

venous tolerance rate. Rats, fasted for 48 hours, absorb glucose at a rate close to 1.78 gram per kilogram per hour or 1.54 gram per kilogram per hour if based on the body weight before fasting.

Summary.

The intravenous tolerance of non-fasting rats during amytal narcosis is between 2.2 to 2.5 gram glucose per kilogram body weight per hour.

2859

Significance of change in oxygen absorption after insulin in normal rabbits.

ESTELLE E. HAWLEY and JOHN R. MURLIN.

[From the Department of Vital Economics, University of Rochester, Rochester, N. Y.]

Respiration experiments by the closed circuit method employing an apparatus which gave perfect control checks are reported upon twenty fasting rabbits. Seventeen of these received an injection of insulin subcutaneously which reduced the blood sugar an average of 62 mg. in two hours. One of two basal periods of 45 to 60 minutes each were obtained before giving insulin, and two periods of at least 45 minutes each, in all cases, and four periods in five of the cases, were obtained after insulin. There was no rise but often a fall in respiratory quotient during the first period up to one hour after insulin. In the second period, however, the average respiratory quotient was 0.98 in contrast with the average of 0.74 in the pre-insulin period. In the third period after insulin, the respiratory quotient returns to the normal level and persists also in the fourth period. The oxygen absorption on the average rises the first hour and falls considerably below the pre-insulin level the second hour. The CO₂ elimination rises the first hour and the average for all the animals rises still farther the second hour. But the average for the five animals studied longest the CO₂ does not rise farther in the second period, and falls

toward but does not quite reach the pre-insulin level in the third and fourth periods.

Calculations of the metabolism, by the Zuntz and Schumburg method, of several animals in which the urinary nitrogen was known, shows in the first hour after insulin an average increase amounting to 16 per cent. In the second period terminating at $1\frac{3}{4}$ hours after insulin, there is an abrupt change in the metabolism from fat to carbohydrate. For example, in the average for five rabbits the change is from no carbohydrate to 1.36 grams per hour and from 0.8 grams fat to 0.06 grams per hour. These changes are believed to be the characteristic action of insulin whether in normal or diabetic animals. The diminished oxygen absorption for the second period is not due to depression but to the fact that additional oxygen is made available for combustion by bringing carbohydrate into the metabolism in place of fat. The diminished absorption in several instances exactly balances the additional oxygen thus made available. The amount of sugar burned under the influence of insulin is far greater than can be accounted for by the most liberal estimate, by the disappearance from the blood, or, from the blood, lymph and tissue fluid combined. Hence the disappearance of glycogen from the liver and other organs of normal animals, as reported by many authors.