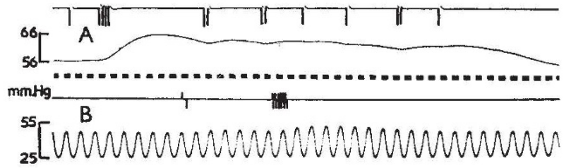

Fig. 2. (*A*) Response of a dog's hepatic artery to short bursts of repetitive stimulation. Top trace shows the stimulus record (retouched) and lower trace the pressure record. (*B*) Effect of an oscillating pressure introduced in the same preparation. Stimuli (upper trace, retouched) cause a rise of mean pressure and of oscillation amplitude (lower trace). Time marking (½ sec.) in between the records is the same for both

excitation through the normal nerve supply will produce more rapid effects.

Since efferent sympathetic activity normally occurs in bursts with a cardiac rhythm[4], it seems possible that rapid response of large arteries to such nervous activity could explain a number of curious phenomena observed in the peripheral arterial pulse contour, notably the augmentation of systolic peak pressure towards the periphery and perhaps also the dicrotic wave. It is noteworthy that atropine and procaine can abolish both these phenomena[5], even though there may be no change in mean arterial pressure.

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Thyroidal Control of Radiophosphorus Metabolism in Salmon

THE part played by the thyroid gland in teleost metabolism has been investigated by many workers. In cold-blooded vertebrates it appears to be concerned more with growth than with general metabolism[1]. However, there is a great deal of controversy on practically every aspect of thyroid physiology. In higher vertebrates, the parathyroid plays an important part in the mineral metabolism. Fishes have, so far as known, no parathyroid. It has been suggested[2] that the ultimobranchial body in the teleost is the homologue of the parathyroid but as yet nothing positive has been established regarding this hypothesis. Fishes are able to control mineral metabolism within narrow limits ; but there is scarcely any information concerning the role of the endocrines in this regulation. Radioisotopes are being used to carry out experiments to find out whether the thyroid gland has any influence on mineral metabolism in fishes.

In fishes the thyroid gland is divided into innumerable follicles in the region of the ventral aorta, hence surgical thyroidectomy is impossible. Yearling salmon, *Salmo salar* L., were divided into two groups of which one was maintained in 0·3 per cent solution of thiourea, referred below as treated. The other was used as control. The fishes were kept in thiourea solution for two weeks, the solution being changed every three days. After two weeks the fish were transferred to fresh aquaria to which sufficient phosphorus-32 had been added to give an activity of 2,500 counts per min. per ml. Aquaria for treated fish also contained 0·3 per cent solution of thiourea. At regular intervals starting from 2 hr. the tissues (liver, kidney, muscle and bone) were prepared for counting. The readings were corrected for decay and checked against a uranium standard. Carrier-free phosphorus-32 used was received from Atomic Energy of Canada, Ltd., in the form of phosphoric acid in diluted hydrochloric acid. In both the sets of experiments, bone took up the maximum activity, followed by liver, kidney and muscles. The uptake was always more in the treated set than the control. In the control, 40·1 per cent of phosphorus-32 was absorbed, whereas in the treated 50·3 per cent was utilized.

Another set of experiments was arranged to throw further light on the problem. The fishes were divided into three groups. One of them was injected with 0·2 ml. of 0·1 per cent solution of thiourea, the other with 0·2 ml. of 0·1 per cent solution of l-thyroxine and the third with 0·2 ml. physiological saline to serve as control. The injections were repeated again after three days. After a lapse of three days the fish were transferred to solutions of phosphorus-32 which gave an activity of 2,500 counts per min. per ml. In these experiments the uptake of radiophosphorus in bone and liver was studied. In the control, the fishes took up 39 per cent, fishes injected with thiourea absorbed 52 per cent and thyroxine-injected fishes utilized 63 per cent of phosphorus-32.

Thiourea had been used in the above experiments to destroy the thyroid gland and so to check its activity ; but the histological studies showed that it was not achieved. Thyroid follicles were still present lined with low epithelial cells and were full of colloid. Administration of antithyroid drugs either abolishes or retards the ability of thyroid gland to synthesize thyroxine[3]. As a consequence of the cessation of thyroxine synthesis, the level of circulating hormone falls and the pituitary immediately responds by secreting additional amounts of thyrotropin which stimulates the thyroid so that hypertrophy of the gland results. This then shows that destruction of thyroid can only be achieved after treating the fishes with antithyroid drugs for considerably longer times.

The results of the experiments can be interpreted that in the fishes treated with thiourea the thyroid was stimulated indirectly (by thyrotropin secreted by the pituitary gland) and so the uptake of radiophosphorus was more than the control. In fishes treated with thyroxine the stimulation was direct and so the uptake was maximum. Detailed results of the experiments will be published elsewhere.

Complete thyroidectomy can be achieved by repeated doses of radioiodine[4]. Further work to study the effect of hypophysectomy and destruction of thyroid by radioiodine upon mineral metabolism is under investigation.

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