

tration of the saline was 142.5 mEq in contrast to a mean plasma Na^+ of 184.2 (Forster and Danforth, this issue of the Bulletin). No exogenous substrate was provided.

Perhaps more important factors were the procedures for catching and maintaining the sea raven. This is suggested by the considerable variation in the plasma osmolality of the fish at the time of experiment; for five fish the range was 334 to 444 mOsm (Forster and Danforth, this issue of the Bulletin).

SUMMARY:

The isolated urinary bladder of the sea raven develops a small transmucosal PD with the mucosal surface consistently positive with respect to the serosal surface. In isolation the bladder actively absorbs both Cl^- and Na^- . For the time required for steady-state study of ionic flux, the preparation was not sufficiently stable and further work is required to establish optimal conditions for maintenance *in vitro* and *in vivo*.

This work was supported by grants NIH AM 05848, HL 04457 and NSF GF 28139.

1972 #26

INFLUENCE OF EXTRACELLULAR ACIDOSIS ON ACID SECRETION BY THE ISOLATED GASTRIC MUCOSA OF *Squalus acanthias*

C. Adrian M. Hogben, Department of Physiology and Biophysics, University of Iowa, Iowa City, Iowa

In the intact mammal it has been recognized that metabolic acidosis favors H^+ secretion by the stomach (Byers et al., Amer. J. Physiol. 202: 429-436, 1962). However metabolic acidosis in the intact animal is accompanied by some degree of respiratory compensation and possibly by less obvious shifts in internal electrolyte balance. The isolated gastric mucosa permits examination of an altered interstitial pH where perturbation is limited to one variable, the extracellular $[\text{HCO}_3^-]$.

TABLE 1

H^+ SECRETION

$\mu\text{Eq}\cdot\text{cm}^{-2}\cdot\text{hr}^{-1}$

Serosal Solution A	Serosal Solution B	Δ (A-B)
pH 6.5 3 mEq HCO_3^-	pH 7.4 30 mEq HCO_3^-	
3.52 \pm .10	2.97 \pm .17	0.54 \pm .19
	pH 7.0 10 mEq HCO_3^-	
3.40 \pm .08	3.45 \pm .24	-0.06 \pm .20
	pH 6.0 1 mEq HCO_3^-	
3.76 \pm .16	3.01 \pm .33	0.75 \pm .32

X \pm SE, n=4

Experiments were conducted as previously described (Hogben, Proc. Soc. Exp. Biol. Med. 124:890-893, 1967). For the serosal (or interstitial) bathing solutions, the HCO_3^- concentrations were 30, 10, 3 or 1 mEq to yield a pH at room temperature of 7.4, 7.0, 6.5, and 6.0 respectively. All serosal solutions were gassed by 95 percent O_2 and 5 percent CO_2 . A constant $[\text{Na}^+]$ and osmolality were maintained by increasing the $[\text{Cl}^-]$ when $[\text{HCO}_3^-]$ was decreased. As previously reported the mucosal (or luminal) solution was an unbuffered saline gassed by 100 percent O_2 . Mucosal samples were withdrawn and replaced hourly for three periods to determine the H^+ secretion rate. Carbachol (a parasympathomimetic stimulus) was added to all the serosal solutions to a final concentration of $10 \mu\text{M/L}$.

The result of comparison of paired portions of gastric mucosa from the same fish are given in Table 1. Though not established at the 5 percent level of confidence, H^+ secretion was greater at pH 6.5 relative to pH 7.4 and relative to pH 6.0. The H^+ secretory rates were indistinguishable at pH 6.5 and 7.0

This work was supported by grants NIH AM 05848 and NSF GB 28139.

1972 # 27

THE EFFECT OF DIPHENYLHYDANTOIN AND VASOPRESSIN ON IONS TRANSPORT ACROSS THE FLOUNDER INTESTINE

K. C. Huang and L. R. Chang, University of Louisville, Department of Pharmacology, Louisville, Kentucky

Recent reports on the effect of diphenylhydantoin (DPH) on the electrical properties of frog skin and ion fluxes in rat diaphragm have demonstrated that this compound stimulates Na^+ transport across these tissues by increasing the membrane permeability to sodium ion (Watson and Woodbury, J. Pharm. Exp. Therap. 180: 767, 1972; Bihler and Sawh, BBA 249:240, 1971). It has not been determined whether DPH also affects the membrane transport of other electrolytes such as chloride. In the present investigation the intestine of winter flounder, *P. americanus*, was used as an experimental model for the study of Na^+ and Cl^- ion transport and the effects of DPH on these processes.

The small intestine was mounted in a lucite Ussing chamber and bathed with seven ml. of Forster's teleost Ringer solution containing 5.5 mM dextrose as substrate. The details of the experimental procedures have been reported previously (Huang and Chen. Am. J. Physiol. 220:1734, 1971 and J. Pharm. Exp. Therap. 180:777, 1972). A potential difference (PD) ranging from one-four mV was measured across the membrane with the serosa negative to the mucosa. A short circuit current (I_{sc}) was applied to zero the PD. An average I_{sc} of $-29 \mu\text{Amp}$. was recorded. When DPH was added to the mucosal bathing solution at a concentration of $140 \mu\text{g/ml}$ or $350 \mu\text{g/ml}$, both PD and I_{sc} increased slightly (moved toward zero), suggesting either an increase in net Na^+ flux or a decrease in net Cl^- flux or both. Radioactive ^{22}Na and ^{36}Cl were then used to measure the ionic fluxes in neighboring intestinal sections of the same fish.