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Study Of Cancer In Ovary of Periplaneta americana (Linn).

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Abstract

Periplaneta americana (Linn), when exposed to sublethal Concentration (LC_{100}, LC_{50} and LC_0 experimental concentration) values were calculated by the Method of Finny (1971). LC_{100}0.5% LC_{50} 0.25% and $LC_0$0.07% for pentachlorophenol. These doses were calculated at 96 hours duration. PCP were vivisected after 5,10,15 and 20 days of the treatment.

The follicular epithelium cells are with diffused chromatin material in immature oocyte whereas in mature oocyte the follicular epdithelium cells are with pycnotic nuclei. The mature oocyte are also distorted in shape and their ooplasm lacking yolky material. The tunica propria and ovariole sheath are also distorted.

Keywords:*Phenol chloro derivatives(pentachlorophenol),Periplaneta americana (Linn), Tissue (ovary).*

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Intorduction

The fat body develops during growth of insects and accumulates protein, glycogen and lipid (Banerjee, 1971; 1981) thus their cells increase in size. The main dissipation of these metabolite are the gonads, particularly the ovary, the yolk precursor substance deposited in the insects ovary are protein, glycogen and lipid. Paillot (1945) demonstrated lipid depletion in the fat body with the incipient appearance of yolk precursor (Hill, 1963; Pardi., 1939; Verma and Das, 1974; Verma and Mohanty, 1975; Couble, 1978). The formation of fat body is debatable, however since electrophoretic studies of fat body extract failed to show the presence of vitellogenin (Pardi., 1939; Gupta, 1966) or show very small amounts (Minke., 1987). The fat body does not seen to be an important although the protein contents of the fat body decreased during egg maturation (Minke., 1987).

The tunica propria of normally developed (control group) or resorbed oocytes (experimental group) showed high protein and PAS positive intensity with presence of sudanophilic material in the investigation in *Periplaneta americana* reported by Bhide., (1981, 1982, 1985).

In most insects the ovaries of mature female after egg laying show the presence of a number of dark coloured rounded bodies at the junction of peduncles and the ovaries. These dark coloured bodies are known as 'Corpora lutia'. Histological and Histochemical study of the corpora luteum and oocyte resorption in Orthopera has been investigated in *Schistoceranca gregaria* (Rizki., 1974; Doene., 1961). *Schistoceraca gregaria* and *Locusta migratora* (Singh., 1965), *Schistoceraca gregaria* (Highnam *et al.*, 1963; Lusia, 1963), *Poepilocerus pictus* (Sahaim, 1971, 1978; Bhide, 1982, 1985), *Sphaerodema rusticusm* (Bhide, 1985, 1982). *Periplaneta americana* (Bhide, (1982, 1985, 1981); Jain, (1988).

Materials and Methods

Collection and Rearing of Insects

The insect selected for the present study is *Periplanata americana* (Linn) (Female adult)) Orthoptera: Dictyoepra.

Periplaneta americana, were collected from hotel, garbage and dark wet places and reared in insect eages in the laboratory and fed regularly with balanced diet and water.

The chemical used for the present investigation was Pentachlorophenol.

Method of Treatment

The concentrations were determined according to the highest of mortality with a high dose and doses below it, till safe concentration was

reached which served as experimental concentration.

Pentachlorophenol was given in food LC_{100}, LC_{50} and LC_0(experimental concentration) values were calculated by the method of Finny (1971). LC_{100}0.5% LC_{50} 0.25% and LC_0 0.07% for Pentachlorophenol were calculated and used as experimental concentration. These doses were calculated at 96 hours duration. The experimental concentration was used throughout the experiment.

The adult insects which were treated with Pentachlorophenol were vivisected after 5,10,15 and 20 days of the treatment.The experimental insects were divided into three groups 10 pair of insects (Female adult) were used in the experiment. the experiment were carried out in the following combinations:

1. The group of insects which were neither treated with drug nor their solvent comprised the normal group.
2. The group of insects which were treated with same volume of solvent acetone comprised the central group.
3. The group of insects which were treated with the drugs comprised the experimental group.

Fixation of Tissue

The tissue selected for the present study was ovary, All the tissues were studied in case of the adult female only.

To study the affected histopathology of the tissues, treated insects as well as control were fixed in aqueous Bouin's fluid and Cornoy fluid. The paraffin blocks of the tissue were cut a 6μ thickness. This was followed by staining technique.

Results

Normal Histopathology of Ovary of adult *P. americana* (F)

Each ovariole is lined with follicular epithelium which is covered with two membrane the tunica propria and the external ovariole sheath. A short pedicle or ovariole. A short pedicle or ovariole neck connects each ovariole with the lateral duct and genital chamber. The nucleus is oval situated at terminal end of the oocyte. The chromatin material is amorphous and is scattered irregularly. There are 4 to 8 nucleoli in the youngest oocytes but later on their number decreases with the development of the oocytes. The follicular epithelium is cubical and rectangular with oval nuclei and the inter follicular tissue has small oval nucleus (Fig. 1a and 1b).

Control Series

The control insects of the present investigation did not show any deviation from the normal histology in terms of ovary.

Pentachlorophenol treated adult *Periplaneta americana* (F)

5 Days

The oocytes asre degenerated and distorted in appearance. The follicular epithelium cells are with diffused

chromatin material is immature oocyte whereas in mature oocyte the follicular epithelium cells are with pycnotic nuclei (Fig. 1). The follicular epithelium cells in immature oocyte were also distorted and obliterated at different places. The mature oocyte are with degenerated ooplasm. The tunica propria and ovariole sheath have lose contact with the oocytes.

10 Days

Degeneration of ovary is further evident. Most of the oocytes are distorted in shape. The ooplasm of the immature oocytes is contracted, degenerated or depleted (Fig. 2a) The follicular epithelium cells of the mature oocyte shows pycnotic nuclei. The mature oocyte are also distorted in shape and their ooplasm lacking yolky material (Fig. 2b). The follicular epithelium cells of the mature oocyte are with diffused and pycnotic nuclei.

15 Days

The ovary degenerated which is evident due to the distorted shape of the oocytes. Their ooplasm is ill developed and contracted in immature oocytyes. The mature oocytes with degenerated, ooplasm (Fig. 3a) The follicular epithelium cells are also degenerated, obliterated and appear as a thin pycnotic layer. The tunica propria and ovariole sheath are also distorted. The mature oocyte are also with ill developed ooplasm (Fig. 3b).

20 Days

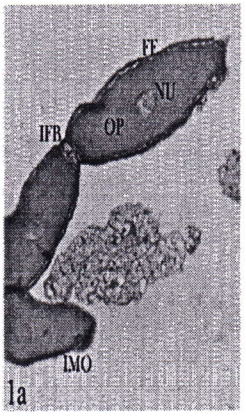
The entire ovary is in a degenerated state which is evident due to disintegrated oocytes. The mature Oocytes depleted off their contents (Fig. 4a). The follicular epithelium cells of the immature oocyte is weak and with diffused chromatin material whereas in mature oocytes (Fig. 4b), the follicular epithelium cells are vacuolated and without nuclear contents. The tunica propria and ovariole sheath are also distorted (Fig.4c).

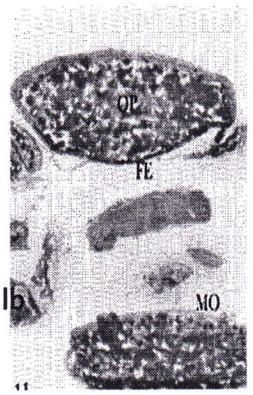
Discussion

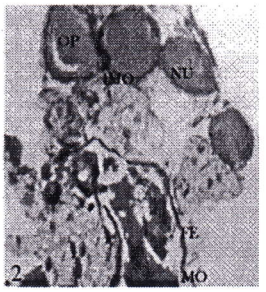
As regard the female gonads (ovary) the visible damage to the oocytes due to the effect of 2,4-DNP treated insects, showed that follicular epithelium in immature oocytes were distorted and degenerated. The immature oocytes were with contracted and dengenerated ooplasm and at some places the follicular epithelium migrated inside the ooplasm. In mature oocytes, yolk platelet present, prior to the treatment become disintergrated and distorted and corpus luteum was also distorted. In confirmation with present finding Kaur *et al.* (1986, 87) reported defects concerning differentiation of oocytes in ovary alongwith reduced germarium and previllarium with few or no occytes. In treated insects, immature oocytes the follicular epithelial cell were with pycnotic nuclei and some nuclei were with diffused chromatin material, lacking

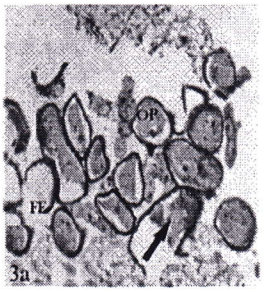
yolky material. Follicular epithelium layer in immature oocytes was obliterated and distorted. In confirmation with the present finding Ahi (1987, 88) also reported that the follicular epithelium migrated inside the ooplasm which appeared as lecitholytic cells and which helps in the resorption of yolk.

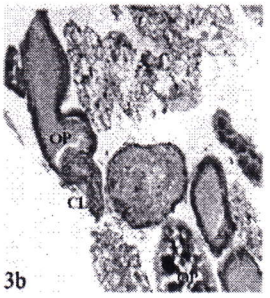
Mishra also reported in *D. similis* that in the germarium, the trophocytes were with the pycnotic nuclei in cypermethrin treated insect while in difulubenzuron treated insect the germarium was obliterated and necrotic, yolk platelets became degenerated and distorted. The contracted ooplasm interferes with yolk deposition, probably leads of dysfunction of the ovaries.

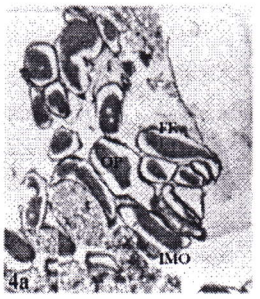


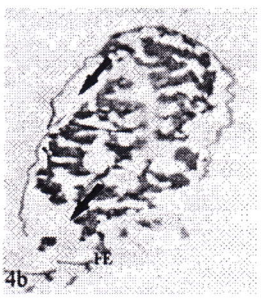


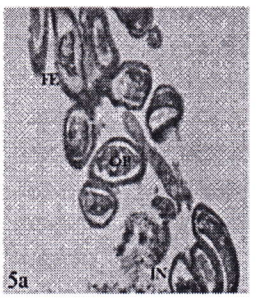


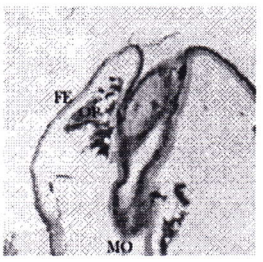












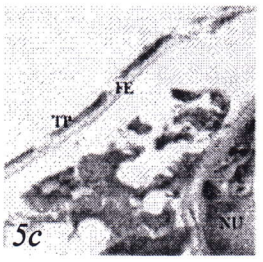


Fig. 1a Section of the ovary of normal adult *P. americana* showing, the oocytes with centrally located nucleus and well developed follicular epithelium and ooplasm (X100) Haematoxylin/Eosin.

Fig. 1b The same showing mature oocyte with well developed ooplasm (X100)Haematoxylin/Eosin.

Fig. 2 Section of ovary of adult female *P. americana* showing, immature oocyte with disrupted and obliterated follicular epithelium, mature oocyte with degenerated ooplasm after 5 days withPCP (X100)Haematoxylin/Eosin.

Fig.3a Section of ovary of adult female *P. americana* showing, distorted oocyte, degenerated ooplasm in immature oocyte after 10 days withPCP (X100)Haematoxylin/Eosin.

Fig. 3b The same showing distorted immature oocyte attached with corupus luteum, pycnotic follicular epithelium, distorted tunica propria (X440)Haematoxylin/Eosin.

Fig. 4a Section of ovary of adult female *P. americana* showing, distorted oocyte with contracted ooplasm, degenerated follicular epithelium after 15 days withPCP (X100)Haematoxylin/Eosin.

Fig. 4b The same showing ill developed ooplasm distorted follicular epithelium in mature oocyte (X100)Haematoxylin/Eosin.

Fig. 5a Section of ovary of adult female *P. americana* showing, ill developed ooplasm, degenerated and vacuolated cytoplasm, distorted follicular epithelium in immature oocyte after 20 days treatment PCP (X100)Haematoxylin/Eosin.

Fig. 5b The same showing distorted mature oocyte without ooplasm (X100)Haematoxylin/Eosin.

Fig. 5c The same showing an enlarged view of mature oocyte (X440)Haematoxylin/Eosin.

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