vincamine alkaloids[10]. We suggest for the present the convention that the carbon to which the carboxyl group is attached be C-16.

When an alkaloid lacks a carboxyl group the numbering should be the same as its carboxyl containing homologue. This convention is necessary because in the line drawings of the Figure, carbons 16 and 17 become equivalent to C-14 and C-3 in Type I bases, to C-19 and C-18 in Type II, and to C-19 and C-18 in Type III bases, respectively. This is not regarded as an ambiguity in deciding the numbering since the biogenesis of the almost ubiquitous two carbon side chain (C-19 and C-18) is probably the same for all types and also in the specific case of Type I alkaloids the absolute stereochemistry at C-15[10,11] has so far been proved to be invariant.

Résumé. Nous proposons un mode uniforme de numérotation pour le squelette des alcaloïdes indoliques complexes. Il est basé sur le fait que tous ces composés sont susceptibles d'être coupés en éléments identiques.

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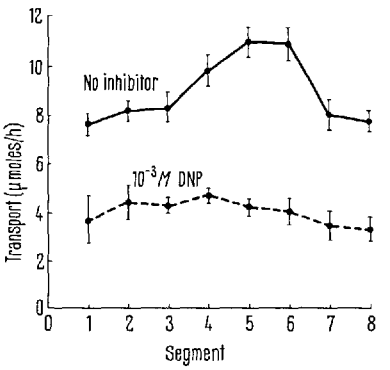
Effect of Dinitrophenol on the Pattern of Methionine Transport Along the Small Intestine of the Rat

It is well known that metabolic inhibitors such as 2,4-dinitrophenol reduce the intestinal transport of amino acids[1]. It is also known that in the case of glucose transport, metabolic inhibitors have a much greater effect on those portions of intestine which transport the best[2]. By virtue of this effect fluoride is able to abolish the gradation along the rat intestine for glucose absorption in vitro[2]. The purpose of the present study was to determine if a similar effect of a metabolic inhibitor could be shown on the pattern along the intestine for amino acid transport.

Methods. The everted small intestine from 24 h-fasted male albino rats (Holtzman; body weight 281–408 g) was divided into eight segments of nearly equal length and transport was studied using the in vitro technique of CRANE and WILSON[3]. Procedural details may be found in a previous publication[2]. Initially, both mucosal and serosal solutions (8.0 ml and 1.0 ml respectively) contained D-glucose at 5.55 μmoles/ml; the mucosal solution contained L-methionine at a concentration of 12.0 μmoles per ml; no methionine was present in the initial serosal solution. In some experiments $10^{-3}M$ 2,4-dinitrophenol (DNP) was present on both sides. Incubation was at 37°C for 1 h. Methionine concentrations were determined on samples of the serosal solution by a modification of the RUDRA and CHOUDHURY revision[4] of the MCCARTHY and SULLIVAN method[5].

When intestinal segments were incubated in the absence of added methionine, small amounts of endogenous methionine appeared in the serosal solution; in 16 segments 0.45 $\pm$ 0.17 μmoles appeared per segment. This amount was considered to be negligible compared to the amounts transported in the presence of mucosal methionine. When methionine was initially placed on both sides of the intestine, uphill transport into the serosal solution was readily observed, thereby reaffirming the viability of this preparation.

Results and discussion. The results are shown in the Figure. Transport is expressed as μmoles of L-methionine which appeared in the serosal solution of each segment during the 1 h incubation period. In the absence of DNP maximum transport was observed in segments 5 and 6 (upper ileum). This pattern is quite similar to the patterns reported by LIN and WILSON for L-tyrosine[6], SPENCER and SAMIY for L-tryptophan and L-phenylalanine[7,8], and SPENCER and BRODY for L-proline[9]. This pattern is not at all similar to the patterns reported by NEIL for L-cystine[10], NATHANS et al. for monoiodo-L-tyrosine[11], and SCHEDL and CLIFTON for L-methionine[12]. These discrepancies cannot at present be explained.



Transport of L-methionine into the serosal solution by 8 levels of rat small intestine. Segment 1 is duodenum, segment 8 is terminal ileum. Each point is mean from 10 animals in experiments without inhibitor, and 6 animals in presence of $10^{-3}M$ 2,4-dinitrophenol (DNP). Standard error of mean is indicated for each point.

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In the presence of DNP, transport was depressed at all levels of intestine and, except for the persistence of a very slight decline along the ileum, the longitudinal gradient was abolished. The energy-independent transfer that remains after DNP poisoning could represent either passive or facilitated diffusion. The fact that essentially no gradation in activity persists in the presence of DNP indicates that the peak activity in segments 4–6 observed without DNP is not due to some morphological or mechanical factor or to some regular bias inherent in the procedure, but is due to a specific distribution of the active transport system along the intestine.

The Figure illustrates the point that in order to measure the maximum effect of an inhibitory agent on transport, in either absolute amounts or percentages, the site along the intestine capable of maximum transport should be chosen for study. This point has been illustrated previously for the effects of hypoxia, fluoride and bile salts on glucose transport[2,13].

Zusammenfassung. Der Transport des L-Methionins durch die Rattendarmwand wurde in vitro untersucht. Die Transportgeschwindigkeit im Verlaufe von 1 h ist am höchsten im unteren Jejunum und im oberen Ileum (Abschnitte 4, 5 und 6). DNP-verursachte Hemmung ist in diesen Darmabschnitten am stärksten, was das Verschwinden des Maximums bewirkt.

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Sex Difference in Liver Tryptophan Pyrrolase Activity of Starved Rats

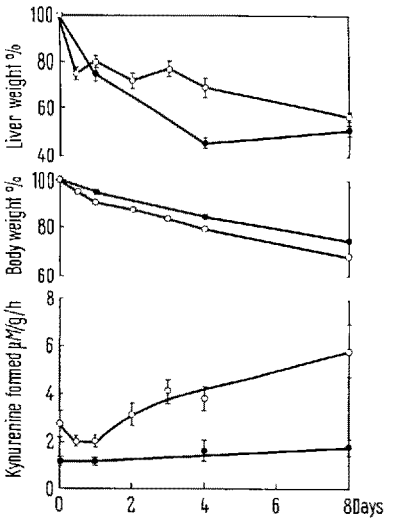
Liver tryptophan pyrrolase (LTP) activity in female rabbits subjected to starvation has been characterized by Rosenthal et al.[1] as a bimodal response with peak values occurring within 18–36 h and between 7–11 days from commencement of starvation. Chiancone[2], however, obtained no significant alteration of LTP activity in male rats subjected to fasting for 8–13 days. It seemed pertinent therefore to investigate the influence of sex on the LTP activity of rats subjected to starvation.

Adult Sprague-Dawley rats of both sexes were maintained ad libitum on commercial rat checkers before being used in the starvation experiments. Water was available to the animals at all times. The estimation of enzyme activity was identical to that of Rosenthal et al.[1] except that entire livers from one to three identically treated rats were pooled to yield a minimum of 7 g for homogenization. Although the data are presented on a fresh tissue weight basis, calculations on a protein basis yield essentially comparable results.

In male rats fed ad libitum, the LTP activity averaged 1.04 μM kynurenine formed/g/h which increased to 1.86 μM/g/h after 8 days' starvation, but this difference is of doubtful significance (Figure). In ad libitum fed female rats, however, the LTP activity (2.70 μM/g/h) was about three times higher than in ad libitum fed males. The value decreased to a minimum (1.98 μM/g/h) after 24 h starvation before again increasing to 5.75 μM/g/h after 8 days' starvation. For male and female rats, body and liver weight decreased in a regular fashion during the starvation period.

The variability and the high values of ad libitum fed female rats suggested the possibility that a bimodal response may occur very early and, because rats eat regularly between periods of 2-4 h, the ad libitum fed female rats may have been voluntarily starved for a short period of time. In order to test this hypothesis, and to stabilize the animals in a more constant physiological state, refeeding techniques were initiated. Rats were initially starved for 24 h and then refed ad libitum for 48 h thus giving assurance that the animals were well fed, as shown by a rapid regaining of body weight after refeeding (Table, Group C). The effect of short periods of starvation (4 and 24 h) on the LTP activity, liver weight and body weight of such *refed* rats, is presented in the Table.

In male rats, the LTP activity was not altered significantly by this procedure, but in female rats (Group C) the enzyme activity decreased to 1.06 μM/g/h. It may be noted that the LTP activity of both male and female rats



Kynurenine formation, body weight and liver weight of male (–●–) and female (–o–) rats vs. days of starvation. Each point represents average data obtained for 6 to 9 determinations. The vertical bar represents 1 standard error.

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