CHAPTER – V

MAST CELLS IN THE OVARY OF THE LIZARD,

CALOTES VERSICOLOR
A number of studies on mammals suggests that histamine might have a role in ovarian physiology. It may be involved in follicular growth (Knox, 1974), ovarian blood flow (Ellinwood et al., 1978) and ovulation (Espey, 1980; Kitai et al., 1985). The mast cells are known to be the source of histamine (Ellinwood et al., 1978). The mast cells have been localized in the mammalian ovary, however, their distribution seems to be species specific. They are distributed in the follicular wall in the rabbit and cow ovary (Cupps et al., 1959; Bjersing and Cajander, 1974), while in the rat ovary, they are localized in the medulla and hilus region (Jones et al., 1980). Further, mast cells have been observed only in the hilus region and near the blood vessels that enter and leave the ovary (Krishna and Terranova, 1985).

Among nonmammalian vertebrates the presence of mast cells in the ovary of domestic fowl has been reported (Weight, 1970; Gupta and Gilbert, 1988) and mast cells are known to be distributed throughout the ovary, both in stroma and in the cortical region, theca of normal and atretic follicles.

Among reptiles, there appears to be a single report on the presence and role of mast cells in the ovary of the lizard,
Anolis carolinensis (Jones et al., 1975a). In A. carolinensis, mast cells are localized in the stroma of the ovary and in the theca of growing follicles above 0.5 mm diameter. Jones et al. (1975a) suggested that mast cells play a role in follicular growth in A. carolinensis. However, this report does not mention whether the mast cells are present in the atretic follicles and the post-ovulatory follicles or not. The present study was undertaken to survey the distribution of mast cells in different ovarian components, viz., germinal bed area, previtellogenic and vitellogenic follicles, atretic follicles, postovulatory follicles and stroma in the lizard, Calotes versicolor. A visual subjective gradation of the nature and quantity of mast cells in the ovaries of the lizard from prebreeding, breeding and postbreeding seasons is also made.

MATERIALS AND METHODS

Female lizards C. versicolor collected from a local supplier in Dharwad during March, June and October were autopsied and the ovaries were fixed in Bouin's fluid, cleared in benzene and embedded in paraffin wax. 6 μm thick sections were cut serially and stained with Toluidine Blue (E.Merck, Germany) following the procedure as described by Humasson (1979).
The sections of the ovaries were observed under microscope to localize mast cells which take up deep reddish purple stain with Toluidine Blue.

**OBSERVATIONS**

A few mast cells were found among the theca of the previtellogenic follicles above 0.2 mm diameter (Fig.5.1 and 5.2). In vitellogenic follicles, the thecal mast cells were more abundant but were very much compressed and slightly degranulated and could be detected with difficulty under low magnification (Fig.5.3).

Mast cells were distinctly observed in the thecae of atretic follicles in the early stages of previtellogenic atresia (Fig.5.4) and their number appeared to be more than that present in the thecae of the normal follicles of similar sizes.

In the newly formed postovulatory follicles, some cells in the vicinity of blood vessels in the theca showed some metachromatric reaction, but granulation was not distinct in these cells suggesting the degranulation of mast cells (Fig.5.5). But distinct mast cells with metachromatic granules were scattered amidst the luteal pigments in the later stages of postovulatory follicles or corpora albicans (Fig.5.6).
Abundant mast cells of comparatively larger size than observed in the thecae of the follicles were found in the stroma of the medullary region. The mast cells in the stroma of ovaries from lizards collected in October (postbreeding phase) and midbreeding phase (July) appeared more than that in the stroma of ovary of lizards autopsied in March (prebreeding phase) (Fig. 5.7 and 5.8). No mast cells were observed in the germinal bed area.

DISCUSSION

In the present study, the mast cells are found in the stroma and follicular wall of the normal, atretic and postovulatory follicles in C. versicolor. Jones et al. (1975a) have reported the presence of mast cells in the thecae of normal follicles and in the ovarian stroma in A. carolinensis. Based on their study involving changes in the number of mast cells and histamine levels with the growth of the follicles in A. carolinensis, they have suggested that histamine plays a role in the follicular growth in A. carolinensis by influencing blood vessel size and permeability. Further, anti-histamine treatment blocked the effect of histamine and also blocked estrogen-induced growth of the largest follicles in the larger ovary of A. carolinensis. Thus, Jones et al. (1975a) proposed that estrogens may be responsible for inducing histamine
release from thecal mast cells and the histamine released from mast cells increases hyperemia and thecal blood vessel permeability which in turn increases the access to and passage of yolk protein into the growing oocyte. Further, some follicles in the ovary become atretic because larger sister follicles appropriate a greater percentage of blood flow. In the present study, the increase in the number of thecal mast cells with the growth of the follicle in *C. versicolor* is similar to that reported in *A. carolinensis*.

The present study appears to be the first report about the presence of mast cells in the atretic follicles in a lizard ovary. The mast cells are found in comparatively larger number in the thecae of previtellogenic atretic follicles when compared to that found in the normal follicles of the same size. In view of the fact that mast cells have a role in the follicular growth in the ovary of *A. carolinensis*, it is difficult to attribute any role to mast cells in the thecae of atretic follicles in *C. versicolor* based on the present study.

The mast cells are very much compressed and partially degranulated in early stages of vitellogenic follicles. Hence, the degranulated mast cells present in the freshly formed postovulatory follicles in *C. versicolor* might be the cells present in the follicular wall of preovulatory follicles. However, the mast cells having
compactly arranged granules are observed in the later stages of postovulatory follicles. It is interesting to note that the stromal mast cells are more abundant in the ovary of the lizards during postbreeding season when compared to that present in the ovaries of lizards from prebreeding season. As suggested by Jones et al. (1975a) the stromal mast cells might get incorporated into the theca of growing follicles and form thecal mast cells in _C.versicolor_ as stromal mast cells are less abundant in the ovaries of prebreeding lizards having many large growing follicles. It appears that mast cells in postovulatory follicles probably contribute to the stromal mast cells in _C.versicolor_.

Though the present study does not deal with the functional aspect of mast cells in the ovary of _C.versicolor_, the presence of the mast cells in different components of the ovary suggests that they might have a role in the ovarian physiology in _C.versicolor_.

SUMMARY

1) The localization of mast cells in the different components of the ovary has been investigated during the prebreeding, breeding and postbreeding phases in C. versicolor.

2) The mast cells are found in the theca of the previtellogenic and vitellogenic follicles. The mast cells appeared to be more in the large follicles than in small follicles. Further, in the vitellogenic follicles the mast cells were compressed and appeared degranulated.

3) The mast cells are also found in the theca of previtellogenic atretic follicles.

4) The mast cells found in the newly formed postovulatory follicles (corpora lutea) are degranulated whereas densely granulated mast cells are found along with luteal pigments of the late stages of corpora lutea.

5) The mast cells are also found in the stroma of the ovary and they are more abundant in the stroma of ovaries during postbreeding phase than during prebreeding phase.
It is suggested that the mast cells may have a role in the follicular development in the ovary of *C. versicolor*. Further, the mast cells of the corpus luteum might contribute to the stromal mast cells in *C. versicolor*. 