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*.

Ventricular perfusions of anesthetized dogfish sharks were performed by placing inflow and outflow needles through the meningeal-choroidal covering and into the opposite sides of the fourth ventricle. An artificial CSF containing two radioactively labeled compounds was perfused through the fourth ventricle for one to three hours. At the end of the perfusion period the brain was quickly removed and the medulla sliced by a freezing microtome into a series of 0.25 or 0.5 mm thick pieces. The radioactivity present in each slice was determined and tissue concentration profiles (graphs of the samples' concentrations versus the distances from the tissue surface) were plotted. Effective tissue diffusion coefficients (D_T) and capillary exchange half-times (the capillary $t_{1/2}$ represents the half-time for emptying or washing-out the ECF compartment into the blood) were calculated from these graphs.

The following apparent diffusion coefficients in the tissue were measured for four extracellular-type compounds: ^{3}H-mannitol = 1.2×10^{-6} cm^2/sec; ^{3}H-sucrose = 1.0×10^{-6} cm^2/sec; ^{14}C-EDTA-Ca = 1.0×10^{-6} cm^2/sec; and ^{3}H-polyethylene glycol (approximate molecular weight = 900) = 0.9×10^{-6} cm^2/sec. These values of D_T are about 25 percent of their respective free diffusion coefficients in water at 15°C. Such a reduction in D_T can be explained in part by the tortuosity of the medullary extracellular space. The tissue distribution spaces of these four compounds ranged from 11 to 25 percent; analysis of these data suggests that the extracellular space of the medulla of *Squalus* is about 14-16 percent.

The following values of the half-time of transcapillary exchange were determined: ^{3}H-water = 2 min; ^{3}H-ethanol = 2 min; ^{3}H-antipyrine = 5 min; ^{14}C-propanediol = 12 min; ^{14}C-acetamide = 13 min; ^{3}H-ethylene glycol = 18 min; and ^{35}S-thiourea = 23 min. Analysis of the meaning of the exchange

$t_{1/2}$ indicates that it depends on both blood flow and blood-brain barrier permeability. For those compounds with small $t_{1/2}$'s (water and ethanol), the exchange across the capillaries is so rapid that the washout is essentially limited by the flow of blood to and from the medulla. For those compounds with large $t_{1/2}$'s (propanediol to thiourea), the rate of exchange is dominated by the permeability of the brain capillary complex and the $t_{1/2}$'s are inversely related to the blood-brain barrier permeability coefficients of each molecule.

The size of the brain extracellular space, the reduction in the tissue diffusibility of extracellular markers, and the rates of capillary exchange agree quite well with published mammalian values when considerations of the differences in body temperature, tissue composition, and cerebral blood flow are included.

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INTRACELLULAR OSMOREGULATION FOLLOWING ENVIRONMENTAL DILUTION IN THE LITTLE SKATE, *Raja erinacea*

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The osmoregulatory functions of marine cartilaginous jawed fishes are of special interest because of the important part that nitrogenous compounds, especially urea and trimethylamine oxide, play in the characteristic osmotic "superiority" of their body fluids relative to the strongly saline external environment. Plasma osmolarity of some of the Chondrichthyes such as the little skate *Raja erinacea* is considerably reduced during transfer from full