5655

Effect of Adrenal Cortical Hormone upon Respiratory Metabolism of Normal, Thyroidectomized and Thyroidectomized-Adrenalectomized Cats.*

BRUCE WEBSTER, J. J. PFIFFNER AND W. W. SWINGLE.

From the Department of Medicine, College of Physicians and Surgeons, Columbia University, and Princeton University.

We have reported[1] the effect of bilateral adrenalectomy upon the respiratory exchange of cats, together with the changes in metabolism produced by the administration of the adrenal cortical hormone to these animals. The present study is a continuation of that work. The adrenal cortical hormone[2] and the method of measuring the respiratory exchange[3] are the same as were used previously.

The cortical hormone was injected subcutaneously in quantities of from 6 to 15 cc. daily into normal cats for periods varying from 2 to 10 days. Measurements of the respiratory exchange were made 18 hours after the injections. In a series of 12 such experiments, no appreciable constant variation from normal occurred. Further, the general health of the animals did not appear to be affected. Similar experiments were carried out in 3 normal rabbits with essentially the same result.

The normal level of respiratory metabolism was determined in a series of 5 cats. Total thyroidectomies were then performed. The metabolism gradually fell to a level varying between 20 and 25% below normal. The animals gained in weight and showed general symptoms of thyroid insufficiency. At this point, the cortical hormone was injected subcutaneously in quantities varying from 10 to 50 cc. over a time period of from 1 to 3 days. Within 24 hours after the injection, there was an increase in respiratory metabolism of from 15 to 30%. This change occurred in 80% of the experiments and continued for from 24 to 48 hours after the administration of hormone was discontinued.

It was considered advisable to determine whether or not the thyroid gland was a factor in bringing about the elevation of metabolism which occurred when the adrenal cortical hormone was in-

* Aided by grants from the Josiah Macy, Jr., Foundation and Mrs. R. E. Breed.

[1] Swingle, W. W., Pfiffner, J. J., and Webster, Bruce, PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 728.

[2] Pfiffner, J. J., and Swingle, W. W., *Am. J. Physiol.*, 1931, **96**, 180.

[3] Marine, D., *J. Metab. Res.*, 1922, **2**, 29.

jected into bilaterally adrenalectomized cats. Accordingly, the previously thyroidectomized cats used in the above experiments were bilaterally adrenalectomized in 2 stages. The respiratory exchange was measured daily. As was the case in the animals in which the thyroid was intact,[1] the metabolism fell with the development of the symptoms of adrenal insufficiency. When these symptoms became severe, injections of cortical hormone were begun. The metabolism rose promptly to a level slightly above the normal and remained there as long as the cortical hormone was administered. In other words, the changes in the respiratory exchange following bilateral adrenalectomy in cats are essentially the same, whether the thyroid is intact or totally removed.

5656

Effect of Injections of Cortin on Resistance of Suprarenalectomized Rats to Large Amounts of Histamine.

J. MARMORSTON-GOTTESMAN AND DAVID PERLA.

From the Laboratory Division, Montefiore Hospital, New York.

In previous experiments it was demonstrated that repeated injections of cortin raise the resistance of suprarenalectomized rats to typhoid vaccine.[1] Similar results were obtained by Hartman and Scott.[2] In subsequent experiments we found that repeated daily injections of cortin raise the resistance of suprarenalectomized rats to 4 and 5 lethal doses of histamine (about 500 mg. of histamine per kg. of body weight).[3] In the following experiments an effort was made to increase further the resistance of suprarenalectomized rats to very large amounts of histamine, by injections of cortin. It has been demonstrated that adult suprarenalectomized rats are killed by 100 to 120 mg. of histamine per kg. when the drug is administered on the sixth day after suprarenalectomy;[4] that immature suprarenalectomized rats are killed by 150 to 200 mg. of hista-

[1] Perla, David, and Marmorston-Gottesman, J., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 648.

[2] Scott, W. J. M., and Hartman, F. A., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 649.

[3] Perla, David, and Marmorston-Gottesman, J., PROC. SOC. EXP. BIOL. AND MED., 1931, **28**, 650.

[4] Marmorston-Gottesman, J., and Gottesman, J., *J. Exp. Med.*, 1928, **47**, 503.