

Distribution of Radioiodine in Erythrocytes and Plasma of Man.* (17940)

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Abundant data concerning the distribution of chloride and bromide between the erythrocytes and plasma are available. However, there is a lack of similar data on the distribution of iodide, owing to the difficulties in the chemical determination of iodine. Because of the ease with which I^{131} may be determined we have reinvestigated with the aid of radioiodine, the distribution of iodide in the cells and plasma of man.

Experimental. Venous blood was drawn from normal individuals and immediately heparinized. Various amounts of labeled sodium iodide in a volume of 0.1 to 0.3 cc were added to 25 cc of blood. This volume ratio was chosen so as to disturb the osmotic relationship to a minimal degree. The tubes containing the blood were then rotated for 20 minutes to obtain complete mixing. An aliquot was transferred to a Wintrobe tube for the determination of the corpuscular volume percentage (hematocrit) by means of centrifugation in the cold for 2 hours at 3,000 revolutions per minute. Another aliquot of the blood was taken for analysis of radioactivity by the method previously described (1) and for determination of chloride according to a modification of the method of Keys (2). The remainder of the blood was centrifuged to obtain plasma, in which the I^{131} and chloride concentrations were also determined.

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1. Rall, J. E., Johnson, H. W., Power, M. H., and Albert, A., unpublished data.

2. Keys, A., *J. Biol. Chem.*, 1937, v119, 389.

TABLE I.
Ratio of Iodide and Chloride Content of Erythrocytes to That of Plasma.

Exp.	I^{127}, μg per 100 cc	Chloride		Iodide*	
		Cell: plasma ratio	Cell: plasma ratio on basis of water content	Cell: plasma ratio	Cell: plasma ratio on basis of water content
1	35	.54	.77	.80	1.14
2	3000	.58	.83	.64	.92
3	70	.57	.82	.67	.96
4	20	.62	.90	.66	.94
5	20	.55	.79	.71	1.02
6	35	.57	.82	.65	.92
7	35	.66	.95	.60	.87
8	20	.68	.97	.69	.99
9	60	.53	.76	.65	.92
10	20	.58	.83	.65	.92
Mean		.59	.84	.67	.96
Stand dev.		.050		.054	

* 0.001 microcurie of I^{131} per cc of whole blood.

The iodide and chloride content of the erythrocytes was calculated from the values for whole blood and plasma according to the following formula:

Erythrocyte halide = [whole blood halide—(plasma halide × plasma fraction)]/erythrocyte fraction.

Chloride determinations were done in duplicate, and radioiodine determinations were done in quadruplicate.

Results. The results of 10 determinations of the ratio of the chloride and iodide content of erythrocytes to that of plasma are shown in Table I. Concentrations of sodium iodide ranging from 20 to 3,000 μg per 100 cc were used so as to avoid adsorption errors. It can be seen that the ratio of the iodide content of erythrocytes to that of plasma was somewhat higher than the corresponding ratio for chloride content. When the results were calculated on the basis of cell water content of 65% and plasma water content of 93%, the distribution of iodide between cells and plasma was approximately unity.

Discussion. The results given in Table I imply that the distribution of iodide is different from the distribution of chloride. Weir and Hastings(3) found that the distribution ratios of chloride and bromide were approximately the same, the cell : plasma ratios on the basis of water content being 0.72 and 0.76, respectively. The reason for the difference in behavior of iodide is not apparent. Although anaerobic handling of the blood was not attempted, escape of carbon dioxide with attendant shift of halogen from cells to plasma was minimized as much as possible by filling the tubes completely, using tight stoppers and carrying out the procedure as rapidly as possible. Since each set of analyses for chloride and radioactive iodide was made on aliquots of the same plasma, errors attributable to slight shifts in halogen equilibrium may be assumed, at least provisionally, to have affected the distribution ratios of chloride and iodide equally and in the same direction. In so far as this assumption is justified, the data indicate that a portion of iodide added to human blood is not freely diffusible and may be bound in some manner within the erythrocytes.

Summary. The ratio of chloride content of the erythrocytes to that of the plasma was found to be 0.59, and the corresponding ratio for radioiodide was 0.67.

3. Weir, E. G., and Hastings, A. B., *J. Biol. Chem.*, 1939, v129, 547.

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