transitional type of plagiostome hypophysis. Brei obtained from whole pituitaries, rostral lobes and neuro-intermediate lobes of the skate *Raja* erinacea was assayed for the presence of prolactin (prolactin-like fraction) by the use of the red eft test, which is based upon the fact that lactogenic hormone initiates water migration in the terrestrial stage of the newt, *Diemyctylus viridescens*. No response was elicited in hypophysectomized test animals receiving doses of brei containing from 0.5 to 6 pituitaries or lobes, but a few efts receiving a dose of 8 rostral lobes did give a positive reaction. These results agree with those from *Squalus* where a prolactinlike substance is localized in the rostral lobe, but the prolactin content of the skate, estimated from the above studies at 0.004 I.U. per lobe, is of a much lower order. Hypophyses of the hagfish, *Myxine glutinosa*, were also assayed but with negative results.

The results of preliminary studies concerned with the thyroid-pituitary axis of the skate must await histological analysis of pituitaries from thyroidectomized test animals, *R. erinacea* and *R. ocellata*.

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## Lipoprotein Lipase Activity in the Marine Dogfish (Squalus acanthias)

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Fish and aquatic mammals use various tissues, such as skeletal muscle (eel), bone cavities (dolphin) and the mesentery (sturgeon) for the storage of fat. Sharks and codfish use the liver as a fat depot. The liver of the dogfish (squalus acanthias) may, depending on the food supply, contain as much as 30 percent fat by weight. In terre-tial mammals, which store fat predominantly in adipose tissue, the release of free fatty acids (FFA) for the energy supply elsewhere, is, at least in part, dependant upon a lipoprotein lipase. An enzyme with similar characteristics has been identified in various mammalian tissues, including heart and skeletal muscle, lung and plasma The activity of this enzyme is in mammals affected by various influences, such as the previous carbohydrate intake, fasting and the administration of heparin and epinephrine If the liver of the dogfish plays a role in the storage of fat, which is comparable to the role played by adipose tissue in mammals, one would expect the dogfish liver to contain a lipoprotein lipase. To examine this possibility homogenates of liver and various other tissues of the dogfish were assayed for lipolytic activity. Lipolytic activity was determined by incubating one gram of tissue homogenate for one hour at 37°C in a medium containing coconut oil emulsion (Ediol), albumen, buffer and dogfish "Ringer" solution and measuring the change in free fatty acid content. The net release of free fatty acids was calculated by multiplying the difference between the initial (pre-incubation) and the final (post-incubation) concentration of fatty acids by the volume of the incubating medium. The free fatty acid concentration was measured by the method of Dole.

The results indicate that dogfish liver contains a lipoprotein lipase. Lipoprotein lipase activity was also detected in heart muscle and gill tissue. On the other hand, neither skeletal muscle, nor plasma of freshly caught fish had detectable lipoprotein lipase activity. Starvation of the fish for at least 2 weeks increased lipoprotein lipase activity in heart muscle and gill tissue and led also to the appearance of measurable amounts of lipolytic activity in skeletal muscle and plasma. Plasma lipoprotein lipase activity could also be increased by the intravenous administration of 10 mgm heparin.

The enzyme can be crudely purified by acetone extraction and maintains its activity if stored at 4°C. The activity of the enzyme obtained from acetone-extracted liver homogenate is optimal at 37°C, despite the fact that these cold blooded animals ordinarily live at much lower temperatures. The activity of the enzyme in the liver is not affected by starvation, or by the in vitro addition of either heparin, or epinephrine. However storage of the crudely purified liver enzyme at 4°C will increase the activity progressively, suggesting the presence of an inhibitor with a more rapid decay rate. Attempts to identify such an inhibitor have so far failed.

The free fatty acid content of plasma was determined in 10 dogfish. The average concentration was 757  $\mu$ M/L (range 655 to 1083  $\mu$ M/L). No consistent change was noted on repeat determinations after varying periods of fasting. Intravenous administration of heparin and forced feeding with either dogfish egg yolk, or a coconut oil emulsion (Ediol) did not change the plasma free fatty acid concentration within 5 to 180 minutes.

Current studies are being directed first to clarify the effect of time on the lipoprotein lipase activity of the acetone-extracted liver tissue and second to purify the enzyme from liver tissue.

## The Electrolyte Metabolism of the Swimbladder and Gastric Mucosa.<sup>1</sup>

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In 1922, J. S. Haldane proposed that gas was secreted into the swimbladder as a result of acidification of the blood bathing the gas gland epithelium. The resultant changes of pH,  $P_{C02}$  and  $P_{C02}$  were thought to be sequestered from the general circulation by counter-current exchange in the "rete mirable". Even though this has been the only credible explanation for gas secretion, no evidence had been provided either *in vitro* or *in vivo*. The isolated gas gland epithelium of the pollack was found to selectively secrete hydrogen ion into the solution bathing its serosal surface. This paves the way for identifying the acid secreted and clarifying the enigma-