Thesis Title Ultrastructure of Follicle Cell and Its Steroid Secretion in *Rana tigerina*

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ABSTRACT

In order to study the ultrastructure of follicle cells as well as the numbers surrounding the various stages of oocytes, the defolliculated oocytes were fixed in 2.5% glutaraldehyde in 0.05 M Millonig buffer for 2-4 hours, intact follicles were fixed in 4% glutaraldehyde, 2% paraformaldehyde in 0.05 M Millonig buffer. Defolliculated oocytes were processed for examination by scanning electron microscopy, and the number of follicle cells were counted, whereas the intact oocytes were prepared for examination by conventional transmission electron microscopy. In addition, the follicles of all stages were measured for the levels of estradiol and progesterone by radioimmunoassay.

The follicle cells have flattened and oval shape. The surface close to the theca layer exhibits short microvilli while there are numerous slender processes protruding from the lateral and ventral surfaces. Some

ventral processes traverse the vitelline coat to adhere to the oocyte's membranes. Follicle cells are connected to each other by desmosomes at the contacts between their thin cytoplasmic processes. Follicle cells from stage I and II oocytes contain short RER, mitochondria with few cristae, and free ribosomes. Their nuclei contain mostly euchromatin with only thin rim of heterochromatin along the nuclear envelopes. The number of mitochondria with elaborate cristae, RER, free ribosomes, SER, Golgi complex, coated vesicle increase in follicle cells from stage III oocytes. The ultrastructures of follicle cells from stages IV,V and VI oocytes resemble those from stage III oocyte. The number of follicle cells increase with the oocyte growth. The oocytes with diameters range 0.8, 0.9, 1, 1.1, 1.2, 1.3, 1.4, 1.5 and 1.6 mm are surrounded by 9430 ± 572, 13126± 670, 17185± 984 , 18571± 1356, 19730± 3121, 21049± 3019, 25160± 406, 28668± 1075, 36566± 1152 follicle cells, respectively.

Both control and frog pituitary-hormone-treated follicles were cultured for six hours and the amount of estradiol and progesterone present in both the medium and follicles was determined by radioimmunoassay. Previtellogenic (stage I and II) follicles secreted very low levels of these two steroids in both presence and absence of frog pituitary hormone. Vitellogenic follicles were active in secreting estradiol. The highest level of estradiol was secreted by stage IV follicle (53.5 pg/ follicle). In follicles larger than stage IV, estradiol secretion decreased as follicular size increased. In contrast, full-grown follicle secreted much more progesterone (52.7 pg/ follicle) than previtellogenic and vitellogenic follicles.