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## CHANGES IN PHOSPHOLIPID CONTENT OF BLOOD AND MALPIGHIAN TUBULES OF *EPILACHNA DODECA-STIGMA* MULS. (COLEOPTERA)

ALTHOUGH numerous analyses of phospholipids of vertebrates have been made, similar studies on insects are relatively recent[1-7]. Except for the works of Crone (1964)[5], Taylor and Hodgson (1964)[6], Bridges and Watts (1975)[7] others are on phospholipid composition of whole insects. Similarly much emphasis is given to the influence of diets on the patterns and composition of phospholipids in insects[8-10]. It is reasonable to believe that the concentration of phospholipid in individual organs might be different from that of the whole organism. So the present study was undertaken to investigate the changes in the concentration of phospholipid in the blood and malpighian tubules of *Epilachna dodeca-stigma* under various physiological conditions.

Male *E. dodeca-stigma* of the same age and more or less of the same size were starved for two days in separate jars each containing 8–10 insects. They were then fed regularly with the flowers of *Hibiscus rosachinensis* for 8 days. They were later transferred to separate jars and kept without food along with a control set of insects that had free access to these flowers. Blood and malpighian tubules were collected at regular intervals employing adequate number of insects. Total phospholipid was estimated by the method of Annino (1964)[11].

The analytical data of the total phospholipid content in blood and malpighian tubules of normally fed and starved *E. dodeca-stigma* are shown in Table I. The

TABLE I

Phospholipid in ♂ *E. dodeca-stigma*

| Period | Malpighian tubules mg/100 mg | | Blood mg/100 ml | |
|---|---|---|---|---|
| | Fed | Starved | Fed | Starved |
| 0 hour | 0·39 ± 0·002 | 0·41 ± 0·001 | 15·4 ± 0 04 | 14·8 ± 0·16 |
| 8 hours | 0·45 ± 0·001 | 0·43 ± 0·002 | 16·2 ± 0·18 | 16·4 ± 0·81 |
| 16 hours | 0·40 ± 0·001 | 0·43 ± 0 008 | 15·1 ± 0·21 | 13·2 ± 0·21 |
| 24 hours | 0·40 ± 0·002 | 0 45 ± 0·002 | 14·6 ± 0·08 | 16·2 ± 0 64 |
| 32 hours | 0·40 ± 0·006 | 0·34 ± 0·008 | 15·8 ± 0·3 | 14·6 ± 0·32 |
| 40 hours | 0·41 ± 0·01 | 0·32 ± 0 006 | 14·8 ± 0·18 | 14·3 ± 0·01 |
| 48 hours | 0·39 ± 0 002 | 0·34 ± 0·004 | 15·1 ± 0·13 | 13·2 ± 0·82 |
| 56 hours | 0·40 ± 0·001 | 0·32 ± 0·008 | 15·3 ± 0·14 | 10·8 ± 0·81 |
| 64 hours | 0·42 ± 0·002 | 0·33 ± 0·006 | 14·8 ± 0·41 | 9·1 ± 0·41 |
| 72 hours | 0·41 ± 0·004 | 0·29 ± 0·004 | 15·2 ± 0·62 | 7·4 ± 0·62 |
| 80 hours | 0·40 ± 0·008 | 0·26 ± 0·001 | 15·3 ± 0·38 | 5·2 ± 0·56 |
| 88 hours | 0·39 ± 0·001 | 0·24 ± 0·008 | 15·1 ± 0 81 | 4·9 ± 0 82 |
| 96 hours | 0·41 ± 0·006 | 0·21 ± 0·004 | 14·8 ± 0·64 | 3·6 ± 0 91 |

phospholipid content ranges from 0·39 ± 0 002–0 45 ± 0 001 mg 100 mg of malpighian tubules and 11 6 ± 0 008–16·2 ± 0·18 mg 100 ml of blood. The total phospholipid content of these tissues considerably decreases during starvation. However after a full meal both these tissues acquire a slightly elevated level (Table I). The blood phospholipid, with an initial decline at 16 hours starvation depicts a slight increase till 24 hours, thereafter, it gradually decreases till 96 hours. The malpighian tubules on the other hand, with an initial marked increase in phospholipid content upto 24 hours, show a sharp decline at 32 hours whereafter maintaining more or less a constant level upto 64 hours, once again exhibit a gradual fall till 96 hours.

Since the insects die or become inactive at the end of fourth day of starvation, no estimation could be made beyond this period. The fall in the blood phospholipid content is more significant than that in the malpighian tubules. Though information on the tissue lipids of other insects are not available except for silkworm[12], it is worth mentioning that phospholipid content of blood and malpighian tubules of normally fed male *E. dodeca-stigma* is more or less constant.

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## A SIMPLE NEW TECHNIQUE TO DEMONSTRATE THE PRESENCE OF GIANT NERVE CELLS (RETZIUS' CELLS) IN THE SUB-PHARYNGEAL AND SEGMENTAL GANGLIA OF THE COMMON INDIAN CATTLE LEECH, *POECILOBDELLA GRANULOSA*

CENTRAL nervous system of leeches consists of a pair of cerebral ganglia, a pair of peri-pharyngeal connectives, a sub-pharyngeal ganglionic mass, composed of four pairs of ganglia fused together, and a ventral nerve-cord, made up of segmental ganglia. Although a lot of work has been done on the Indian leeches[1], even the presence of giant nerve cells (Retzius' cells) has somehow completely escaped the attention of all the workers. A very simple technique has been developed to demonstrate these cells. Chilled $C_{\alpha}$ –formol – fixed frozen sections (5–10 $\mu$) of the (freshly taken out) central nervous system of leeches were suitably processed for alkaline phosphatase by the method of Gomori[9]. These paired cells can be seen clearly embedded in the central neurofibrillar network of the sub-pharyngeal and segmental ganglia and depicting extremely intense enzymatic localization. The activity is in extreme contrast to the characteristic punctate reaction in the surrounding neurofibrils, but similar to the one seen in the neurons, surrounding the core. Some work has been done on the gross morphology, neuronal geometry and electrophysiology of the Retzius' cells[3-6 10]. However, their precise function is not yet known. Considering that each cell is electrically coupled with its contralateral partner, but not with the partners in the adjacent ganglia, paucity of their fine arborizations and thereby minimal synaptic contacts, their involvement in the control of dominating common motor responses and the stereo-typed behaviour of the leeches has been speculated.

The demonstration of such giant cells by the technique, communicated here, presents a fascinating biological material for neuro-anatomical and physiological work. It can also be used in laying to rest the metameric controversies in certain leeches. There is a significant segmental telescoping in leeches owing to cephalization. This, as well as the absence of inter-segmental septa in adult leeches put the criterion of segmental demarcation at stake. There have been two schools of thought on this issue. Some workers emphasize that the first annulus, which bears the characteristic tactile and photoreceptor sensillae, should be regarded as the external evidence of the beginning of a segment[1 7]. Others[2 8] regard the nervous system as the basis for determining the segmental