It is clear from survivorship values that hermit crabs of both species have higher fitness in appropriately sized shells than they do out of shells or in shells that are too small when DDT is used as a stressing agent. *P. acadianus* in large shells also have high survival values. The degree of protection afforded by larger shells and those of the appropriate size is consistent with the fact that crabs so protected absorb about 20 percent less DDT than do exposed crabs or those in small shells. That individuals of the latter group with SAI >1.0 show somewhat higher initial mortalities may be explained on the basis of previous studies which have shown that crabs occupying small sized shells became hypersensitive and highly aggressive.

The results of this study indicate that Gastropod shells afford hermit crabs significant protection from both predators and short term pulses of DDT induced environmental stress at concentrations of 0.1 ppm or above. The size of the shells occupied by crabs according to a shell adequacy index may be used as a reliable indicator of relative fitness in individual crabs.

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1974 #12

A SELECTIVE EFFECT OF CHROMATE ON RENAL UREA REABSORPTION IN *Squalus acanthias*

HENRY O. HEINEMANN, NICHOLAS FRANKI, HENRY BERLINER, AND RICHARD M HAYS. DEPARTMENT OF MEDICINE, DIVISION OF NEPHROLOGY, ALBERT EINSTEIN COLLEGE OF MEDICINE; AND CORNELL UNIVERSITY MEDICAL COLLEGE, NEW YORK, NEW YORK

Urea crosses the cell membrane of the erythrocyte and the toad bladder by a pathway which is distinct from that of water, and by a process that has the properties of facilitated diffusion. Urea movement across these tissues can be selectively and reversibly blocked by phloretin. Urea reabsorption

by the kidney of the dogfish *Squalus acanthias* is also reduced by this agent (Bull. MDIBL., 13, 70-71, 1973); fractional urea reabsorption in these experiments fell significantly from 96 to 84 percent following phloretin. There was however a significant decrease in the fractional reabsorption of sodium in these experiments (from 76 to 68 percent) and the ratio of urea to sodium reabsorption was not influenced by phloretin, remaining 1.6. Therefore it was not possible to establish a selective effect of phloretin on urea reabsorption since a reduction of sodium reabsorption might secondarily reduce urea reabsorption if the two transport systems were coupled.

In the experiments now to be described we were able to produce a large and irreversible inhibition of urea reabsorption in the dogfish kidney with a relatively smaller effect on fractional sodium reabsorption by the infusion of chromate, an agent that selectively and irreversibly blocks urea transport by the toad bladder. (J. Memb. Biol., 14, 177-191, 1973.) Following a three hour control period free-swimming inulin-loaded dogfish were given intravenous sodium dichromate, yielding a blood level of approximately 10^{-4} M. The fish tolerated the chromate well and determinations of urea and sodium excretion could be made in the ensuing three hours and (in separate experiments) 18 hours after chromate administration. The results of the acute experiments are shown in the upper half of Table 1. There was a greater than tenfold increase in UV urea following chromate and fractional reabsorption of urea fell from 95 to 51 percent by period IV and even lower in the two fish studied in period V. UV sodium also increased following chromate and fractional sodium reabsorption decreased, but in both cases the change was not as pronounced as that of urea. The ratio of urea to sodium reabsorption fell significantly from 1.62±0.05 to 1.34±0.07; $\Delta = 0.24 \pm 0.08$, $p < 0.02$.

TABLE 1

EFFECT OF CHROMATE ON UREA AND SODIUM REABSORPTION IN *Squalus acanthias*

A. ACUTE EXPERIMENTS

	V ml/kg/hr	GFR ml/kg/hr	UV Urea mM/kg/hr	Fract. Reabs. Urea (%)	UV_{Na} mEq/kg/hr	Fract. Reabs. Na (%)	Urea Reabs. Na Reabs.
CHROMATE (8)							
Period I	0.57±.06	3.09±0.5	43±7	95±1	152±25	81±2	1.62±.05
II	0.68±.12	3.20±0.5	62±14	95±1	171±33	80±2	1.58±.05
III	0.92±.22	2.75±0.5	221±54	80±3	244±55	69±2	1.52±.07
IV	2.18±.29	4.05±0.4	713±100	51±4	573±81	49±3	1.34±.07
V†	2.33	4.09	711	42	608	43	1.22
CONTROL (3)							
I	0.48±.03	2.48±.35	23±2	98±1	118±34	82±3	1.75±.08
II	0.73±.23	3.41±1.07	26±11	97±1	213±71	76±2	1.78±.02
III	0.60±.14	2.94±.32	59±28	94±2	179±55	74±2	1.74±.03
IV	0.62±.22	2.50±.81	53±27	94±1	173±51	73±2	1.76±.03
V	0.62	2.79	35	96	180	75	1.84
B. 18 HOURS AFTER CHROMATE							
Chromate (6)	1.28±.25	2.47±.51	336±87	59±3	317±65	52±2	1.31±.06
Control (6)	1.12±.38	4.81±1.19	102±56	94±2	282±86	78±1	1.53±.07

Number of fish studied
Chromate added after Period II in acute experiments
†2 fish studied in Period V

There was no significant change in any of these parameters in the three control fish studied. GFR remained high after chromate; indeed there was a small, but significant increase in GFR by period IV compared to period II. Urine volume increased progressively after chromate.

Eighteen hours after chromate infusion (lower half of Table) fractional urea reabsorption remained significantly depressed compared to that of control dogfish kept in the same tank and studied at the same 18-hour interval. Fractional sodium reabsorption was also depressed but to a lesser extent and the ratio of urea to sodium reabsorption in the chromate-treated fish was again significantly below that of the controls ($p < 0.05$). Urine volumes were comparable but GFR in the experimental fish was below that of the controls.

These findings indicate that chromate is a potent and long-lasting inhibitor of urea reabsorption in the dogfish kidney and that its effect is to some degree selective in relation to its effect on sodium reabsorption.
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1974 #13

ELECTRON MICROSCOPY AND ELECTROPHYSIOLOGY OF THE GIANT AXON OF *Myxicola infundibulum*

JOSEPH P. HOLT, JR. UNIVERSITY OF LOUISVILLE, DEPARTMENT OF PHARMACOLOGY, LOUISVILLE, KENTUCKY

Electron microscopic and electrophysiologic studies of the giant axon of *Myxicola infundibulum*, a marine annelida, were conducted as a preliminary step in the development of techniques to examine transport systems in nerve