

## PERMEABILITY CHARACTERISTICS OF THE GOOSEFISH NEPHRON\*

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It has been reported that the urine of the aglomerular fish Lophius americanus contains trace amounts of glucose. We were interested first in verifying and quantifying this observation and then in determining the mechanism by which glucose appears in the urine. All glucose concentrations were determined using the Glucostat reagent which is specific for  $\beta$ -D-glucose. Glucose was found to be present in the urine of all fish examined. The average concentration in urine collected from 11 fish immediately upon capture was 0.67 mg %, range 0.29-1.39 mg %. This was essentially the same concentration found in urine 24 hours after capture. Urine to plasma ratios were followed in Lophius after injection of phlorizin and exogenous glucose. After injection of either glucose or phlorizin the U/P ratios for glucose increased from about 0.02 to 0.12. These observations suggest that glucose diffuses into the tubular urine and is actively reabsorbed. If the transport system is inhibited with phlorizin or the inward leak increased by elevated plasma levels of glucose proportionally more glucose escapes reabsorption, resulting in elevated U/P ratios. Additional experiments were done in which the excretion of exogenous inulin was measured. Inulin was detected in the urine of Lophius after intramuscular injection. Inulin U/P ratios were slightly lower than control glucose ratios and were unaffected by phlorizin or glucose loading. However, it is not clear whether inulin enters the urine by crossing the tubular epithelium or the bladder wall.

## THE ALKALINE GLAND OF THE SKATE: BIOELECTRIC PROPERTIES AND CHARACTER OF THE SECRETION

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This is a continuation, and final report, of studies on the alkaline (Marshall's) gland previously abstracted in this Bulletin. It was previously shown (see 1961 report) that the sodium and potassium concentrations of gland fluid are about twice that of plasma. Using the techniques of Ussing as well as potential measurements made in situ, it appears that the secretory (luminal) surface of the gland is negative to the serosal by about 16 millivolts. This suggests that cation distribution is passive. Since  $\text{Cl}^-$  concentration in gland fluid is about the same as in plasma, and  $\text{HCO}_3^-$  greatly exceeds that of plasma, we believe that the anions are actively transported from serosa to mucosa. The net flux of  $\text{Cl}^{36}$  is in this direction, as is the net accumulation of  $\text{CO}_2$ .

pH and  $\text{CO}_2$  measurements, and acidimetric titration of gland fluid, show that of the total  $\text{CO}_2$  present, about 35% is  $\text{CO}_3^{=}$ . The presence of this ion, and its colligative properties, serve to explain the fact that the osmotic and electromotive activity of the gland fluid is less than

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