

THE EFFECT OF FOOD RESTRICTION ON THE NET UTILIZATION OF PROTEIN BY WEANLING RAT

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An experiment was conducted to study the influence of food restriction on the utilization of dietary protein in rats. The animals on restricted diet received 70 per cent of their normal food intake. NPU was measured on weanling rats fed on restricted diet for 6 days before the start of NPU assay and compared with the animals which were fed only restricted diet during the assaying period. The rats fed restricted diet for 6 days before the start of NPU assay grew better than the groups fed restricted diet only during the period of 10 days and NPU values were 72 and 66, respectively. It was concluded that rats fed restricted diet for a longer period adapted to low food intake and utilized dietary protein more efficiently than the rats fed restricted diet for a shorter period or fed ad-libitum.

INTRODUCTION

The energy intake is an important factor in affecting the protein value of diet. If this is reduced below a certain level, protein in the food is oxidised to meet the energy needs of the body and consequently the efficiency of utilization falls. Morrison and Rao (1967) determined NPU values for different protein fed ad-libitum or at restricted levels of caloric intake. The NPU values were not markedly altered until the caloric intake was less than the maintenance energy requirement. Similarly, Forbes and Yohe (1955) reported no change in the biological value of a diet when the food intake of rats was reduced from 8 to 6 gm per day, but a fall from 99 to 69 occurred when food intake was further reduced to 4 gm per day. Cox *et al.* (1953) demonstrated that even when energy intakes were markedly reduced, a certain amount of protein continued to be used for anabolic purposes. Munro (1951) reported that response to a caloric restriction was a function of the physiological state of the animal as well as the diet.

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The object of this study was to measure NPU on rats fed on restricted diet for 6 days before the start of NPU assay, and compared with the rats which were fed restricted diet only during the assaying period.

MATERIALS AND METHODS

Forty weanling rats of Sprague-Dawley strain were used in this investigation. In the first experiment twenty weanling rats were fed on stock diet for 6 days and divided into five groups of four rats each. Each group was housed in a wire screen mesh bottomed cage. The temperature of room was maintained at 80°F. The composition of experimental diets is given in Table 1. Two groups of rats were transferred into individual cages and were given ad-libitum the experimental diet A containing 10 per cent protein for 3 days to measure their food consumption. Both the groups were fed restricted diet i. e. 70 per cent of their normal food intake for 6 days. For NPU assay one group was continued on the same restricted diet and the other group was changed to protein free diet B for 10 days.

TABLE 1. *Composition of experimental diets*

Ingredients	Diets	
	A	B
Casein	10.0	—
Corn starch	79.0	74.0
Glucose	—	15.0
Corn oil	5.0	5.0
Vitamin mixture	2.0	2.0
Mineral mixture	4.0	4.0
Total :	100.0	100.0

The other three groups received stock diet for 6 days and then diet A for 3 days to measure their food intake. NPU was determined by feeding three groups of rats, ad-libitum, restricted to 70 per cent of their normal food intake and protein free diet respectively for ten days.

At the end of the experimental period the rats were killed and NPU was determined according to the method of Miller and Bender (1955). The experiment was repeated with same number and strain of rats under similar laboratory conditions.

RESULTS AND DISCUSSION

Food intake and NPU values of the diets are shown in Table 2, and the changes in the body weights of all the groups are plotted in Fig. 1.

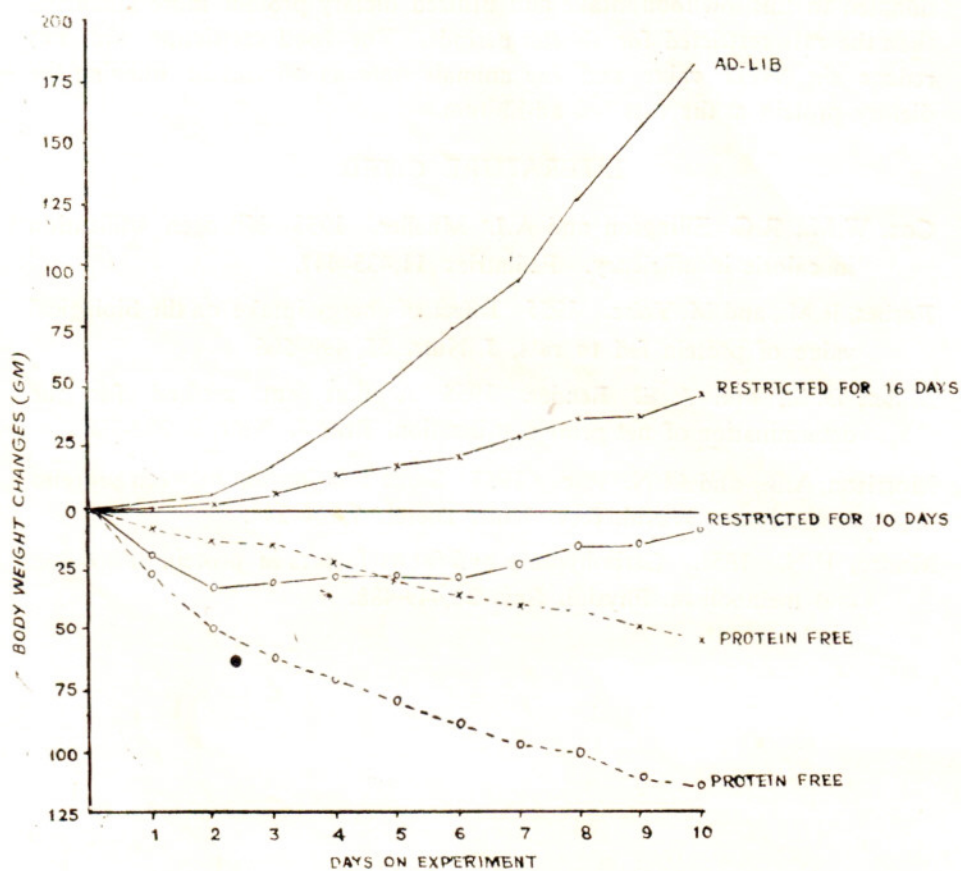


FIG. 1: EFFECT OF FOOD RESTRICTION ON GROWTH

TABLE 2. Average food intake and NPU values

Dietary Treatment	Food Intake (gm/day)	NPU (per cent)
Ad-libitum	11.0	66
Restricted (10 day)	7.2	66
Restricted (16 day)	6.3	72