CHLORIDE REABSORPTION BY THE FROG RENAL TUBULE

WILLIAM D. BLAKE
Dartmouth College

In these experiments the inulin clearance was used to measure the rate of glomerular filtration, and simultaneous chloride clearances were determined with the chloride plasma concentrations ranging from 200 to 500 mg. per cent. 98 such clearance periods were obtained on 13 normal bullfrogs. Varying chloride plasma levels were produced by the injection of aqueous solutions of sodium chloride into the dorsal lymph sac. The procedures for blood and urine collections were the same as those of Forster (1938). Chloride was determined in both plasma and urine by Eisenman's modification of the method of Van Slyke and Sendroy (1929), and inulin after hydrolysis with 1.0 N. H_2SO_4 by the method of Shaffer and Somogyi (1933).

In every instance the chloride clearance was lower than the simultaneously determined inulin clearance, indicating chloride reabsorption from the glomerular filtrate by the renal tubules. A localization of this function in the distal tubule cells was shown by direct tubular puncture experiments by Walker *et al* (1936). At normal plasma concentrations (about 200 mg. per cent) this reabsorption is complete and no chloride escapes to the bladder urine. In no instance is the chloride urine/plasma concentration ratio greater than 1.0, even when the plasma chloride concentration has been raised to 500 mg. per cent by the injection of exogenous NaCl. This stands in contrast to glucose in the frog (Forster, 1940), which at high plasma levels has a urine/plasma concentration ratio almost invariably greater than 1.0.

At normal or slightly above normal chloride plasma concentrations, chloride reabsorption is relatively independent of the amount of water simultaneously reabsorbed by the renal tubules, but at higher plasma levels (above 350 mg. per cent) a direct relationship exists. At these high plasma chloride concentrations a marked diuresis is produced, primarily by a greatly increased filtration rate, and secondarily by diminished tubular water reabsorption.

REFERENCES

Forster, R. P., 1938, J. Cell. and Comp. Physiol., **12**, 213.
———, 1940, Anal. Rec., **78**, Supplement, 157.
Eisenman, A. J., 1929, J. Biol. Chem., **82**, 411.
Shaffer, P. A., and M. Somogyi, 1933, J. Biol. Chem., **100**, 695.
Walker, A. M., C. L. Hudson, T. Findley, Jr., and A. N. Richards, 1937, **118**, 121.