Carbon brings about a transitory "blockade" of the RES, reducing the activity for a short period, and our own unpublished studies indicate that recovery from temporary "blockade" may be associated with a rebound increase of RES phagocytic activity and the delayed advent of amyloidosis. The results given here show that stimulation of the RES induced by B.C.G., as indicated by increased phagocytic activity, is also associated with inhibition of the development of amyloidosis.

The pathogenesis of the alteration in serum protein patterns caused by B.C.G. and casein treatment is uncertain. The response of humoral antibodies to bacterial antigens was intensified by B.C.G. treatment[12]. The rise of serum gamma-globulins observed in our experiments could be caused either by formation of antibodies directed specifically against B.C.G. or to an adjuvant effect of B.C.G. on the production of antibodies to the casein. Whichever is the case, our experiments have shown that the B.C.G. augmentation of the increase of serum gamma-globulin in response to casein injections is associated with inhibition of amyloid formation. These results appear to show that any association between hypergamma globulinaemia and the deposition of amyloid is at least indirect, and possibly only incidental.

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Enzyme Studies in Human Liver and Adipose Tissue

DURING an investigation of metabolic and hormonal control mechanisms in humans, a number of potentially adaptive enzymes in human liver and adipose tissue were investigated with regard to their possible regulatory function.

This communication presents results obtained on three important enzymes, glucose-6-phosphate dehydrogenase (G-6-PD), NADP linked malic enzyme (ME) and citrate cleavage enzyme (CCE), which have been found to be highly adaptive in the rat when it undergoes the changes involved in lipogenesis[1-3]. Ten per cent homogenates in 0·25 molar sucrose, prepared from liver and omental adipose tissue obtained surgically were centrifuged at 105,000*g* at 0° C for 60 min. Enzyme activities were assayed in the clear supernatant fraction at 23° C using a recording spectrophotometer by the methods of Kornberg and Horecker for G-6-PD[4]; Ochoa for ME[5], and Srere for CCE[6]. Proteins were determined by the biuret method[7].

Table 1 gives the specific activities of the enzymes in human liver and adipose tissue samples. The values are usually similar to those observed in rat tissue[1-3]. The one exception is the strikingly low activity of CCE in human adipose tissue. The value shown may be considered to be negligible because it reflects the limit of reliability of the method. In an effort to show possible CCE activity by using larger amounts of enzyme and incubating the reaction mixture over a longer time interval, acetyl coenzyme *A* formation was determined by the hydroxamate procedure[8]. At no time was any activity noted.

Table 1. ENZYME ACTIVITIES IN HUMAN LIVER AND ADIPOSE TISSUE

Enzyme	Specific activity (mμmoles/min/mg of protein)	
	Liver	Adipose tissue
Glucose-6-phosphate dehydrogenase	11·4 ± 3·0	14·7 ± 4·6
Malic enzyme	5·1 ± 2·2	4·8 ± 1·7
Citrate cleavage enzyme	2·2 ± 0·8	0·3 ± 0·1

Values are an average of between five and seven samples. Activities are expressed in terms of NAD and NADP oxidized or reduced during the reaction ± standard deviation.

There was a virtual absence of CCE from human adipose tissue, which cannot be explained by any abnormal nutritional state of the patients because none was without food for any great period of time. Furthermore, the corresponding values for the G-6-PD and ME were not low, and the CCE activity in the liver could be considered to be in the normal range. The presence of an inhibitor of CCE was ruled out by adding increasing amounts of an extract of human adipose tissue to a rat liver or epididymal fat pad high speed supernatant without any resulting loss of CCE activity. The adipose tissue specimens used in this investigation were obtained from omental and mesenteric sites which should correspond to the epididymal fat pad of the rat. A survey of the CCE concentration in rat subcutaneous or intra-abdominal fat showed no differences from that found in the epididymal fat pad.

These results, although preliminary, show the absence of CCE in human adipose tissue, and suggest that the pathway for and the control of lipogenesis in this tissue are considerably different from those in lower organisms. One possible explanation is that fatty acids are not synthesized in human adipose tissue, and that triglycerics are formed from free fatty acids synthesized in the liver and carried to the adipose tissue by the circulation.

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Structural Relationships between some Plant and Animal Proteases

THE hydrolysis of a substrate by the proteolytic enzymes, papain and ficin, has been shown to involve the formation of an acyl-enzyme intermediate through the sulphydryl group of a cysteine residue[1]. These cysteine residues must therefore be in the catalytic site of the enzymes and a knowledge of their environment could facilitate our understanding of the mechanism of action of these enzymes. Cysteine-25 has been identified as the active centre cysteine residue of papain, by irreversible inhibition with [^{14}C]-iodoacetate[2] and with the "active site directed" irreversible inhibitor, chloroketone

(p-$CH_3.C_6H_4.SO_2NH.CH_2.CO.CH_2Cl$) (ref. 3)