DIABETIC ACIDOSIS AND COMA IN THE MONKEY

EXAMINATION of the literature reveals only two recent studies on the influence of pancreatectomy in the monkey.[1,2] Both reports emphasize that the monkey does not develop the same degree of metabolic disturbance as occurs in the dog or cat following removal of the pancreas. Thus Collip, Selye and Neufeld state that the monkey can survive pancreatectomy for many months without insulin treatment; that ketonuria, which may be observed during the first few days following the operation, disappears later, irrespective of whether or not the animal is treated; that the depancreatized monkey shows a marked sensitivity to insulin and rapidly develops hypoglycemia on fasting, and finally that such animals lose weight rapidly. Similar observations were made by Chapman and Fulton who concluded that, unlike depancreatized carnivora, depancreatized monkeys do not die in typical diabetic acidosis. Both groups of investigators are of the opinion that the depancreatized monkey resembles in many respects the depancreatized-hypophysectomized dog.

During the past year we have conducted studies on depancreatized monkeys and our observations do not support the above conclusion. Rhesus monkeys were depancreatized under nembutal anesthesia. Within a few hours after the operation, insulin was administered and within twenty-four hours thereafter the animals were given food. Insulin therapy was continued for from a number of weeks to several months and the animals were permitted to eat freely, records being kept of the daily intake. The diet consisted of oranges, bananas and biscuits made with dog ration, pancreatin and ground peanuts. The diet was supplemented with adequate amounts of vitamin A and D concentrate. The insulin dosage was regulated so as to permit the urinary excretion of from 10 to 20 grams of glucose per day. Loss of weight did not occur on this régime. When the weight was stabilized for several weeks, both insulin and food were withdrawn. The blood sugar and acetone body content were determined at frequent intervals thereafter, as was the urinary excretion of these substances.

In this preliminary report we wish to draw attention to a rapid development of acetonemia following the withdrawal of insulin and food from depancreatized monkeys (Fig. 1). The acetonemia was accompanied by a decrease in the carbon dioxide combining power and a decrease in the pH of the blood. The development of the acidosis was accompanied by typical symptoms such as weakness, dehydration, Kussmaul breathing, and tarry vomitus. When the acetonemia

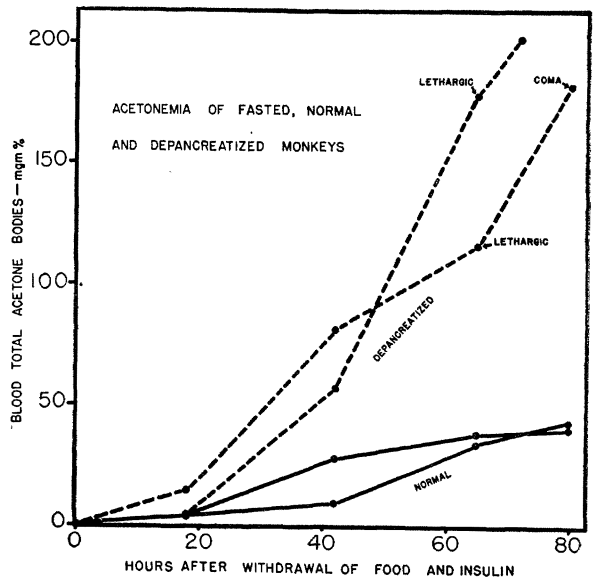

FIG. 1. Illustrating the acetonemia consequent to the withdrawal of food from normal and from depancreatized monkeys after insulin deprivation.

reached about 175 mgm per cent., the animals became lethargic and in one instance a state of coma was present at this blood level.

Fig. 1 depicts the acetonemia of two normal and two depancreatized monkeys subsequent to food and insulin withdrawal. Coma developed in one of the depancreatized monkeys, but insulin was not administered until the monkey had been in this state for 24 hours. The administration of insulin thereafter was ineffective in preventing the death of the animal.

It is obvious from the preceding that the depancreatized monkey can develop a severe acetonemia and the symptoms of diabetic acidosis after insulin withdrawal and that death in typical diabetic coma can ensue if insulin therapy is not instituted at a sufficiently early period of time. The similarity between the syndrome of diabetic acidosis and coma in man and that observed in the monkey is very striking and will be discussed in greater detail in another communication.

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EFFECT OF LIGHT ON GROWTH HABIT OF PLANTS

A POTTED plant of teosinte, *Euchlaena mexicana* Schr., became prostrate under greenhouse conditions at Cornell University, Ithaca, N. Y. When moved to

[1] J. B. Collip, H. Selye and A. Neufeld, *Am. Jour. Physiol.*, 119: 289, 1937.
[2] S. W. Chapman and J. F. Fulton, *Am. Jour. Physiol.*, 123: 35, 1938.