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Effect of Exercise and the Specific Dynamic Action of Fat in Obese Subjects.

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The effect of a meal containing 100 gm. of butter and 50 gm. of olive oil mayonnaise, alone, and with exercise, has been determined in 2 normal and 4 non-diabetic obese subjects.

The metabolism was determined by collection and analysis of the expired air; after determining the basal metabolic rate the subjects were usually exercised while still in the post-absorptive state and before the ingestion of the fat meal; this gave the post-absorptive metabolism both at rest and in exercise. They were then given the 150 gm. of fat and the resting and exercise metabolism was determined, usually once an hour for 7 to 8 hours.

The exercise consisted of having the subject lift the lower extremities, while lying on the back and connected with the spirometer, rhythmically and alternately so as to touch with the toes a board placed a given distance above the foot of the bed. The rhythm was maintained by the use of a metronome which was usually set at about 76 beats per minute, so that a lower extremity was lifted 19 times per minute. This exercise increased the metabolism from 2 to 3 times. The subjects exercised for 2 minutes before collection of the expired air was begun; and this was continued for 5 or 6 minutes, depending on the degree of fatigue produced.

In 2 normal subjects and one of the obese there was a slight initial rise in the resting respiratory quotient following the ingestion of the fat; this was followed by a gradual fall, which, at the end of 6 to 7 hours reached a level lower than the resting quotient.

In 3 of the 4 obese subjects there was a rise in the resting quotient following the fat meal. In one of these, who was observed on 3 different days, the quotient reached unity twice and 0.94 the remaining time; in the former it was still one at the end of 5 hours. In another subject the quotient rose from 0.73 to 0.83 at the end of 3 hours and a quarter and was still 0.78 at the end of 6 hours and a quarter. In the remaining subject the rise was from 0.74 to 0.93 at the end of 6½ hours.

The respiratory quotient during the periods of exercise after the fat meal was always lower than that of the resting metabolism in all

of the subjects studied. This reduction was considerably more in the obese subjects, in whom the resting quotients went highest, than in the normals.

As the butter was given in 150 cc. of clear, hot broth; and the mayonnaise with 50 gm. of lettuce, the effect of the hot broth and lettuce alone was observed in 1 of the obese subjects. Under these conditions the quotient fell from 0.84 to 0.71 but during exercise rose to 0.88. There was no specific dynamic action.

In general we found that when the respiratory quotient was high, exercise caused it to fall and when it was low, exercise caused it to rise. The fall at high quotients, however, was greater than the rise at low quotients. In this respect these results are similar to those found by Krogh and Lindhard,[1] whose subjects, however, were studied in the post-absorptive state.

The CO_2 capacity of the plasma in many of the subjects was determined in the basal state and after the fat meal before the rest periods. No significant change was found. Also we found that the exercise did not affect the CO_2 capacity in one of the obese subjects studied.

There was no essential difference in the maximum specific dynamic action in the normal individuals and in the obese. The average was about 13%.

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The Hormone of the Adrenal Cortex.

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We have previously[1] demonstrated that an extract which will definitely prolong the lives and ameliorate the symptoms of adrenalectomized cats can be made from the adrenal cortex.

We have proposed the name of cortin[2] for this hormone, which is essential to life.

Heat (80°C. for 5 minutes) destroys it. It is lost upon repeated

[1] Krogh, A., and Lindhard, J., *Biochem. J.*, 1920, xiv, 290.

[1] Hartman, F. A., MacArthur, C. G., and Hartman, W. E., PROC. SOC. EXP. BIOL. AND MED., 1927, xxv, 69.

[2] Hartman, F. A., Brownell, K. A., Hartman, W. E., Dean, G. A., and MacArthur, C. G., *Am. J. Physiol.*, 1928, lxxxvi, 353.