*Discussion.* The results presented in the table strongly suggest that exposing a choleraic intestinal segment to lidocaine inhibits the net fluid loss and in some instances even induces a water absorption. This observation indicates a nervous involvement in the pathogenesis of cholera although one cannot entirely exclude the possibility that lidocaine in some way affects the direct cellular action of the cholera toxin. However, no experiments to test such a cellular effect seem to have been performed.

A nervous involvement in the pathogenesis of cholera was, as pointed out in the introduction, suggested by the finding of large amounts of VIP in the choleraic secretion. VIP has been proposed to be a neurotransmitter in the small intestine[9] involved in the elicitation of a nervous reflex producing a functional hyperemia in the gut[10]. This reflex hyperemia could be abolished by lidocaine or 5-HT blocking agents. In this context it is interesting to note that chlorpromazine, a serotonin receptor blocking agent, markedly inhibits cholera secretion in the mouse[11].

It is thus proposed that the activation of an intramural nervous reflex may be one mechanism of importance in explaining the fluid loss from the small intestine in cholera. Serotonin and VIP may possibly be involved in this nervous reflex.

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## The excretion of urea by the larvae of *Spodoptera mauritia* Boisd. (Noctuidae: Lepidoptera) during development

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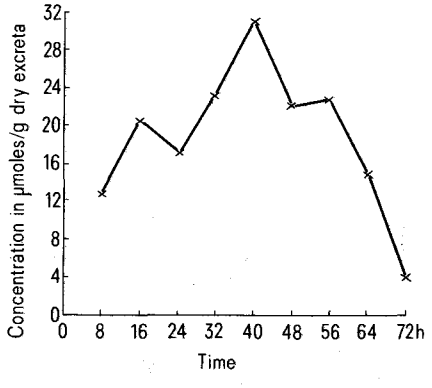
*Summary.* The concentration of urea in the excreta of the 6th instar larvae of *Spodoptera mauritia* varies from $4.017 \pm 0.541$ to $31.052 \pm 1.193$ µmoles/g dry excreta (mean ± SE). The observation confirms that urea excreted is of metabolic origin.

Though the presence of urea in the excreta of insects is well documented[1,2], no information is available on the nature of urea in the excreta during the development of insects. In this communication we show the occurrence and changes in the concentration of urea in the excreta of the last larval instar of *Spodoptera mauritia* during its development.

The 6th instar larvae were separated immediately after moulting from the colony reared in the laboratory. The larvae, fed on the grass, *Ischaemum asistatum*, were used for the experiments. The excretory pellets collected at regular intervals were dried to a constant weight at 60 °C and were analysed for urea[3].

The concentration of urea determined at regular intervals of larval development is illustrated in the figure. The concentration varies from $4.017 \pm 0.541$ to $31.052 \pm 1.193$ µmoles/g dry excreta (mean ± SE). Analysis of the food reveals that it contains urea only in trace amounts. The urea concentration in the excreta shows an initial increase at 16 h; after moulting, however, the level declines at 24 h. Later it increases rapidly and reaches the peak at 40 h. Thereafter the concentration falls sharply till 72 h, interrupted by a gap between 48 and 56 h. No excretory pellets were voided after 72 h.




Concentration of urea in the excreta of the 6th instar larvae of *S. mauritia* during development.

It has been demonstrated that the synthesis of urea is enhanced by the increased substrate availability[4,5]. The increase in the production and excretion of urea in the early stages of the larvae may be due to the intensive metabolism of nitrogenous compounds during this period when active feeding and rapid growth take place. The present observations also reveal that the concentration of urea in the excreta falls gradually to a low level during the period when the feeding activity and growth rate are low. Similar variations in the concentration of urea are reported for *Dysdercus fasciatus*[6]. Since the food contains only detectable amounts of urea, it is presumed that the large quantity of urea found in the excreta of this insect is of metabolic origin.

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