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Histological studies on the camel ovary (Camelus dromedarius) in relation to season

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A B S T R A C T

Aim of study was focus to assessment and distinguish the histological features of the camel ovary in relation to season. Materials and methods 57 ovaries were taken from adult she-camels (*Camelus dromedarius*) during the breeding and non- breeding seasons (37 ovaries in the breeding season and 20 ovaries in the non-breeding season). The ovaries were subjected to routine histological techniques (H&E and PAS). Result Histological findings revealed that camel ovary was covered by continuous sheet of germinal epithelium underneath a cortex which filled with different developmental stages of follicles and vascular medulla. The mature follicles had typical oocytes that surrounded with granulosa cells, cumulus oophorus, and presence of large antrum with thick theca externa. Zona pellucida showed strong PAS positive reaction. There was difference in number of mature follicles between breeding season and non-breeding season, in which ovaries in breeding season had higher number of larger size mature follicles than during the non-breeding season. Conclusion she-camel was a seasonal breeder with marked ovarian activity during breeding season.

Key words: Breeding season, Histological finding, Non-breeding season, She-camels

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1. INTRODUCTION

In many regions of the world was Great attention directed toward camel researches because it was the only animal that can survive for several weeks without water while still provide human beings with meat, milk, and hides. Focus on fertility of beauty is very important in the development of camel racing in the Middle East, so it's important to improve their reproductive efficiency (Fernandez-Baca, 1993). The reproductive efficiency of camels under natural conditions was generally low (Djellouli and Saint-Martin, 1992) probably due to a longer prepubertal period, the short breeding season, a long gestation period and a

prolonged (8–10 months) lactation period (Adams and summer, 1990).
The reproductive physiology of camels differs to that of other domestic livestock. She-camel exhibits multiple waves of ovarian follicular growth (Adams and summer, 1990). They were induced ovulators and therefore do not exhibit estrous cycles in the manner of spontaneously ovulating species of domestic livestock. Unmated, non-ovulatory females were sexually receptive most of the time, regardless of the stage of ovarian follicular development (Djellouli and Saint-Martin, 1992).

The aim of present study is to distinguish the histological features of the camel ovary in relation to season.

2. MATERIALS AND METHODS

2.1. Ovaries:

A number of 57 ovaries from she-camels (C. dromedarius) were collected during breeding and non-breeding season (37 ovaries during the breeding season and 20 ovaries during non-breeding season). The age of animals was roused between be 5-10 years according to El-Tayerb (1998). All animals were apparently clinically normal and slaughtered in Benha abattoir (Benha city, Qalubyia province, Egypt) during the period from 2013 to 2014).

2.2. Histological examination

small ovarian specimens for light microscopy were dehydrated in ascending grades of alcohol, cleared in 3 changes of xylene, impregnated in soft paraffin then blocks in paraffin. Paraffin blocks were cut into section of 5 Mm. Tissue sections were stained with HαE to study general architecture of the ovary, and in PAS staining for estimation neutral mucopolysaccharide content. Both fixation and staining techniques were done the according to Bancroft and cook (2009).

3. RESULTS

The ovaries of non-pregnant she-camels during non-breeding season were covered with single layer of cuboidal cells of the germinal epithelium. Numerous primordial and primary follicles were the common feature of the ovarian cortex (Fig. 1). Also, few small size and degenerated mature follicles were identified (Fig. 2) as well as markedly developed stromal cells (Fig. 3).

Concerning the breeding season, the ovaries of she-camel showed higher cuboidal cells of the germinal epithelium (Fig. 4) and many mature follicles on the ovarian surface (Fig. 5).

Moreover, the later were spread in the deep cortex in close contact of vascular medulla where numerous arterioles and venules were present (Fig. 6).

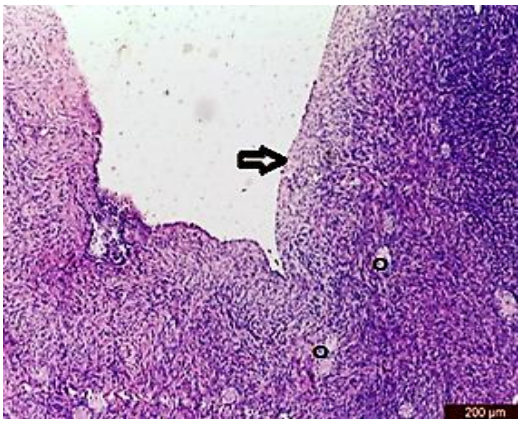

Fig. 1: Photomicrograph of the ovary of non-pregnant she-camel during non-breeding season showing single layer of low cuboidal cells with rounded nuclei lining the germinal epithelium of the ovary (arrow) and many primordial and primary follicles spread all over the ovarian cortex (o). H&E stain. Scale bar = 200 µm×10.

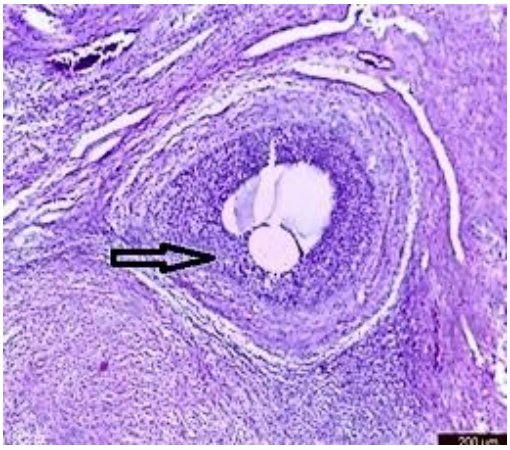

Fig. 2: Photomicrograph of the ovary of non-pregnant she-camel during non-breeding season showing degenerated follicle with no oocyte and has dark stained nuclei (arrow). H&E stain. Scale bar = 400 µm×10.

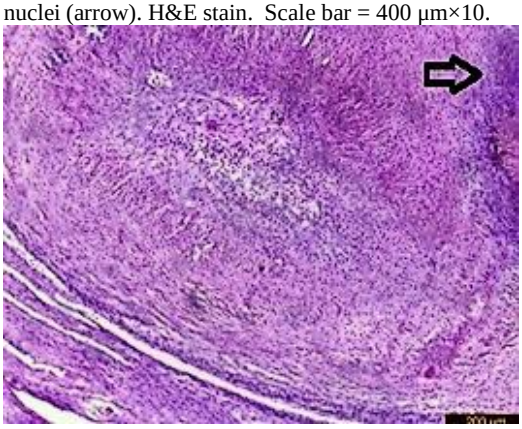

Fig. 3: Photomicrograph of the ovary of non-pregnant she-camel during non-breeding season showing well developed rounded darkly stained stromal cells (arrow). H&E stain. Scale bar = 200 µm×10.

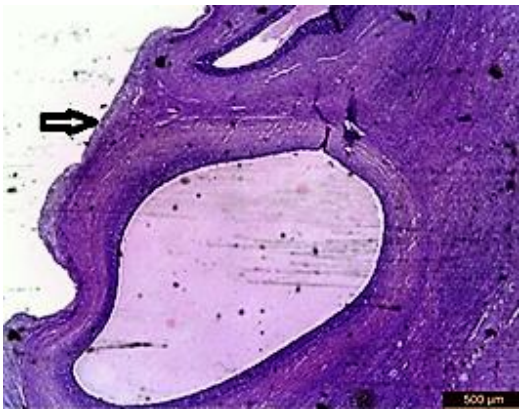

Fig. 4: Photomicrograph of the ovary of she-camel during breeding season showing single layer of high cuboidal cells with rounded nuclei that lining the germinal epithelium (arrow). H&E stain. Scale bar = 500 µm×4.

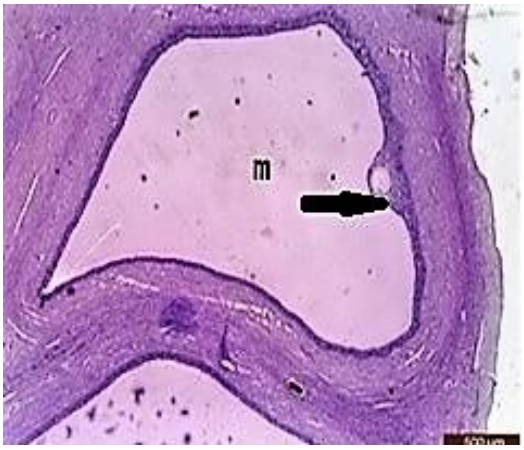

Fig. 5: Photomicrograph of the ovary of she-camel during breeding season showing mature follicles on the ovarian surface (m) that has oocyte surrounded by granulose cells (arrow). H&E stain. Scale bar = 500 µm×4.

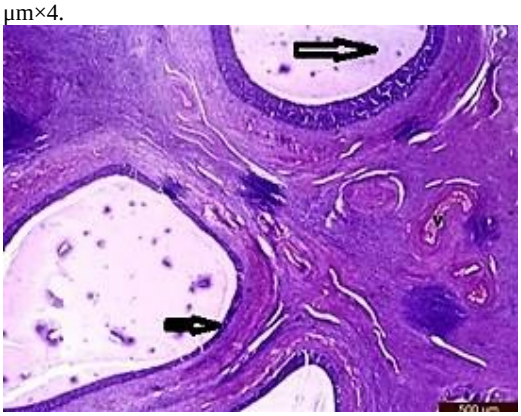

Fig. 6: Photomicrograph of the ovary of she-camel during breeding season showing clusters of many mature follicles (arrow) close to many blood vessels (v) in the deep cortex. H&E stain. Scale bar = 500 µm×4.

The mature follicle was characterized by large antrum filled with acidophilic structureless fluid, corona radiate surrounding the mature oocyte and heaps of cumulus oophorous carrying the oocyte (Fig. 7).

Well-developed zona pellucida was detected clearly by using PAS technique (Fig. 8). Theca folliculi of the mature follicles were well differentiated into theca interna and externa layers (Fig. 9) the area of contact between membrane granulosa and theca interna was characterized by presence of many blood capillaries (Fig. 10).

Fig. 7: Photomicrograph of the ovary of she-camel during breeding season showing positive PAS reaction in the zona pellucida that surround the oocyte (arrow). PAS technique. Scale bar = 100 µm×20.

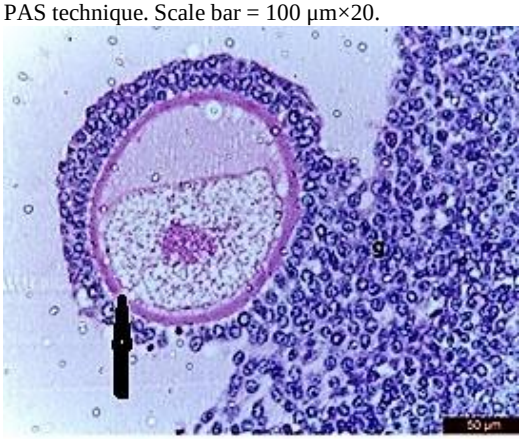

Fig. 8: Photomicrograph of the ovary of she-camel during breeding season showing positive PAS reaction in granulosa cells (g) and well-developed zona pellucida surrounding the oocyte of the mature follicle (arrow). PAS technique. Scale bar = 50 µm×40

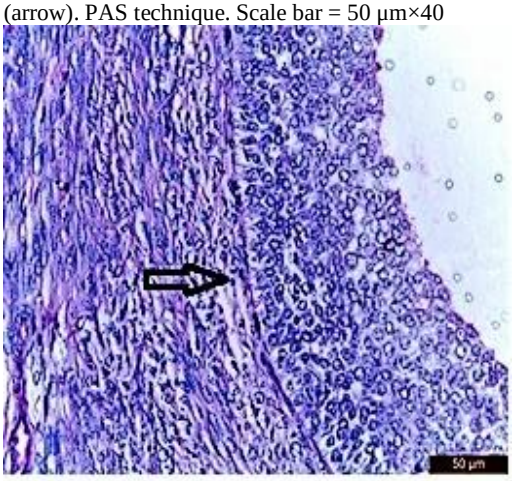

Fig. 9: Photomicrograph of the ovary of she-camel during non-breeding season showing negative PAS reaction but well differentiated theca interna and externa layers of a mature follicle (arrow). PAS technique. Scale bar = 50 µm×40.

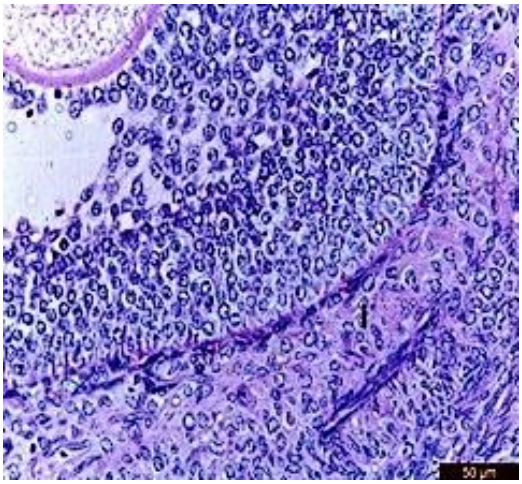

Fig. 10: Photomicrograph of the ovary of she-camel during non-breeding season showing negative PAS reaction. Note presence of blood capillaries in the area of contact between membrane granulosa and theca interna (i). PAS technique. Scale bar = 50 µm×40

4. DISCUSION

The histological findings of the camel ovaries in the present study revealed that the cortex filled with different stages of developing follicles where the primordial follicles were numerous, circumscribed and surrounded by concentric arranged stromal cells which appeared spindle in shape with spindle basophilic centrally located nuclei. The fact that the surface of mammalian ovaries was covered by a continuous sheet of germinal epithelium was demonstrated in the current work, where the ovary of adult camel was found to be covered by a continuous layer of germinal epithelium.

These cells were flattened in some parts and cubical in others, similar findings reported in cows (Sghiri and Driencourt, 1999, Hafez and Gordon, 2002) and buffalo (El-shafey,2001).These results were in accordance with Abdoon et al (2007) who suggested that follicular growth and maturation were optimal during the breeding season, while during non-breeding season, small follicles grow in a lesser number and fail to reach

maturity. This was indicated by the presence of a significantly few numbers of medium and large sized follicle during this period.

The cytoplasm of the cells was found to be acidophilic and reacted negatively with PAS, and contained glycogen (Harrison, 1995). The differences in PAS reactions might be as a result of decrease mucopolysaccharide substances according to the reproductive activity.

The current results revealed that the tunica albuginea of the camel ovary of the camel consist of devise reticular net and fine collagenous fibers with each other and were arranged parallel to the surface of the ovary. Many authors suggested that the tunica albuginea was a dense layer of connective tissues lying just beneath the germinal epithelium in the camel's ovary (Hadek, 2000), goat (Harrison, 2001) and buffalo (El-Shfey, 2001 and Nawar et al., 2001). The current results confirmed that the female camel were had a seasonal breeder animal usually the heat period is from November to March (Khanvilkar et al, 2009), although the female shows strong tendency to be regarded as a seasonal breeder, pregnancy can occur at any season of the year as a polyestrus animal.

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