Electrolyte Transport in Aglomerular Tubules of the Goosefish, Lophius piscatorius.*

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Attention was directed to this biological system because it constitutes the simplest situation in which measurements can be made on the effectiveness of a unicellular membrane in elaborating a fluid from plasma which differs markedly from it in chemical composition.

Determinations of Na, K, Ca, Mg, Cl, SO_4, PO_4, protein, HCO_3, NH_3, pH, titratable acidity, freezing point depression, creatine and trimethylamine oxide were made in urine and plasma samples taken from fish immediately after capture and also during the course of "laboratory diuresis." The undifferentiated renal tubule of this marine teleost acts as a barrier to the movement of univalent ions while its cells actively transport Mg, Ca, SO_4, creatine and trimethylamine oxide. Urine normally is hypotonic to plasma to the extent of 0.1°C. Diuretic urine is isotonic with plasma, and as diuresis progresses there is a gradual rise in the total osmolarity of both plasma and urine, with marked shifts in the electrolyte composition of the latter. Cl immediately floods into urine in concentrations approaching those of the plasma, Na follows more slowly and never reaches 50 per cent of plasma values. K appears only in traces. The urine/plasma concentration ratios of Ca, Mg, and SO_4 remain high, even at the height of diuresis. Creatine and trimethylamine oxide, which in normal urine may contribute more than 50 percent of the total osmolarity, are present merely in traces in diuretic urine.

These results emphasize the fact that active transport across biological membranes cannot be explained in terms of known electrochemical phenomena. Future studies are planned to elucidate the biochemical energy sources which underlie divalent ion transport, and the mechanism accountable for the elimination of trimethylamine oxide and creatine.

In Vitro Studies on the Isolated Renal Tubule

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Preparations were made by placing fragments of the kidneys of the fresh water catfish (*Ameirus nebulosus*) in isotonic saline solutions containing phenol red, following the technique developed by Forster. In the present study individual renal tubules were teased out and an effort was made to trace the passage of the dye along the entire length of the individual tubule. The morphological differentiation of the renal tubule can read-

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