

at this point to propose the introduction of a new, more specific term, 'helical RNP bodies', for chromatoid bodies of the same nature as those found in *E. invadens*. The new term combines the biochemical composition defined by Barker with the helical structure described in this article.

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Effect of DL-Ethionine on the Level of Cystathionase in Rat Liver

WE have previously reported that the level of cystathionase ('soluble' cysteine desulphurase) of rat liver is increased when L-methionine is injected in male rats maintained on a commercial diet¹. We have recently shown that a similar increase could be obtained with rats placed on a synthetic diet (diet B) containing 18 per cent casein; furthermore, the level of cystathionase is higher in liver of rats maintained on a synthetic diet (diet C) containing 60 per cent casein, and we have observed that addition of a definite quantity of DL-methionine to diet B increases the enzyme-level². These results indicate that some correlation could be established between dietary protein and the level of enzyme activity, and suggest that 'adaptation' of cystathionase is mediated, at least in part, by the content of methionine in the diet. As the increase in enzyme activity found on varying methionine intakes could be the reflexion of alteration of the content of specific protein in the liver, in the investigation described here we have determined the effect of addition of DL-ethionine (S-ethyl/analogue of methionine) to the diets on the level of hepatic cystathionase.

We used Wistar rats from the Centre de Sélection des Animaux de Laboratoire du C.N.R.S., with mean body-weight of 80 g; the preparation of the supernatant fraction of the liver, the conditions of determination of hydrogen sulphide formation and the composition of the diets have been described earlier²⁻⁴. The experiments were conducted as follows: all rats were placed for 8 days on the

diet B, then they were divided in two groups; the first group was maintained on diet B, while the second received diet B containing 2.5 per cent DL-ethionine. After 8 days, rats were weighed and killed; the weight of liver and the activity of cystathionase were determined. The contents of protein in supernatant are measured according to the method of Lowry *et al.*⁵.

Other experiments were similarly carried out with rats routinely maintained in diet C and diet C + 2.5 per cent ethionine; furthermore, as from the results of Farber and Corban⁶ ethionine inhibits hepatic protein synthesis more effectively in female than in male rats, some experiments were performed on female rats. All results are expressed as $\mu\text{moles hydrogen sulphide}/\mu\text{g protein/h}$.

Table 1 shows the results obtained in these assays. From the figures it is evident that DL-ethionine increases the level of enzyme. Such an increase is rather surprising and the stimulation of cystathionase by DL-ethionine merits further comments. The increase of activity was observed in male rats maintained on diets B and C; but in this last case the increase did not start before 10 days, while it is faster in rats placed on diet B. Furthermore, we have observed no difference between male and female rats; ethionine is equally effective for the alteration of enzymatic activity. Moreover, while methionine by itself is not a substrate for cystathionase, some products formed from methionine, like cystathionine, homoserine and cysteine, are good substrates, and the response of enzyme to injections of some of these substrates is an increase of level¹. If ethionine is de-ethylated, one can suppose that cystathionine and other substrates might arise; however, it seems improbable that de-ethylation of ethionine is of considerable importance in the rat⁷.

Table 1. EFFECT OF ADDITION OF DL-ETHIONINE TO SYNTHETIC DIETS ON THE LEVEL OF CYSTATHIONASE

Diet	Body weight (g)	Liver weight	Mg protein/ml supernatant	H ₂ S $\mu\text{moles}/\mu\text{g protein/h}$
I Male rats				
B (8 days)	133	7.4	13.2	286 \pm 12
B + eth. (8 days)	85	3.0	10.4	1,383 \pm 95
C (10 days)	164	6.0	14.8	795 \pm 38
C + eth. (10 days)	116	3.9	12.0	840 \pm 74
C + eth. (19 days)	99	4.7	12.8	1,197 \pm 168
II Female rats				
C (8 days)	130	6.3	12.9	551 \pm 97
C + eth. (8 days)	84	3.1	11.7	1,143 \pm 71

Natori⁸ has reported that the level of methionine-activating enzyme in female rats is almost twice that of male rats, and he observed that the ethyl group of ethionine is extensively incorporated into the liver RNA fraction. It might be supposed that action of ethionine may be due to the formation of an abnormal cystathionase in which methionine is partially, at least, replaced with ethionine. This new protein could have different physico-chemical properties and enzymatic activity to those of normal cystathionase.

An examination of the properties of purified enzyme obtained from livers of normal rats and from livers of ethionine-treated rats is under investigation.

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