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A Review of Collecterial Gland of a Beetle CybisterTripunctatus (Ol)

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Abstract*- The collecterial gland is a long thread-like enormously coiled structure Opning into the common oviduct. The colleterial gland is composed of a layer of columnar epithelial cells Which undergo cyclical changes during the reproductive phase. The lumen Is filled with secretory material. Oocyte development and vitellogenesis . The terminal oocytes of the ovarioles undergo gradual development Exhibiting successive five stages of vitellogenesis; pre-vitellogenic, Early-vitellogenic, mid –vitellogenic , late-vitellogenic and maturation stages.*

I- INTRODUCTION

The wall of the gland Composed of a layer of columnar epithelial cells with large spherical nuclei at The center and cytoplasmic inclusion in the cell bodies. The cell and nuclear Diameter of the epithelial cells measure about 16.40 and 12.30±цm Respectively. Externally they are coverd with a thin peritoneal membrane. The Epithelium is internally lined with a thin layer of cuticular intima. The epithelial cells undergo cyclical changes during secretory phase, The nuclei become large the perikarya are inintially containing secretory granule Around the nuclei and later on disbursed towards the periphery. The secretory material is well stained by conuterstains. It is stored into the lumen during post copulation period. The presence of intracellular as well as inter cellular spaces in the epithelial cells can be seen distinctly.

II-MATERIAL AND METHOD

The aquatic carnivorous beetles were collected from the ponds Located Pavani, Disti.Bhandara (MS). The beetles were reared in laboratory Throughout the year to carry out the present studies. The female reproductive organs dissected in insect Ringer's Solution under stereoscopic binocular microscope. The organs were fixed in Bouin's fluid for 18-24 hrs for histology and in 6 to 12 hours in Carnoy's fixative For DNA, RNA. Protein and carbohydrate histochemistry. The fixed tissues were, Dehydrated and embedded in paraffin wax at 60-62. The sections were cut at 4 And 10 um thickness on the microtome for histological and histochemical Staining techniques respectively. Following histological techniques (Humason, 1962) were used by Ehrlich's Haematoxylin-eosin (HE) method.

III-OBSERVATION

The terminal oocyted undergoes development periodically. Repeated cycles of oocyte development and subsequent cycles of oviposition Occur in the adult female Cybistertripunctatus. Development of the terminal Oocyte shows consective stages of vitellogensis. During development the terminal follicles show remarkable changes In the oocyte shape, size, cytological structure, deposition of yolk material and Formation of egg-membranes along with the cytomorphological change in the Trophocytes and foolicular epithelium. The entire process of vitellogenesis can be Divided into following five stages :Pre-vitellogenic; Early-vitellogenic; Mid-vitellogenic; Late-vitellogenic and Maturation stage. Histomorphological changes during vitellogenesis were as follows:

Pre-vitellogenic stage- In the newly immerged females. The ovaries are small threadLike structures measuring about 20.00± 2.00 mg in weight. The Follicle is filled with cytocysts and the oocytes are

undifferentiated. In two Day-old females, differentiation of nurse cells and oocyte become distinct. Most Of the region of follicle is oocupied by the nurse cells, and the oocyte is very Small, lying ventrally. The oocyte bears centrally placed large germinal vesical. The cytoplasm of oocyte is granular. The nurse cells are large and their nuclei, Are lobulated. The nurse cells measure about 96.10 ± 0.48 цm in diameter. They discharge secreroty material into the oocyte through the redial canals. The follicular epithelium of the previtellogenic oocyte is composed of squamous Ephithelial cells. They posses large spherical nuclei at the centre measuring about 8.10± 0.5 цm in diameter. The pre-vitellogenic oocyte grows upto 201 ± цm In length. Thetransport of secretary material from the nurse cells to the Previtelloginic oocytes is well evident. The pre-vitellogenic oocytes are filled With the granular cytoplasmic inclusion. In 3 day-old females the pre-vitellogenic Oocytes further grow up to about 255.0 ± 25 цm in length and 20± 2 цm in Diameter respectively. Along with the oocyte, the follicular epithelial cells along With their nuclei increase in size.

The nucleoli in the cuclei of follicular cells are very prominent. TheChromatin material of the nuclei of the nurse cells is dispersed and granulated. The pre-vitellogenic oocytes are devoid of yolk bodies. The-Early vitellogenic stage. In the 4 day old beetles, the ovaries are gradually increased in Size and measure about 97.00 ± 9.50 mg in weight. The terminal oocytes are Encircled by a double layered follicular epithelium. The terminal oocytes Become large and occupy almost half the portion of fo follicles. Rest of the portion Of the follicle is occupied by a group of the nurse cells. The nurse cells are found To the large in size with well defferntiated ring canals. The nucei are lobulated Enormously containing granular chromatin material. The transport of secretory Material from nurse cells to oocyte occurs predominantly. Accumulation of fine Granules is well-evident in the intrafollicular spaces formed within the follicular cells. The follicular cells are fully-packed with granular material. The follicular cell are tall and columnar in shape in the 5 day old beetles. The early vitellogenic oocytes measure about 290 ± 16 цm in length And 60.0 ± 4 цm in diameter while the nurse cells measure about 90.7 ± 6 цm in Deameter. The muclei of follicular cells measure about 7 ± 1 цm in deamete. Mid-vitellogenic stage In the 6 day old beetles, the ovaries become large and Measure about 227.00 ±13.00 mg in weight. It is foung that the volume of oocyte increases greatly and subsequently, the nurse cells also attain the maximum size.At this stage, the nurse cells become active and the cytoplasmic material flows Into the respective oocyte through the intercellular bridges. The terminal oocytes Are filled with initially small dense spherical yolk bodies at the periphery.

They measure about 400± 23цm in length and 295.5 ± 29 цm in Diameter while the nurse cells are 97.0 ± 11 цm in diameter. The follicular Cells are spherical in shape. The nucei of follicular cells are measured about 11.0 ± 0.69 цm in diameter. In the 7th day old beetle, the terminal oocytes attainthe maximum size i.e. 445 ± 22 цm in length and 342 ± 21 цm in deameter andare fully filled with yolk bodies. The nurse cells increase to 103 ± 9 цm in diameter and the nuclei of follicular cells to about 14 ± standard error цm in diameter . At this stage the foolicular epithelial cellas are full of RNA contents. he late- vitellogenic stage In the 8 day old beetles, the ovaries increase in size and measure About 340.00 ± 20.00 mg in weight. The nurse cells undergo degeneration and Are reduced in size greately . The follicular epithelial cells become squamous and Filled with large quantity of cytoplasmic inclusions. The yolk bodies occupy whole Substance of the terminal oocytes. The follicular epithelial cells secrete globular Chorion bodies in the form of fine membranous vesicals. The size of the late Vitellogenic oocyte increases i.e. 663.5 ± 14.5 цm in diameter.

The nurse cells decreases in size . The follicular nuclei measure About 15.2 ± 1.25 цm in diameter. The formation of vitelline membrane and the Chorion is initiated. The maturation stage In the 10 day old beetles, the ovaries measure about 273 ± 22 mg in Weight. The terminal oocytes represent the maturation stage. The terminal oocytes Become large and surrounded by two membranes, the internal vitelline and

The external thick chorion. The trophocytes are completely disappeared. The Columnar follicular cells are greatly regressed and wide spaces are formed Initially in between the vitelline and chorion membranes and later on between Thechorion and follicular epithelium. The matured oocytes are fully packed with Yolk bodies and measure about 657 ±27 цm in diameter, and nuclei of follicular Cells measure about 12.4 ± 1.80 цm in diameter.

IV-DISCUSSION

The colleterial gland in Cybistertripunctatus is well developed as Elongated, thread-like, coiled structure

and the epithelium of the wall is internally Lined with a thin layer of cuticular intima suggesting ectodermal origin of the Gland. The epithelial cells contain large amount of cytoplasmic content and theNuclei show variation in their size showing cyclic seretory activity (Chen etal., 1962; Weaver and Edward, 1990).

The secretory material of female accessory gland is analysed as the Proteinaceous material in Schistocercagregaria (Szopa, 1981 a, b,), PhlebotomusPernicianus (Fausto et al.,1997) and liporprotein in nature in Gesonulapunctifrons (Ghosh et al., 1998).

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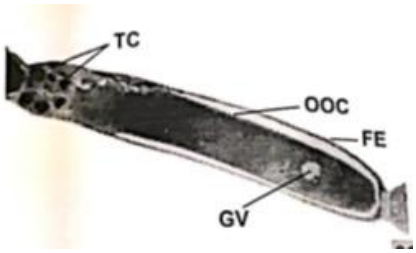

Abbrevations :

CI	-	Cuticular intima
CTW	-	Connective tissue wall
EC	-	Epithelial cells
LU	-	Lumen
NU	-	Nucleas