clearly requires cell differentiation, and gonads capable of producing these large and small gametes. It seems reasonable to suggest that this differentiation was associated with the evolution of heterogamety from isogamety. In addition, we suggest that the DNA required for this change came from H-Y duplication or *m-f* gene duplication. This mechanism predicts the observed H-Y cross reaction with ZW and XX females, without invoking a switch in the sex determining role of H-Y.

Finally, we would like to suggest that positive H-Y cross reaction in humans lacking a Y is most readily explained by assuming that the H-Y locus is present as part of a heterochromatic rearrangement. This idea may be extended to suggest that balance sex systems are, at base, also H-Y determined. Many Y-autosome rearrangements are known and such rearrangements may account for descriptions of sex determining mechanisms which do not appear to depend on a primary sex determining locus. For example, in *Drosophila* the sex chromosome/autosome ratio describes the sex of an individual. If an X linked H-Y repressor is present in *Drosophila* and H-Y is, indeed, autosomal, then the balance description of sex determination is consistent with an H-Y system. Numerous attempts to locate the sex determining genes in *Drosophila* have been unsuccessful. Pipkin found none in the 2 major autosomes[14] and Bridges[15] eliminated the 4th chromosome. Although Dobzhansky and Schultz[16] reported female-determining genes on the X, these were later shown by Patterson et al.[17] to be non sex determining fertility factors. Now that mapping in the proximal heterochromatin of *Drosophila melanogaster* is more readily done, the H-Y gene should be mapped.

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Effect of some insecticides on cellular lipids of the neurosecretory complex of the red cotton bug, *Dysdercus koenigii*

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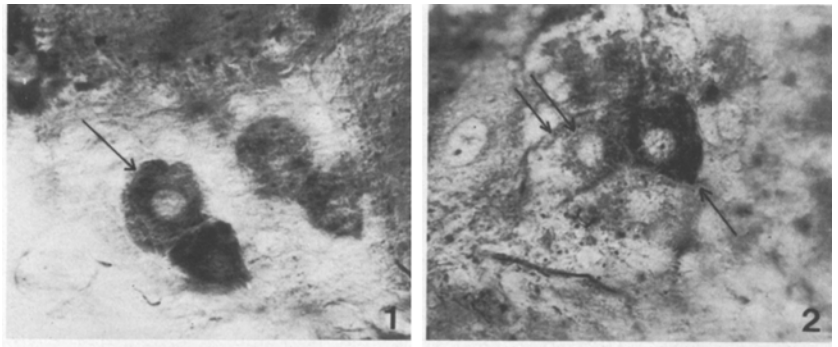
Summary: In normal specimens of the bug, *Dysdercus koenigii*, the cells of the pars intercerebralis stain highly positively with Sudan black B and acid haematein, while the corpora cardiaca and allata stain lightly. After the administration of parathion, carbamate and endrin the situation is reversed. The increased level of lipids in the corpora cardiaca and allata coincides with the degree of loss of lipids from the cells of the pars intercerebralis.

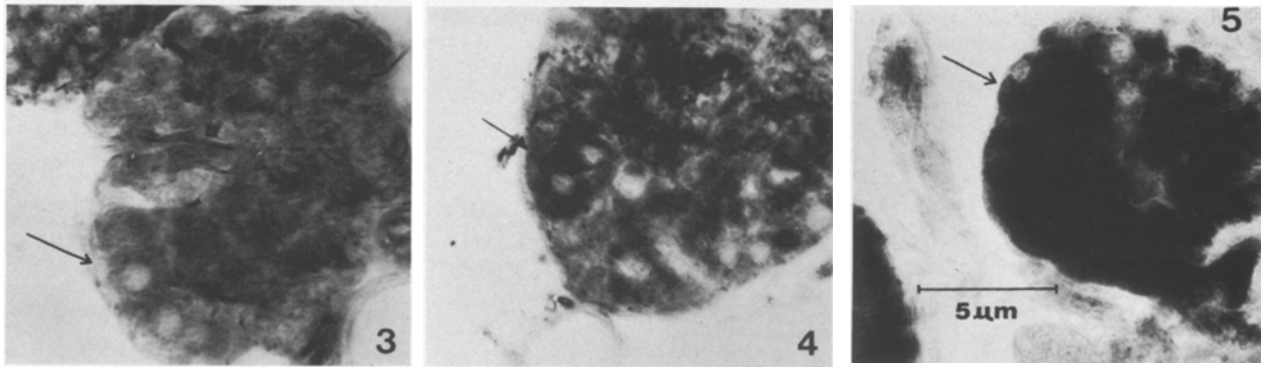
The involvement of a number of enzymes and metabolites in the toxic action of organophosphate, carbamate and cyclodien insecticides has been reported by a number of investigators and reviewed by O'Brien[2], but hormonal involvement, direct or indirect, in insecticidal action is still not clear. In this context, it was considered desirable to investigate cytochemical changes that occur in the neurosecretory complex under the influence of various insecticides. Accordingly, the present communication reports the effects of parathion, carbamate, and endrin on lipids in the pars intercerebralis, corpora cardiaca and corpora allata of *Dysdercus koenigii*.

For experiments, 2-day-old adult male and female specimens of the red cotton bug, *D. koenigii*, were separated from the main stock maintained in the laboratory at 27 °C ± 1 and 80% relative humidity. They were divided into 4 groups of 30 each (15 males and 15 females). The animals of groups I-III were treated topically with 2 µl of 2% parathion (dimethyl p-nitrophenyl phosphothionate) 2 µl of 3% carbamate (1, naphthyl-methyl carbamate), and 2 µl of 2.5% endrin in acetone, respectively. The dosages were so adjusted that the insects of each group died after 1 h and 30 min. Animals of group IV, that served as control, were treated with 2 µl of 2% acetone. Each experimental group was further subdivided in to 3 groups of 10 insects (5 males and 5 females) each depending upon the symptoms of intoxication i.e. hyper-excitation, moribundity and paralysis.

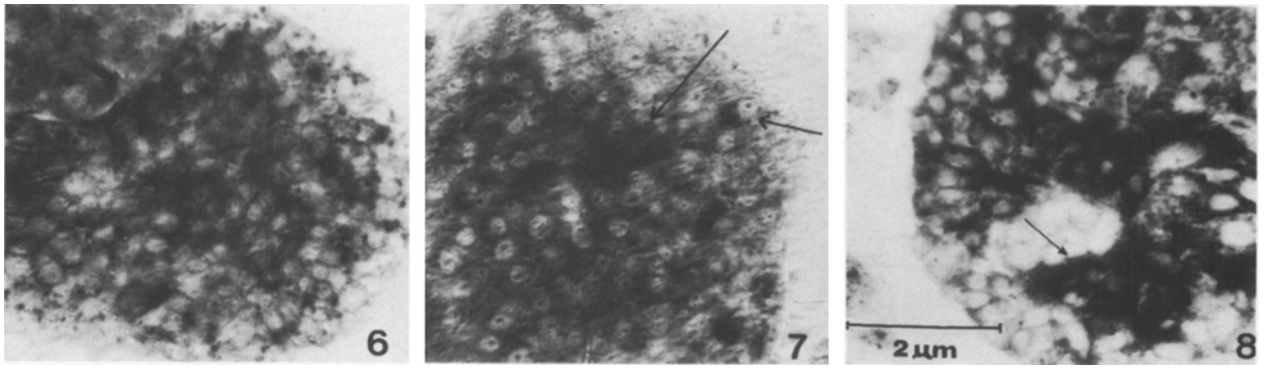
The brains, along with the corpora cardiaca and allata of the above mentioned groups of bugs were dissected out, and fixed in formol calcium with post chrome and weak Bouin's. 10-µm gelatine sections were cut and stained in Sudan black B (SBB) for total lipid[3] and acid haematein (AH) for phospholipid[4]. Sections of tissues fixed with weak Bouin's fluid were processed for the pyridine extraction control technique[5]. Paraffin sections of tissues fixed after Helly were stained by Berenbaum's technique[6] for bound lipids.



Figs. 1 and 2. Sections of brains of *D. koenigii* showing neurosecretory cells of pars intercerebralis; *1* control insect (formol calcium/acid haematein); *2* endrin-treated bug (formol calcium/Sudan black B).



Figs. 3–5. Sections of corpora cardiaca of *D. Koenigii* (formol calcium/Sudan black B); *3* control; *4* parathion-treated; *5* endrin-treated.



Figs. 6–8. Sections of the corpora allata of *D. koenigii* (formol calcium/Sudan black B); *6* control; *7* parathion-treated and *8* endrin-treated.

In control insects, the cytoplasm of the lateral group of neurosecretory cells of the pars intercerebralis stained pitch black in SBB, dark in AH and feebly with Berenbaum's technique while that of the corpora cardiaca and allata stained light (figures 1, 3 and 6). Sudanophilic and AH positive material did not show any significant change in these structures in the experimental insects that were showing the symptoms of hyper-excitation under the influence of the insecticides under study. However, in moribund and paralyzed insects (males and females) of the parathion- and carbamate-treated groups, some of the cells of the pars intercerebralis gave negative SBB and AH reactions while others still had SBB and AH positive material in their cytoplasm; in endrin-treated bugs most of these cells appeared negative in both the tests (figure 2).

In the cells and nerve terminals of the corpora cardiaca of parathion- and carbamate-treated bugs (males and females), on the other hand, increased intensities of the SBB and AH reactions were noticed in moribund and paralyzed bugs as compared to controls (figure 4). In endrin-treated insects, the corpora allata displayed such an intensely positive reaction that the cells were packed with sudanophilic inclusions to such an extent that it became difficult to distinguish the individual cells of this gland (figure 5).

The accumulation of sudanophilic inclusions in the corpora allata also occurred in the treated moribund and paralyzed bugs and the amount varied with different insecticides. In parathion- and carbamate-treated bugs, the sudanophilic inclusions were less concentrated than in endrin-treated bugs but were somewhat higher than in the controls (figures 7 and 8).

Aldehyde fuchsin and Gomori's chrome haematoxylin techniques, which are employed frequently to study neurosecretory phenomena in insects[7], are indicative for the protein fraction, whereas the SBB and AH positive material observed during the present investigations and also reported by Nayar[8] and Pipa[9,10] represents the lipoidal fractions of the neurosecretory material of the pars intercerebralis. A small fraction of lipid is associated with proteins, as revealed by its feeble reaction with Berenbaum's[6] technique employed for localization of bound lipids. Most of the

free lipid fraction is lost during alcohol and acetone treatments.

In moribund parathion- and carbamate-treated bugs a few, and in endrin-treated bugs most of the cells of the pars intercerebralis lack SBB and AH positive material. The increased level of SBB and AH positive material in the corpora cardiaca and allata coincides with the degree of its loss from the pars intercerebralis. Since more of the material accumulates in endrin-treated bugs than in parathion- and carbamate-treated ones, it appears that the degree of release of this material is dependent upon the nature and chemical composition of the insecticides.

In roaches under electrically induced stress, Hodgson and Geldaiy[11] reported an insignificant change of AF positive material in the cells of the pars intercerebralis and its decrease in the corpora cardiaca. In the light of the observations of Hodgson and Geldaiy[11] and of our observations, it appears that the proteins and lipids represent 2 fractions of brain hormone and behave independently under different conditions. The release of SBB and AH positive material from neurosecretory cells might be a response to stress situation and may be involved in some way in stimulating the corpora cardiaca and allata for the release of their neuroactive hormones in the blood; high titers of these have been estimated by Davey[12,13], Karter[14] and Colhoun[15] after either stimulating roaches electrically or treating them with DDT and TEPP.

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Influence of somatostatin on serum prolactin concentrations of cows during rest and milking

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Summary. Administration of somatostatin (SRIF) to lactating cows significantly increased basal, premilking serum concentrations of prolactin (PRL), and potentiated PRL release in response to milking and significantly reduced resting concentrations of growth hormone (GH).

Brazeau et al.[2] reported that purified extracts from sheep hypothalami inhibited GH release in rats. A peptide was isolated from these extracts, purified and subsequently named somatostatin (SRIF). SRIF inhibits basal concentrations of GH, as well as GH release in response to a variety of stimuli[3]. SRIF does not influence basal concentrations of PRL in man, but in patients displaying pathologically high levels of GH and PRL, SRIF appears to suppress both hormones[3]. Gala et al.[4] demonstrated that SRIF did not block PRL release in monkeys induced by perphenazine, TRH or serotonin. In fact, SRIF potentiated PRL release induced by perphenazine and TRH, but not that induced by serotonin.

PRL is believed to play an important role in mammary development and milk secretion. Milking or suckling is a potent natural stimulating mechanism for the release of PRL in cows and other lactating animals. We therefore investigated whether SRIF would alter basal serum concentrations of PRL in cows and the milking-induced rise in hormone normally observed in these animals. Changes in resting concentrations of GH after SRIF treatment were also noted.

Serum growth hormone (ng/ml ± SEM)

Milking	No treatment (bleeding)	PVP or	CMC	SRIF* (mg)				No treatment	
				5	20	50	100		
1**	8.5 ± 1.1								
2	6.8 ± 0.8								
3		7.5 ± 1.2							
4			6.9 ± 2.0						
5				6.0 ± 0.6					
6					5.5 ± 0.8				
7						3.0 ± 0.7			
8							1.8 ± 0.5		
9								5.8 ± 0.2	
10									8.0 ± 0.2

* Mean serum concentrations of GH were significantly ($p < 0.05$) reduced when compared with mean serum concentrations of GH after injection of saline, PVP or CMC, or no treatment ($n = 4$).

** Odd numbers i.e., 1, 3, 5, etc. indicate that milking was carried out at 12.00 h. Even numbers indicate that milking was carried out at 24.00 h.