

FINE STRUCTURE AND OSMOREGULATION

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During the summer a variety of tissues taken under the experimental conditions described below were prepared for subsequent electron microscopic examination. The preliminary findings are as follows:

Injection of ouabain to produce a tissue concentration of 5×10^{-6} M. in *Anguilla rostrata* results in a fall in Na and Cl efflux after the first hour (see Epstein et al., this Bulletin). This concentration is lethal in about two hours but the animals were active when sacrificed 80 minutes after injection. At sacrifice the gills were bright red and suffused with blood. On microscopy the vessels were filled with erythrocytes. The chloride cells show dense (shrunken) cytoplasm and clumped mitochondria but also contain several electron-lucid vacuoles with multiple membranes near the bases of the cells. The tubular reticulum is shrunken and Golgi arrays are abnormally prominent. In summary the intracellular membrane systems are profoundly affected. These effects of acute ouabain poisoning are unusual in the degree and rapidity with which the morphological changes are produced (80 minutes).

Prior studies on adaptation and toxicity of ions (Bulletin MDIBL 13, p. 30) were extended to examine effects of 0.02 M. LiCl in sea water on the rock eel, *Pholis gunnellus*. This concentration was lethal in 68 ± 8 hours and produced abnormal distension of the tubular reticulum of chloride cells. Rock eels were found to tolerate 60 percent sea water for eight weeks with the chloride cells remaining normal in appearance except for slight distension of the tubular reticulum.

Marinogammarus sp. has a salt gland on the basal segment of the legs which is found to exhibit the extensive elaboration of plasma membranes and abundant mitochondria typical of such organs. We have found this structure in the freshwater *Gammarus locusta* and it would be of interest to examine responses of the gland to altered salinity in those gammarids reported to tolerate low salinities (*M. dobreinii*).

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THE DIFFUSIONAL EXCHANGE OF MATERIALS BETWEEN CEREBROSPINAL FLUID, BRAIN EXTRACELLULAR FLUID, AND BLOOD IN *Squalus acanthias*

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Materials which are introduced into the cerebrospinal fluid (CSF) compartment by perfusion or injection may remain in the CSF or if appropriately permeant enter the extracellular fluid (ECF) of the adjacent central nervous system (CNS). For those substances which follow the latter course their subsequent transport through the tissue involves diffusion through the ECF, cellular uptake, cellular metabolism and/or binding, and transcapillary exchange. Measurements of the apparent rates of movement of a substance from CSF into and through the brain yields information about these various transport steps (Fed. Proc. 33: 2070-2074, 1974). The purpose of this study was to measure the transport of two of these components - ECF diffusion and transcapillary exchange - for a series of organic compounds in the medulla of *Squalus acanthias*.