Study the event cycles of Spermatogenesis and Spermogenesis in the Testes of Creeper

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Summary

Established that the seminiferous tubule is the site where the event cycle of its epithelium which form, the spermatozoa. The knowledge of this event is variable in different species of animals. However, a more detailed study had been made of in this research in order to identify this event cycle of spermatogenesis and spermiogenesis in creeper. The histological result of the creeper testes of creeper revealed the presence of a thin capsule which does not give off septa to divide the testes into lobules. The seminiferous epithelium in the seminiferous tubule had spermatogenic cells and sertoli cells and the whole was circumscribed by interstitial connective tissue contained leydig cells. The stages in sertoli cells structure were difficult to identify. The event cycle of seminiferous epithelium start with the presence of three type of spermatogonia(A,B,I-spermatogonia) The B_spermatogonia produce primary spermatocyte which showed distinguished phases included ,preleptoten, zygotene, diplotene, leptotene, pachytene and diakinesis phases. The secondary spermatocytes were derived from the primary spermatocytes. and end With the appearance of spermatids spermatogenesis which goes through Complex processes of differentiation include eighteenth stages lead to form the sperms inside the seminiferous tubule.

دراسة الحوادث الدورية لنشأت وحؤول النطف في خصي طير الكوجنCreeper

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الملخص

اصبح من الثابت ان النبيب المنوي هو موقع الحوادث الدورية للظهارة المنوية اذ تكون الحيامن لهذا، انجزت هذه الدراسة لاضافة معلومات لتشخيص الحوادث الدورية لنشأت وحؤول النطف في طائرالكوجن **Creeper**. اظهرت الدراسة النسيجية لخصي طائر انها محاطة بمحفظة رفيعة اذ لا تشكل حواجز لتقسيم الخصية الى فصيصات. تتكون الظهارة المنوية في النبيب المنوي من خلايا منوية وخلايا سرتولي وتحاط بنسيج ضام بيني تحتوي على خلايا ليدك. ان من الصعب تشخيص مراحل خلايا سرتولي . تبدأ الحوادث الدورية للظهارة المنوية بظهور ثلاثة انواع من سليفات النطف(ا،ب،وسليفات نطف) تشتق خلايا النطف الابتدائية من سليفات النطف نوع ب اذ تمر بأطوار تمايزية تشمل الطورقبل الخيطي ،الخيطي،الاعتناقي،التغلظي،التضاعفي والطور الحركي تشتق الخلايا النطفية الثانوية من الخلايا النطفية الابتدائية وتنتهي نشووء النطف حين ظهور الطلائع النطفية تمر الطلائع النفية بمراحل معقدة وتشمل ثمانية عشر مرحلة يتم فيها تكوين الحيامن.

Introduction

Morphology of cells forming the SE in domestic man species were done by Kumaran and .Turner(1) and de Reviers(2) in fowl ,clulow and jones (3) in Japanese quail, Marchand and Gomot(4) in ducks ,Brillard(5) in quinea-fowl, AL-Samawy(6) in adult pigeon, and AL-Ameley(7) in adult local breed Iraqi cock.

The difficulty in such morphology of the avian seminiferous tubules is probably due to the relatively rapid transition of certain germ cell categories(8). The event cycle of spermatogenesis is reflected in the spermatids derived from a single spermatocyte which means the ability of a given spermatid to be transform into functional spermatozoa. This ability is a strong indicator of the reproductive potential of an individual male (2,9,10). The goal of the present research is to denote the event cycle of spermatogenesis and spermiogenesis in the testes of creeper, as less attention has been taken and this attempt is to

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facilitate identification and retrieval of specific information which could be useful to functional and clinical application.

Materials and Methods

Twelve adult male creeper were purchased from local marked at Tikrit city, Iraq. All these birds were acquainted with the laboratory environment and kept for more than two weeks in order to eliminate whose have the signs of illness. These creeper were kept also under light (14 hours dark cycle) and provided with commercial bird food and tap water adlibitum prior to this study. Each creeper was sacrified by capitation. Abdominal laboratory was done for each bird and the viscera were carefully handled for the reproductive organs approach. The testes were obtained immediately. Each testes was transferd to alarge volume of 10% formalin labeled containers contain a shank of glass wool to aid keeping the testes free of a container bottom.

The period of fixation was for 24 hours. Then, washing out of the testes with running tap water for two hours. Dehydration of testes samples was done through a series of alcohol from 50%, 60%, 70%, 80%, 90% and 100% for two hours each concentration. Clearing of testicular tissues with xylene then embedded with molten wax . The next subsequent process was to cut the testes by using rotary microtome. The thickness of cutting is was 6 micrometers and the specimens was transformed in hot water path with 35 centigrade. And fixed on slide contain a mixture of egg albumin cover the slides. These samples were stained by weigarts iron hematoxylin and eosin stain(11). Photographs of examined slides were done with olympus microscope which supplied with digital camera.

Results and Discussion

The testes of creeper were found in the coelomic cavity and each testes was surrounded by a thin connective tissue capsule. There was no well-developed septa which diverage from the capsule to divide the testes into lobules. The testicular capsule of creeper (**Fig1**) was found composed of three layers, the outer most layers, the tunica serosa the most layer or the tunica serosa correspond to the derived mesothelium . From the peritoneal lining with the abdominal cavity of this bird. The tunica albuginea was, the thickest portion of the testicular capsule. The tunica vasculosa was composed of loose connective tissue, fibroblast and blood vessels. The results were coincided with (12) whom also ,declaired that there were no clearly defined branches of tissue. Leaving the tunica albuginea to enter the testicular parenchyma as septae. Van Nassauwefal (13) noted that avian testicular capsules and peritubular tissues were capable of contracting and facilitating the movement of testicular fluid into the recurrent duct system.

The testicular seminiferous tubules were lined with germinal epithelium contained two type of cells, the spermatogenic cells that produce spermatozoa and supportive sertoli cells that nourish the developing sperms. The spermatogenic cells were successively arranged in a continuous process of differentiation from the basement membrane toward the lumen (**Fig2**). These seminiferous epithelium in the seminiferous tubules metallized into basal and abdominal region via tight junction between adjacent sertoli cells. This was in accordance with(14,15). Sertoli cells were often triangular in outline contain irregular or elongated nuclei with prominent nucleoli. The developmental germ cells were adjacent to the sertoli cells. It is mostly difficult to describe cycle of stages or classification of sertoli cells as resting cells or immature cells and active sertoli cells or mature cells stated by lake (16).The present study showed the event cycle of spermatogenic epithelium within the seminiferous tubules in the testes of creeper. The spermatogonia undergo a series of mitosis and give rise to type A-spermatogonia, intermediate type and type B-spermatogonia. Indeed, it was difficult to identify the sub classification of spermatogonia which was found by ALSamarrae (17)whom reqisted spermatogonia AO. Spermatogonia AI, spermatogonia A2, intermediate spermatogonia, spermatogonia B0, spermatogonia B1, spermatogonia B2. Type A-spermatogonia were relatively large posses

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elliptical or round nuclei. These cells adhere to basement membranes of the seminiferous tubules. The nuclear chromatin propely located on one side of its nucleus. The intermediate type spermatogonia were found smaller than type A-spermatogonia and their situation were far from the basement membrane of the seminiferous tubules **(fig3)** coarsely clumped chromatin was found in their nuclei. Each nucleus contains one or two nucleoli. The big elliptical or round nuclei of spermatogonia type- B, possess of chromatin adherent to the nuclear membrane. Besides flakes of chromatin were also distributed throughout the endoplasm. one or two nucleoli were also noticed nearer to the nuclear membrane. The mitotic division of B-spermatogonia led to the formation of more spherical and largest cells known as primary spermatocytes. These newly cells were being passes through six different stages**(Fig4).** These stages include preleptoten stage, leptotene stage , zygotene stage, pachytene stage, diplotene stage , and Diakinesis stage(Fig.5). Small size nuclei with areas of condensed chromatin were the characteristic features of the secondary spermatocytes. These cells were nearly centrally located within the seminiferous tubules **(Fig5)**. These results coincided with the finding of Yamamatoetal (18) in male Japanese quaid and with the finding of AL-shamary (19) in common quaid. The meiosis of the secondary spermatocytes leads to form the spermatids. Spermatids pass through complex process of differentiation which results in transformation of spermatids into mature spermatozoa. Therefore, according to the changes in the acrosomes and their nuclei, the spermatids develop into sperms. These changes showed eighteenth stages which include the first stage, in this stage, the spermatid was small and posses round nucleus. Small granules were present within the nuclear chromatin beside flakes were also found within the nucleoplasm, In the second stage, presence of small cgromatin flakes which adhere to the nuclear membrane. Crust of chromatin was found positioned nearer to the nuclear membrane besides filaments of chromatin which found extend from the center of nucleus to the nuclear membrane in the third stage. In the fourth stage, three to fourth or more masses of chromatin adhere to the nuclear membrane of the round nucleus of spermatid. There were also chromatin crust found nearer to the nuclear envelope. The chromatin begin to accumulate at one pole of the nuclear spermatid which led to elongation of nuclear spermid and appear in the form of triangular or ring shape in the sixth stage, appearance of two protrusion derived from the nuclear spermatid. Third chromatin horns diverge in the seventh stage and the nuclear spermatid become more elongated. In the eight stage ,the elongated nucleus became irregular in shape and slimy. The chromatin appear blended to one pole of the nucleus whereas condensation of the nuclear chromatin at the other pole. The nuclear chromatin loses its attachment with the condensed pant of the chromatin in the ninth stage and the nucleus as a whole becomes oval. In the tenth stage, cellular cytoplasmic band surrounds the nuclear spermatid. In the eleventh stage, disappearance of the previous cytoplasmic band in the twelve stages. In the thirteen stage, the nuclear spermatid occupy most of the cellular spermatid and appearance of flagellar spermatid which was noticed. The characteristic feature of the fourteen stage, was that, the nuclear spermatid appear wide at the anterior part and was more slimy at the posterior part, which represent the Golgi phase. In the fifteen stage, the nuclear spermatid appeared in the form of cap. This stage represented cap phase of spermiogenesis process. In the sixteenth stage, the ends of each nucleus expanded to the exterior in the form of a converged slimy horns. The nuclear chromatin look like V-shape in the seventeenth stage, which represented acrosomal phase. In the eighteenth stage, the spermatozoa were found within the human or attached to the sertoli cells. This stage represented the final stage of spermiogenesis. The sperm of this bird in this result was long with slightly taper towards the anterior end. These previous results in this research were also coincided with AL-SAMAWY(19) in common quail and with AL-SAMAWY(16) in adult pigeon. Indeed, this result was not similar to the result

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of Gunowardana and Scolt (20) whom registered four stages only in adult white leg

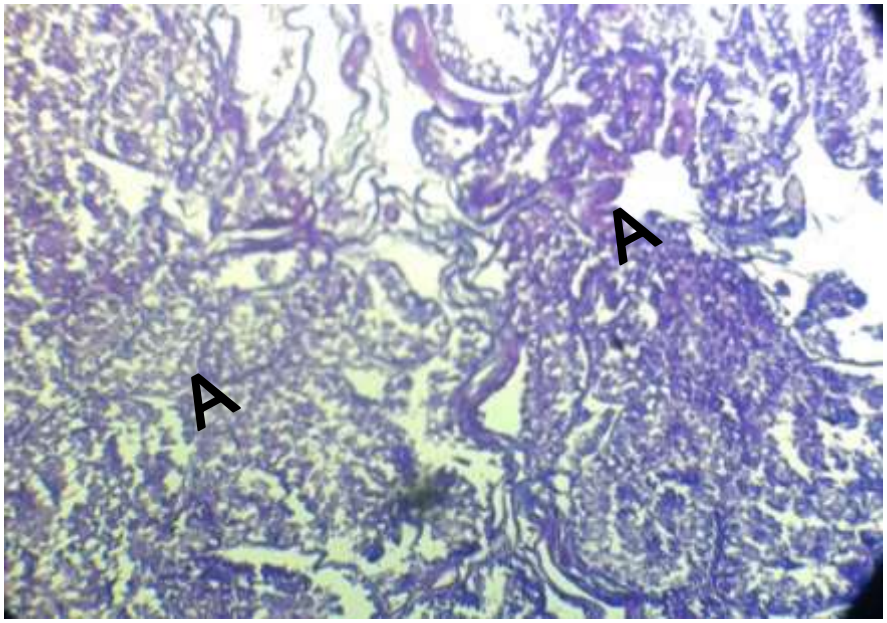

Fig:1 Histological section in testicular capsule of creeper composed of dense connective tissue A (H&E stain 10X).

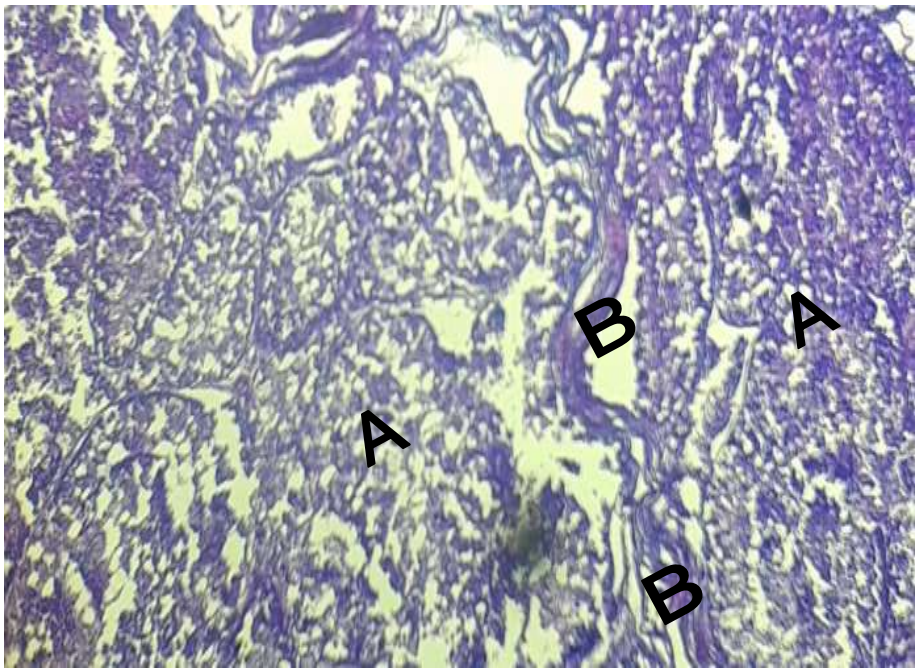

Fig:2 Histological section show spermatogenic cells A and basement membrane B (H&E stain 10X).

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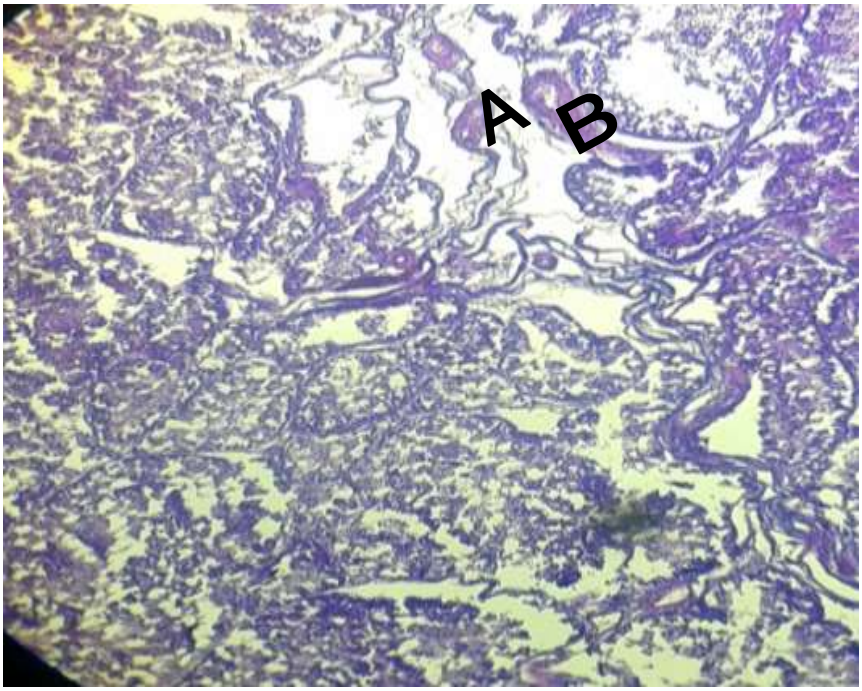

Fig:3 Histological section in testicular capsule of creeper A differentiation from the basement membrane toward the lumen B (H&E stain 10X).

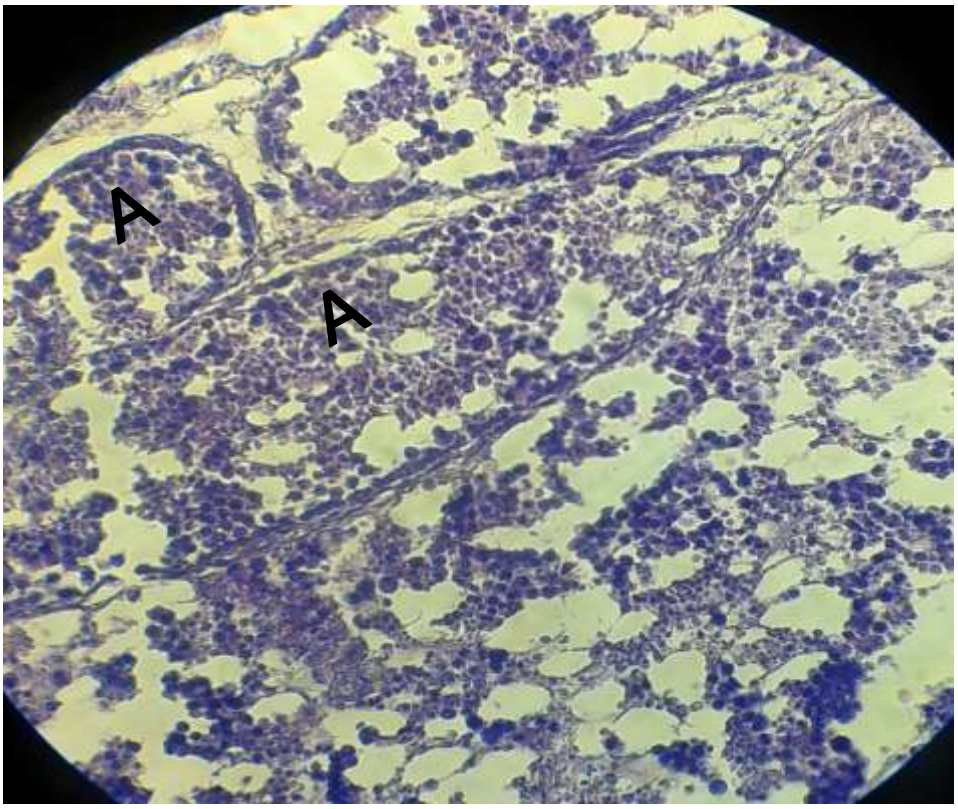

Fig:4 Histological section newly cells being passes through six different stages A (H&E stain 10X).

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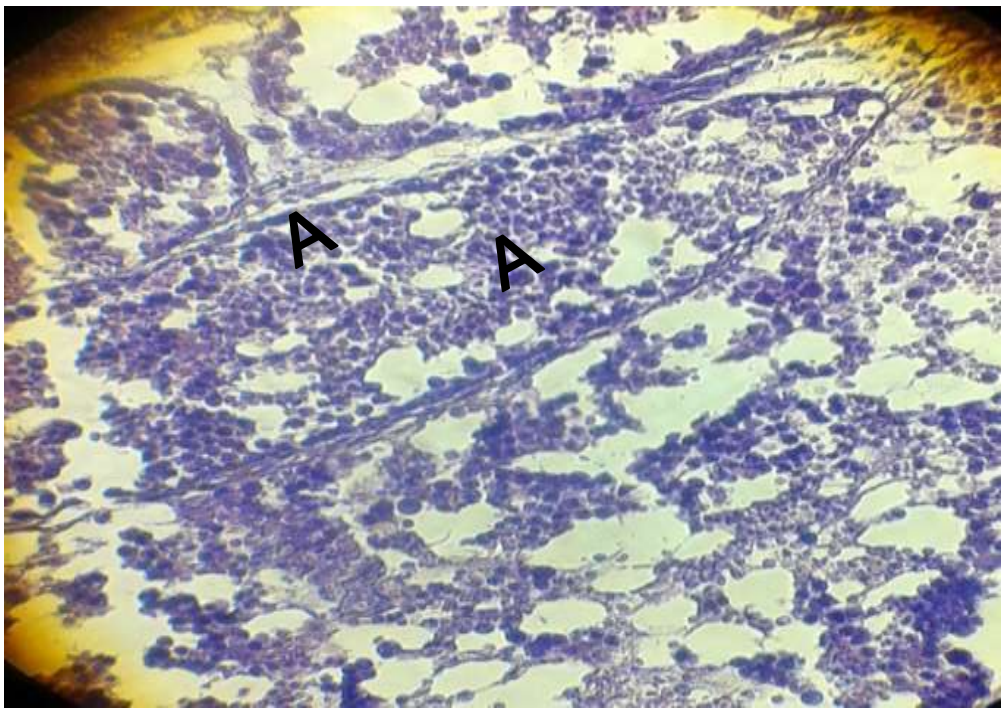

FIG:5 Histological section in secondary spermatocytes centrally located witin the seminiferous tubules A (H&E stain 10X).

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