

SUMMARY

Little is known of the effects of malnutrition on the composition of adipose tissue in children. Total body fat is severely depleted in most cases but it is not known how this affects the structure and subsequent regeneration and metabolic activity of the tissue. There is evidence that during normal growth in both children and animals that there are sensitive periods during which the cell number and cell size in adipose tissue may be altered by nutritional factors. This study was designed first to develop methodology for use in the analysis of small samples of tissue and then to study the composition of adipose tissue of rats which had been malnourished and then refed with high fat diets. Two different fats, peanut oil and coconut oil were used in order to investigate whether the type of fat in the diet influenced the tissue composition.

The available literature has been reviewed and the results of the measurement of DNA, protein and fat content of the tissue, of total body fat and of total body water are presented. The study has shown that:

- (a) adipose tissue of rats fed a protein-free diet containing peanut oil was more depleted of fat than if the diet contained coconut oil;
- (b) the accumulation of fat in the tissue of malnourished rats which had been refed with a diet containing peanut oil was more rapid than in those which were fed coconut oil. The increase in adipose tissue mass in both cases occurred by an increase in cell size rather than cell number;

(c) total body water and total body fat were both lower than normal in the malnourished rats. There was a progressive increase in total body fat as refeeding continued. Total body water increased very rapidly in the early stages of refeeding with peanut oil. Greater than normal values were attained after only 4 days refeeding. These values thereafter declined to normal. There was a slower increase to normal in the rats fed coconut oil.

Total body fat was measured in children recovering from malnutrition on high energy diets containing either peanut oil or coconut oil. There was a tendency for the total body fat to increase more slowly in those fed coconut oil.