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Histology of the ovary of *Chinchilla lanigera* in captivity

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ABSTRACT

Chinchilla, the lanigera variety in particular, is one of the most valuable rodents in the fur industry. The chinchilla ovary is morphologically similar to that of other South American hystricognath rodents, especially as regards its anatomy and, to a lesser degree, its histology.

The presence of numerous primary follicles throughout the annual cycle suggests that a few of them are recruited to initiate growth and differentiation during folliculogenesis. Primary follicles with two or more oocytes are common; this is not the case with follicles at more advanced stages, suggesting that they do not develop.

Only one or two large corpora lutea (CL) and three to five small or accessories CL were observed but no corpora albicans. The presence of accessory CL may reflect the importance of continuous hormonal production to support prolonged gestation. Atretic CL were also present, showing signs of degeneration in luteal cells. The interstitial cells distributed throughout the cortex were the main histological feature shared with other species, as stated in previous reports. Antral atresia was observed in all sizes of antral follicles while basal atresia was confined exclusively to smaller follicles.

1. Introduction

Chinchilla, together with squirrel, beaver, mouse and rat, belongs to the order Rodentia which, with its almost 2000 species, constitutes the most numerous order of mammals. A nocturnal rodent, native to South America, chinchilla (*Chinchilla lanigera* and *Chinchilla brevicaudata*) belongs to the suborder Hystricomorpha, whose members have a similar reproductive pattern. They are fully developed at birth, fully furred and with open eyes. Their gestation period is longer than that of other rodents (111 days) and they usually have 1 or 2 young per litter.

Chinchillas, seasonal polyestrous animals whose reproductive period ranges from November to May in the northern hemisphere and approximately from April to October in the southern hemisphere, are native to the Andes Mountains and inhabit the Andean plateau from southern Peru and western Bolivia to northwestern Chile and Argentina. Wild chinchillas are mainly vegetarian, live in rocky caves, and develop thick fur because of the cold climate. They always live in colonies, as they are social animals. Their fur is highly appreciated, which has led to indiscriminate hunting resulting in a dramatic decrease in the wild population. The maximum lifespan of wild chinchillas is 6 years. In captivity, it ranges from 12 to 15 years, a difference attributable to factors such as the greater amount of available food and the absence of predators. Because of the characteristics of its fur, chinchilla is one of the most valuable rodents in the fur industry, so that at present most chinchilla specimens are farm raised, especially those of the lanigera variety.

Studies of the anatomy of chinchillas of include detailed descriptions of their external morphology and reproductive cycle (Hillyer et al., 1997; Jimenez, 1990). Weir (1966,

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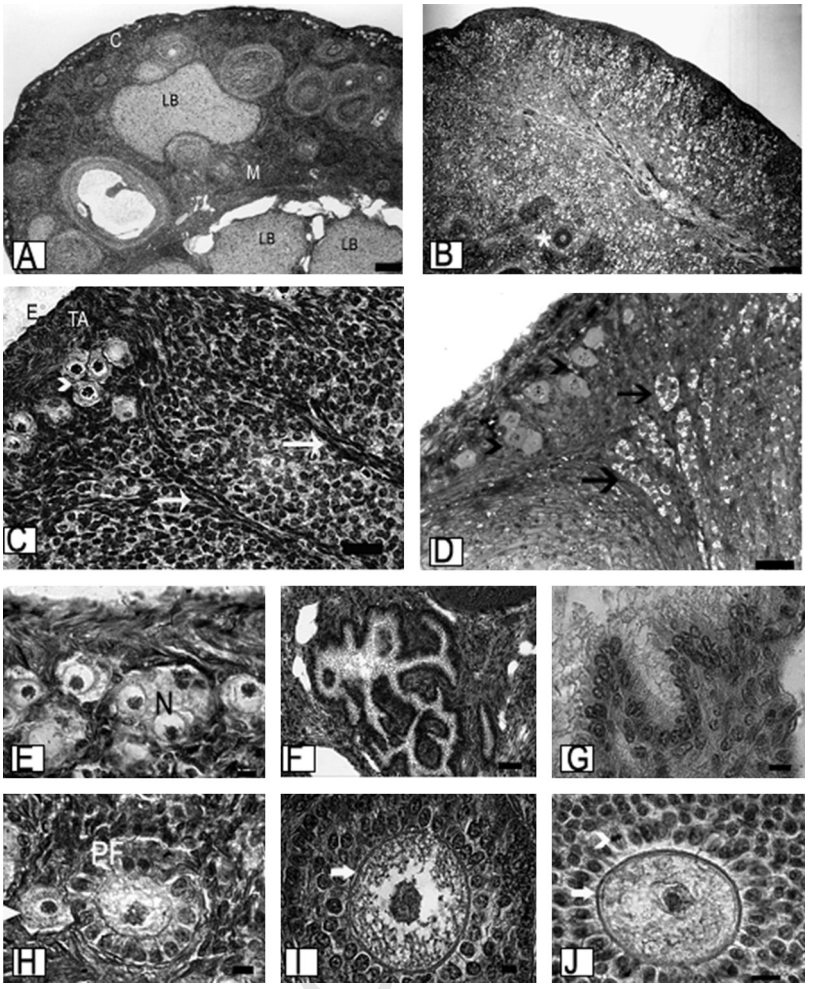

Plate 1. (A) Young adult female ovary, C: cortex; LB: luteal body; M: medulla. PAS H–E. Scale bar represents 121.18 μm. (B) The ovary of senile animals shows few follicles (asterisk). H–E. Scale bar represents 153.71 μm. (C) Connective tissue trabeculae (arrows). E: lining epithelium; TA: tunica albuginea; primordial follicle (arrowhead). PAS H–E. Scale bar represents 25.88 μm. (D) Interstitial glands (arrows); primordial follicles (arrowheads). TB. Scale bar represents 22.49 μm. (E) Primordial follicles in nest (N). H–E. Scale bar represents 10.38 μm. (F) Rete ovarii (200×). H–E. Scale bar represents 38.38 μm. (G) Rete ovarii at higher magnification (1000×). H–E. Scale bar represents 12.88 μm. (H) Primordial (arrowhead) and primary follicle (PF). H–E. Scale bar represents 7.56 μm. (I) Small secondary follicle with pellucid zone (arrow). H–E. Scale bar represents 6.18 μm. (J) Secondary follicle with granulosa cell in metaphase (arrowhead). H–E. Scale bar represents 16.69 μm (A, C, D, E, F, G, H, I and J correspond to young adult female ovary).

1974) conducted the analysis and description of the chinchilla reproductive system, this being the only existing study up to the present.

An important problem in the intensive breeding of chinchillas is their low reproductive rate and the lack of knowledge of their reproductive biology. The aim of the present study was to provide a histological description of the ovary, during the sexual maturity of adult *C. lanigera* in captivity.

2. Materials and methods

2.1. Animals

We worked with fourteen sexually mature females of *C. lanigera* weighing 750–800 g. All animals were maintained under a 12-h light–dark cycle (lights on from 07:00 to 19:00) at a constant temperature of 22 ± 1 °C, with food and water *ad libitum*. The animals were sacrificed by cervical dislocation and immediately taken to the laboratory in thermal containers to maintain constant temperature. Both ovaries were extracted and immersed in a fixative solution. Samples were taken during the May–August period.

2.2. Processing of samples

For the general histological description, ovaries were fixed in Bouin's solution and embedded in Histoplast. 5-μm thick sections were obtained and stained with hematoxylin–eosin (H–E). Four ovaries were fixed in a mixture of glutaraldehyde 2.5% and phosphate buffer 0.1 M at pH 7.4. After dehydration, they were embedded in epoxy resin to obtain 0.5- and 1-μm sections with an ultramicrotome and stained with Toluidine Blue (TB), which can infiltrate resin on a hot plate and reach the tissue. For determination of polysaccharides, mucopolysaccharides,

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