

Illinois Section.

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4942

Evidence in Support of the Filtration-Reabsorption Theory of Urine Formation in the Dog.

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In these experiments the amount of urea and glucose excreted in the urine under varying conditions is compared with the amount of similar substance calculated to have been filtered through the glomeruli on the basis of the Filtration-Reabsorption Theory. The amount of urea or glucose filtered is calculated from the following formulae which are adaptations of those proposed by Rehberg¹:

$$\frac{(\text{Urine Creatinine in mg. per 100 cc.}) (\text{Urine Volume in cc. per minute})}{\text{Plasma Creatinine in mg. per 100 cc.}} = \text{Amount of Glomerular Filtrate in cc. per minute.}$$
$$\frac{(\text{Glomerular Filtrate in cc. per minute}) (\text{Plasma urea in mg. per 100 cc.})}{100} = \text{mg. of Urea Filtered per minute.}$$

Creatinine is assumed to have no threshold value. To make the blood creatinine determinations more reliable creatinine is given by stomach tube 3 hours before samples are collected. All blood concentration figures are averages for the period of observation.

Fifteen experiments have been performed to date.

The amount of urea present in the urine has never exceeded the amount estimated to have been filtered. When urea is injected intravenously an increase in the output of urea is obtained which is approximately proportional to the rise in blood urea concentration except when a spontaneous decrease in the amount of filtrate occurs. Such a decrease counteracts to a large extent the rise in blood

¹ Rehberg, P. B., *Biochem. J.*, 1926, **xx**, 447. *Ibid.*, 1926, **xx**, 461.

urea concentration. Euphyllin administered intravenously increases the amount of urea excreted in the urine and this increase is roughly proportional to increases in the calculated amount of filtrate formed and in the estimated amount of urea filtered.

The amount of glucose appearing in the urine after the administration of large doses of phlorhizin is, within the limits of error of the methods employed, equivalent to the amount estimated to have filtered through the glomeruli. When euphyllin is given intravenously the amount of glucose excreted is increased and this increase can be accounted for by the greater amount of filtrate formed. The increase in glucose excretion which occurs when glucose is given intravenously to a phlorhizinized dog corresponds to the increased amount of glucose filtered as a result of the rise in plasma glucose concentration.

TABLE I.
Effect of the intravenous injection of urea upon the excretion of urea in the urine.

Time	Urine Creatinine mg./100 cc.	Urine Volume cc./min.	Blood Creatinine mg./100 cc.	Glomerular Filtrate cc./min.	Blood Urea mg./100 cc.	Urea in Glomerular Filtrate mg./min.	Urea in Urine mg./min.
2.20 to 2.50 251	3168 4.5 gm. urea i.v.	0.07	4.72	49.0	8.8	4.3	2.9
3.00 to 3.21	320	0.38	4.54	26.8	96.0	26.6	12.6
3.22 to 3.39	510	0.50	4.37	57.7	84.8	48.9	22.1

The excretion of sulphate is now being studied in a similar manner.

The evidence so far obtained would indicate that the process of urine formation in the dog may be accounted for solely on the basis of filtration and reabsorption.

4943

Functional Pathology of the Denervated Kidney.

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Long established clinical observation has made evident the close association of chilling of the body surface with the inception of certain types of nephritis. In those cases where chilling has involved