MUSCLE AND BLOOD HEMOGLOBIN IN THE DOLPHIN

ROBINSON[1] has recently reported the muscle hemoglobin of harbor seals (*Phoca vitulina*) as being 7.715 gm per 100 gm of fresh tissue. We are reporting our results for skeletal muscle and blood from dolphins (*Turciops truncatus*) studied during the past summer through the courtesy of the Marine Studios of St. Augustine, Florida.

Muscle and blood samples were obtained simultaneously from a living female dolphin which weighed 149 kg. Muscle hemoglobin was determined by the method of Whipple[2] and compared colorimetrically with the blood hemoglobin.

The oxygen capacity of the blood was 19.1 volumes per cent., or 14.25 gm hemoglobin per 100 cc. The hemoglobin content of the sacro-spinalis muscle was 3.534 gm per 100 gm tissue. The muscle hemoglobin concentration in the dolphin is thus less than that found in the seal by Robinson, but greater than that in the dog (0.85 to 1.00 gm per 100 gm rectus abdominis muscle).

It should be noted that the common submersion time of the dolphin is rarely over a few minutes; therefore the oxygen storage of the dolphin need not be as great as that of the seal. It will also be necessary to determine the amount of myoglobin in dolphin skeletal muscle in order to determine the oxygen storage more exactly; work on this problem is now in progress.

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BIOGRAPHY OF DR. HARVEY CUSHING

MRS. CUSHING has requested me to prepare a biography of her husband, and I should be most grateful to any one who wishes to make letters, anecdotes or other memorabilia available.

Copies of all letters, no matter how brief, are desired, and if dates are omitted it is hoped that, when possible, these may be supplied (*e.g.*, from the postmark). If original letters or other documents are submitted, they will be copied and returned promptly.

A new Medical Library building is being erected at the Yale University School of Medicine to receive Dr. Cushing's library and collections, including his letters, diaries and manuscripts. Any of his friends who wish, now or later, to present correspondence, photographs or other memorabilia for permanent preservation among the Cushing papers will receive the appreciative thanks of the university.

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SPECIAL ARTICLES

THE ACTION OF CERTAIN HORMONES AS DIETARY CONSTITUENTS

THE present study was prompted by the following theoretical consideration.[1] We know that normal food contains small quantities of hormonic substances, which may exert certain activity and may perhaps be utilized by the organism as precursors of other hormones. On the other hand, a deficient diet may lack certain building stones from which the animal organism synthesizes its own hormones.

Judging from our present knowledge, the various hormones belong mainly to three chemical classes, *viz.*, simple nitrogenous substances, derived mostly from the amino acids of the diet, hormones belonging to the steroid group and finally hormones of protein nature. As far as the first two groups are concerned, it is obvious that the organism prepares these substances from material present in the food. More complicated is the origin of activity of the protein hormones. These substances when hydrolyzed do not seem to differ in structure and composition from the usual proteins; yet no known protein exhibits any definite hormonal activity. Whether the hormonal action is associated with a definite constituent or whether this activity depends on certain spatial configuration of the amino acids, must remain unanswered for the present.

Further, it seems possible that on deficient diets, the synthetic capacity of the organism may become impaired, even though the actual precursors are present. It is hoped that further work will give an answer to the problems outlined.

The present study deals with the action of estrin, testosterone propionate and gonadotropic hormone (of pregnant mare serum)[2] when added to the diet. The problem was approached in this way: a diet was chosen which causes a definite retrogression of the organs to be studied; then a regeneration was sought by inclusion in the diet of the corresponding hormone. It was soon found out, however, that most of the problems raised require special dietary studies: for instance, a diet which is responsible for marked retrogression of the female sex apparatus exerts no influence on the corresponding organs of the male.

In order not to complicate our task, we have used

1 D. Robinson, SCIENCE, 90: 276, 1939.

2 G. H. Whipple, *Am. Jour. Physiol.*, 76: 693, 1926.

1 The present work was outlined by the senior author in an address given on November 10, 1938, at the Hotel Pierre, New York City.

3 These names are listed alphabetically because the work was carried out by the authors as a group. No indication of seniority is implied.

2 We are indebted for the hormones to Roussel Laboratory, Paris, and Dr. André Girard.