

1. Glucose and Lactate. In both species the addition of 10  $\mu$ g of anhydrous glucose or lactate produced slight but significant rises in respiration of homogenates. However, amounts of glucose above 50  $\mu$ g were inhibitory indicating the presence of a Crabtree effect.

2. Norepinephrine. Homogenates receiving 10-95  $\mu$ g of norepinephrine-bitartrate (Sigma) showed a significant rise in respiratory rate over controls from  $0.13 \pm .007$  to  $0.189 \pm 0.011 \mu$ l  $O_2$ /ml/min in Raja. In the dogfish norepinephrine had, if anything, a slight depressant effect.

3. Glucagon. 5  $\mu$ g glucagon (Lilly) produced the largest responses recorded in both Raja and Squalus, with respiratory rates nearly doubled over those of controls.

4. 100 mg tissue slices of skate liver exhibited higher rates of oxygen consumption than 350 mg of homogenate at 25° C.

The above experiments indicate that liver homogenates and slices in a simplified Ringer's medium may be used to determine endogenous respiration rates in elasmobranchs. Endocrine secretions known to influence carbohydrate metabolism such as glucagon and norepinephrine have a positive effect on liver respiration in the skate. That norepinephrine had little or no effect on dogfish preparations tends to confirm earlier work on the effect of catecholamines on blood sugar levels. In future investigations it is suggested that liver slices may prove a more effective means of studying respiration rates than homogenates.

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#### DISTRIBUTION OF $^{14}C$ -DDT IN THE LOBSTER

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Many studies have been conducted where assays for levels of DDT are reported only in terms of the whole body of fresh water or marine species. It was felt that it would be much more informative to study the organ distribution of this important pesticide after administration of  $^{14}C$ -DDT. Lobsters weighing about 500 g were procured from local lobstermen. Animals received 0.1 mg/kg of  $^{14}C$ -DDT (Amersham/Searle, ring labeled) in 50% ethanol by injection into the pericardial sinus. After various times indicated in Table 1, the lobsters were dissected, and organs were prepared for subsequent assay for total  $^{14}C$  (DDT plus metabolites) by the combustion technique. The chemical nature of the radioactivity is currently under investigation by use of combination gas chromatographic-mass spectro-photometric methods. The results in Table 1 show that DDT is rapidly removed from the plasma while there is a striking, persistent increase in the amount of radioactivity found in the liver (hepatopancreas). Preliminary results showed that this organ was about 60% fat, and this may explain the selective localization of the very lipid-soluble DDT. Most other organs, i.e., green gland, stomach, male gonads, brain, gills, claw muscle, and tail muscle, while decreasing in the amount of  $^{14}C$  by the 7th day, always contained greater amounts of radioactivity than did plasma. The levels in lobster intestine remained rather constant for 7 days. The high initial levels in heart are undoubtedly related to the mode of administration. It was noted that egg masses contained more of the radioactive material than

Table 1  
DISTRIBUTION OF  $^{14}\text{C}$ -DDT IN THE LOBSTER\*

Organ	1 Hr	4 Hr	24 Hr	48 Hr	7 Day
Plasma	5.2	2.2	1.7	0.7	0.3
Liver	16.0	52.9	118.6	145.1	171.5
Green gland	41.0	27.3	6.0	4.9	4.6
Stomach	6.2	6.6	2.2	1.6	2.4
Intestine	7.0	7.6	8.1	5.4	4.6
Male gonad	8.1	18.1	6.3	6.5	2.2
Egg mass	7.5	10.9	6.7	21.0	1.4
Brain	8.7	8.4	3.2	3.9	2.4
Gills	9.3	6.2	2.4	1.1	.8
Claw muscle	2.7	4.7	2.6	1.1	.7
Tail muscle	2.6	3.2	2.7	1.5	.6
Heart	85.8	17.9	18.6	1.9	1.8

\* Mean disintegrations/ml or  $\mu\text{g} \times 10^3$  for 3-6 animals for each time period. Each lobster received 0.1 mg/kg ( $7 \times 10^6$  d/kg) of  $^{14}\text{C}$ -DDT by injection into the pericardial sinus.

plasma at all times studied; and furthermore, the 48-hr levels of this tissue were greater than all other organs except the liver. The male gonad levels at 4 hr were maximum and about equal to the 48-hr egg mass levels. These results have important ecologic and economic significance since they suggest procedures for coping with an acute exposure of lobsters to DDT. Ecologically the rather persistently high levels of DDT and/or its metabolites in gonadal tissue could affect the reproductive performance of these important marine animals. Economically, it may be feasible to hold lobsters that have been exposed to DDT for more than a week to allow their levels to decrease to relatively harmless levels, but each animal would be rendered safer for consumption if liver were removed.

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#### THE RELATIONSHIP OF DORSAL AORTIC TO RENAL VENOUS PORTAL HYDROSTATIC PRESSURE IN THE SKATE, Raja erinacea

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Forster et al (Bull. MDIBL 9:10, 1969) found increased fractional excretion of urea, chloride and TMAO in Squalus acanthias following injection with epinephrine. The authors suggested that this agent reduced tubular reabsorption by raising hydrostatic pressure in both the dorsal aorta and peritubular capillaries, since elevation of capillary pressure is known to decrease proximal tubular reabsorption in the mammal. In the present study the effect of epinephrine on hydrostatic pressure changes in dorsal aorta and peritubular capillaries was studied in another elasmobranch. Raja erinacea, the common skate.