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Excretion Rate of Hippuric Acid in Man.

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The synthesis of hippuric acid as a test of liver function is valid only if the rate of excretion of this acid is greater than the speed of formation. It is desirable, therefore, to know how rapidly hippuric acid is excreted. Hirsheimer¹ found that when 2.26 g of sodium hippurate (equivalent to 2 g of hippuric acid) were injected intravenously, approximately 60% was excreted by normal pregnant women in 30 minutes. In patients suffering from various types of toxemias of pregnancy, the excretion was frequently diminished. Smith and Schwei² reported that when 1 g of hippuric acid was injected intravenously into a rabbit weighing 3 kg, 67% was excreted in 30 minutes; after injecting 2 g of the acid, 43.5% was eliminated, and after 3 g only 34.6% in the half-hour period.

In the present study, the procedure of Hirsheimer was followed except that the output of hippuric acid was determined for the 15

TABLE I.
Excretion of Hippuric Acid in Normal Subjects and in Patients with Kidney Dysfunction.

Subject	Weight, lb	First 15-min period		Second 15-min period		Hippuric acid output 30 min., g	Remarks
		Hippuric acid output, g	Urine vol., cc	Hippuric acid output, g	Urine vol., cc		
1	166	.91	49	.48	24	1.39	Normal
		.97	150	.37	18	1.34	
		.93	47	.47	23	1.40	
2	170	.94	134	.33	18	1.27	"
3	175	.87	58	.34	17	1.21	"
4	130	.74	30	.50	16	1.24	"
5	142	.96	146	.47	212	1.43	"
6	135	.25	29	.25	26	0.50	Left hydronephrosis
7	112	.27	31	.26	18	0.53	Hydronephrosis
8	165	.14	18	.40	30	0.54	Pyelonephritis
9	175	.28	86	.53	88	0.81	Chronic prostatitis
10	145	.39	124	.50	120	0.89	Prostatic hypertrophy

The hippuric acid was determined by the senior author's method.³

The urine of subjects 6 to 10 was obtained by catheterization.

¹ Hirsheimer, A., *Am. J. Obs. and Gynec.*, 1939, **37**, 363.

² Smith, F., and Schwei, G. P., *Marquette Med. Rev.*, 1940, **4**, 66.

³ Quick, A. J., *Am. J. Clin. Path.*, 1940, **10**, 222.

and 30 minute periods following the injection of 2.26 g of sodium hippurate.* Typical results are recorded in Table I.

It will be noted that the excretion of hippuric acid in normal men is very rapid. The average output of 15 subjects was 0.88 g in 15 minutes which is 44% of the amount injected. On this basis, an adult can excrete at least 3.5 g of hippuric acid in an hour. Since the average hour output of hippuric acid in a similar group of subjects injected with 1.77 g sodium benzoate was found to be 1.25 g of hippuric acid, one can conclude that the excretory capacity of the kidneys is over 2.5 times as great as the speed of synthesis.

In patients with various types of kidney pathology the excretion of hippuric acid is often definitely diminished. Curiously, the output is frequently considerably higher for the second 15-minute period than for the first, which is difficult to explain by any of the current theories of kidney function. Since the excretion of hippuric acid is diminished in certain renal disorders, it is to be recommended that when liver function is determined by the hippuric acid test in patients with suspected concomitant kidney dysfunction, the excretion rate of hippuric acid should also be estimated.

Summary. The excretion of hippuric acid in normal adults following intravenous injection is exceedingly high: about 44% is eliminated in 15 minutes when 2.26 g of sodium hippurate are administered. In various renal disorders the speed of excretion is diminished.

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Restoration of Blood Pressure by Renin Activator After Hemorrhage.†

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That a renin-like substance may be found in the blood stream after hemorrhage was first indicated by Saperstein, Ogden and Southard,¹ who pointed out that a homeostatic mechanism for the regulation of blood pressure might be involved. Independently, similar

* Ampules of sodium hippurate were kindly furnished by George A. Breon, Inc., Kansas City, Mo.

† Aided by a grant from the Board of Research of the University of California.

¹ Saperstein, L. A., Ogden, E., and Southard, F. D., Jr., *PROC. SOC. EXP. BIOL. AND MED.*, 1941, **48**, 505.