action may be expressed by "sigma," the ratio of concentration of impermeable solute to concentration of penetrating solute necessary to maintain zero volume flow. Sigma values for ethylene glycol and propylene glycol were 0.9 and 0.65 respectively. Further experiments performed with both solutes present simultaneously showed effects which are consistent with solute-solute interactions.

Renal Transport of Urea and Some Carbohydrates in (Lophius Piscatorius)

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Previous studies by others on the goose fish with non-electrolytes have led to the following conclusions. 1. The U/P ratio for exogenous urea is greater than 1.0, and probably is indicative of urea secretion. 2. The renal tubular epithelium is impermeable to sugars. Our work this summer has shown that urea U/P ratios were 1.0 when urea was injected into muscles of the head region and were greater than 1 only when injected intramuscularly in the tail. We feel that the apparent discrepancy results from the fact that the kidney in *Lophius* is supplied almost entirely by venous blood from caudal regions. If urea is injected IM into tail muscle, blood perfusing the kidney would have a higher concentration of urea than that in mixed venous or arterial blood. Earlier investigators injected into tail muscle and used heart blood for computing plasma urea concentrations. Consequently, they calculated erroneously high U/P ratios. The present data give no basis for postulating urea secretion by goose fish.

We were also able to show that significant quantities of D-arabinose, L-arabinose and fructose are able to diffuse across the tubular epithelium. The appearance of such substances in urine might have resulted from either exchange diffusion or passive diffusion along a chemical gradient. U/P ratios for L-arabinose and D-arabinose were similar, suggesting that passive diffusion predominated, since L-arabinose is transported more readily than D-arabinose in several other systems possessing exchange diffusion mechanisms.

Calcium and Iron Transport in the Shorthorn Sculpin and Fundulus

Thomas Manis and James Manis

Active transport mechanisms for calcium and iron have been demonstrated in the small intestine of the rat using everted gutsacs *in vitro*. Similar experiments were carried out at the Mount Desert Island Biological Laboratory during August of 1961 using the intestine of two teleost fishes.

Everted gutsacs were prepared from consecutive intestinal segments of the shorthorn sculpin and Fundulus. The sacs were incubated in small flasks containing modified Ringer's solution with glucose, fructose or mannose as substrates. Calcium 45 Chloride or Ferrous 59 Sulphate were added to the bathing medium in several experiments in addition to the "carrier" calcium or iron. The flasks were equilibrated with 100% oxygen and shaken for 1-4 hours at 18-26° C. Subsequently the sacs were removed, drained and the concentration of calcium or iron was determined in the medium bathing the mucosal and the serosal surfaces. No net transport to the serosal surface or concentration gradients serosal/mucosal could be demonstrated for calcium or iron in these experiments.

Electrolytes of Cerebrospinal Fluid and Aqueous Humor of S. Acanthias: Effect of Carbonic Anhydrase Inhibition

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This is a continuation of work done in the summers of 1957 (Maren and Frederick) and 1958 (Maren and Fischer); the present report is chiefly concerned with Na^+ and K^+ concentrations in these fluids. *Cerebrospinal (ventricular) Fluid*: The finding of a considerable Cl^- excess (9%) in C.S.F. over plasma was confirmed; this excess is abolished by carbonic anhydrase (C.A.) inhibition, produced by intravenous acetazolamide (30 mg/kg). Na^+, however, which is in slight excess (6%) in C.S.F. is not changed by C.A. inhibition. K^+ also has higher concentration in C.S.F. than in plasma; this is unlike the mammalian relationship. This is probably not changed by C.A. inhibition. C.S.F. has a 5% osmotic excess over plasma. *Aqueous Humor*: There does not appear to be any substantial Cl^- excess in aqueous, or change following C.A. inhibition. Na^+ however, has a 9% excess over plasma, and this is abolished by C.A. inhibition. There is also K^+ excess in aqueous, but this is unaffected by C.A. inhibition.

It seems clear from these and our earlier studies that although carbonic anhydrase is involved in the secretion of these two fluids, their electrolyte properties are quite different, and injection of acetazolamide produces different results. A publication containing details of the work done on this project in the summers of 1957-1959 is being prepared.

Electrolytes and Carbonic Anhydrase Content of Marshall's Gland in the Skate

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Thirty years ago H. W. Smith (J. Biol. Chem. 81, p 407, 1929) reported the electrolyte composition of fluid obtained from an appendage of