axon (J. Gen. Physiol., 43: 73, 1960), and suggested that these channels are a passive diffusion pathway for the movement of sodium and potassium ions and water across the Schwann cell to the axolemma. The axoplasm contains a few mitochondria and many neurofilaments. The neurofilaments are frequently interconnected by cross bridges and there are some long linear arrays of neurofilaments parallel to the axolemma.

The resting membrane potential was found to vary between -54 mV and -72 mV, with the inside negative with respect to the bathing solution, and the action potential amplitude to range from 70 mV to 104 mV with an overshoot ranging from +1 mV to +66 mV. These data and Strength-Duration curve plots were consistent with reported values for *Myxicola* (Binstock and Goldman, Science, 158: 1467, 1967) and other nerve membrane preparations (Moore, Holt, and Lindley, Biophysical J., 12: 157, 1972).

(Electron microscopy by Mrs. G. Currier is gratefully acknowledged.)

1974 #14

ION TRANSPORT AND PERMEABILITY STUDIES ON THE INTESTINE OF *Fundulus heteroclitus*

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Our previous studies of ionic flux across the intestinal mucosa have demonstrated that the electrical properties observed in fish intestine are different from those of mammalian intestine. For example in the intestine of marine winter flounder and freshwater catfish there was a net flux of Na and Cl ions from mucosal-to-serosal side, with the Cl ion predominant, resulting in a serosal negative potential difference (PD) (Huang and Chen,

Am. J. Physiol. 220:1734-1738, 1971; Chen and Huang, J. Pharmacol. Exptl. Therap. 180:778-783, 1972). Conversely the intestine of mouse (Chang, Chen and Huang, Proc. Soc. Exptl. Biol. Med. 145:1220-1224, 1974) and guinea pig (Powell, Binder and Curran, Am. J. Physiol. 223:531-537, 1972) showed a serosal positive PD due to a net mucosal-to-serosal Na^+ flux plus a net serosal-to-mucosal Cl^- flux (secretion).

During the summer of 1974 we investigated the electrical properties across intestine of *Fundulus heteroclitus* and obtained results similar to those found in the two teleosts previously studied. Large *Fundulus* were kept in seawater tanks for more than two weeks before being used. The intestine was cut open along the mesenterial line and mounted over an aperture of 1.3 cm^2 in the Ussing chamber. Forster teleost Ringer solution was used to bathe both mucosal and serosal surfaces. Serosal-positive PDs of 0.3 to 1.0 mV were observed with an occasional serosal-negative PD. When the bathing solution was replaced by Na_2SO_4 Ringer solution, the PD across the intestinal mucosa was always positive on the serosal side, ranging from 1.0 to 4.0 mV. Ouabain at a final concentration of 2×10^{-4} M was found to abolish the PD.

TABLE 1

ISOTOPIC MEASUREMENT OF *Fundulus* INTESTINE

Bathing Solution	No. of Fish	Isotope	J_{ms}	J_{sm} μEq. cm^{-2} hr^{-1}	J_{net}
Na_2SO_4-Ringer	18	^{22}Na	10.40±0.48	7.36±0.50	3.04±0.50
NaCl-Ringer	10	^{36}Cl	6.84±1.10	3.24±0.32	3.60±1.10

TABLE 2

PERMEABILITY MEASUREMENT OF *Fundulus* INTESTINE

	K_{trans} x $10^{-7}cm^{-1}sec^{-1}$	
	m → s	s → m
^{3}H-Water	549.5±55.3 (12)	791.3±38.4 (12)
^{14}C-Urea	96.0±10.9 (7)	97.9±12.1 (3)

Radioisotopes, ^{22}Na and ^{36}Cl, were then used to measure the ion flux across the intestinal mucosa; ^{3}H-water and ^{14}C-urea were used to measure the permeability constant. The results are summarized in Tables 1 and 2 where it can be seen that there was a net mucosal-to-serosal flux of both Na and Cl ions similar to that obtained from the intestine of winter flounder and catfish. The K_{trans} constant for ^{3}H-water and ^{14}C-urea was of the same magnitude as that observed in both flounder and catfish intestine.

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1974 #15

IN VITRO EPOXIDE METABOLISM IN SOME MARINE SPECIES

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Epoxide metabolites have been implicated as the agents responsible for the carcinogenic effect that aromatic hydrocarbons have when administered to mammals. For a recent review of this subject, see (Oesch, Xenobiotica 3: 305, 1973). Epoxides are generated in vitro by the action of mixed-function