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Histological study of pars tuberalis of the pituitary gland of rats in Iraq

دراسة نسجية للفص الحدبي للغدة النخامية في الجرذان في العراق

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Abstract

This study was carried out on the ten pituitary glands of rats, under light microscope; ten samples were collected from animal house in (college Veterinary. Medicine of Kerbala University). This work involves histological studies. The histological results revealed that the pars tuberalis contained four types of cells, not similar to any other cell types of the pars distalis. This finding and the location of the pars tuberalis at the gate of pars distalis which control the blood circulation give to the pars tuberalis a special functional importance.

المستخلص

اجريت هذه الدراسة النسيجية على عشرة غدد لنخامية الجرذان المختبرية في البيت الحيواني (كلية الطب البيطري جامعة كربلاء) اجريت الدراسة تحت المجهر الضوئي لدراسة الفص الحدبي للغدة النخامية. أظهرت الدراسة إن للفص ألحدبي أهمية خاصة بسبب احتواءه على أربعة أنواع من الخلايا التي لاتشبه أي نوع من أنواع خلايا الفص الأمامي. علاوة على وقوع هذا الفص عند مدخل الفص الأمامي والذي يسيطر على مجرى الدم الذاهب إليه وكذلك وجد لاول مرة نوع من الخلايا ذات شكل غير منتظم وساتيوبلازم يحتوي على حبيبات افرازية دقيقة.

Introduction

The pars tuberalis forms a sleeve around the stalk of infundibulum. Its thickness is 25-60 µm. It consist of highly vascularized cord, of epithelial cells. In human, pars tuberalis is not known with certainty(1),(2),(3). (4),(5) stated that the cells of pars tuberalis were arranged in short clusters or cords and may be found as nests of squamous cells and small follicles lined with cuboidal cells whose function was unknown. Many authors found that the cells of pars tuberalis were agranular and arranged in columnar clusters (6), (7). Other authors described the cells of pars tuberalis as roughly cuboidal with no cytoplasmic granules with mild basophilic cytoplasm (8),(9),(10). Some author classify three types of pars tuberalis i:e pars tuberalis- specific cells; pars distalis –like cells and the follicular cells which smaller than the pars tuberalis- specific cells and similar to follicle-stellate cell of pars distalis (2),(11),(12),(13),(14). (15),(16) reported that most cells of pars tuberalis secrete gonadotropin, follicle – stimulating hormone (FSH) and Leutinizing hormone (LH). Because the importance of the location of pars tuberalis at the gate of pars distalis and the paucity of the histological researches on the part of pituitary gland, the study was prepared.

Materials & Methods

Ten pituitary glands were used for histological study of the pars tuberalis in the mature rats. The samples were obtained from animal house in college f Veterinary Medicine\ University of Kerbala. The samples were immediately removed and fixed in 10 % buffered neutral formalin. Routine histological techniques were done on the samples. Periodic-acid shiff (PAS) reagent and H&E stain were used for staining (17). The samples were examined under light microscope.

Results

The present study found that the pars tuberalis encircled the infundibulum of neurohypophysis. There are four types of cells found in this part of pituitary gland:

1-Epithelial cell

These types of cells lies at the periphery of the pars tuberalis, located closed to pars nervosa, it consisted of two layers of small squamous cells with dark secretory granules (Fig.1)

2-Water- clear cells

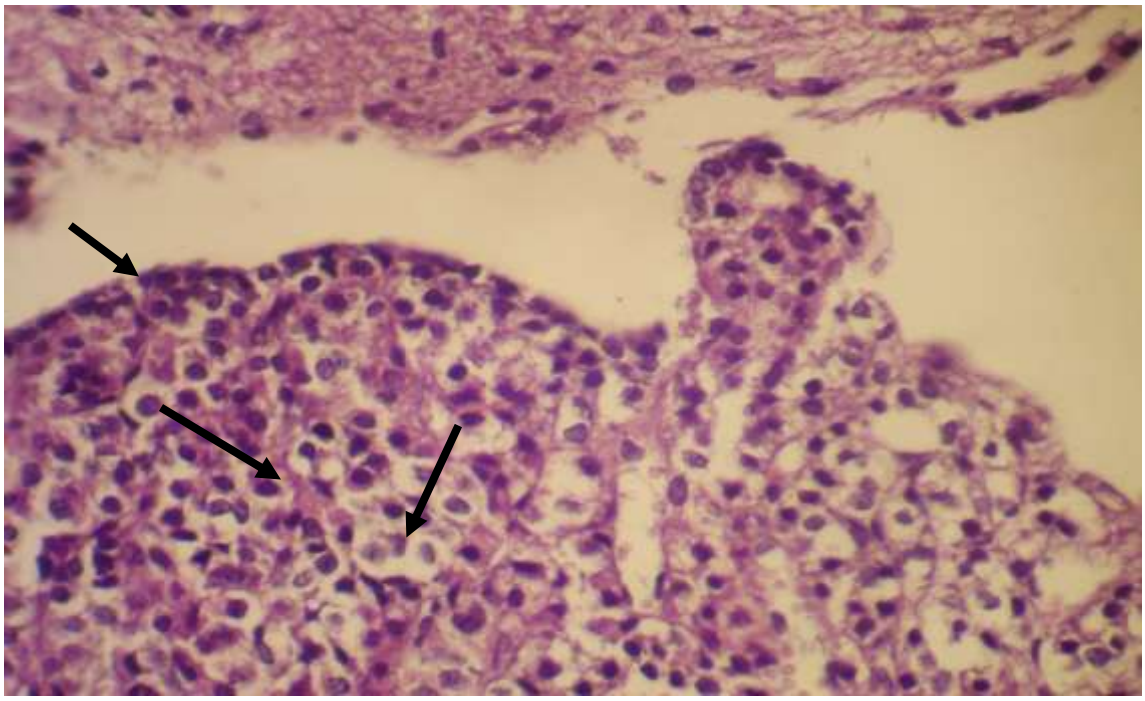
There are two types of cells, small and large, spherical, found in a large number in pars tuberalis. It has a pale water- clear empty cytoplasm with dark spherical nuclei. The average diameter was (7 – 10) µm. (Fig.2).

3- Magenta- syncytial cells:

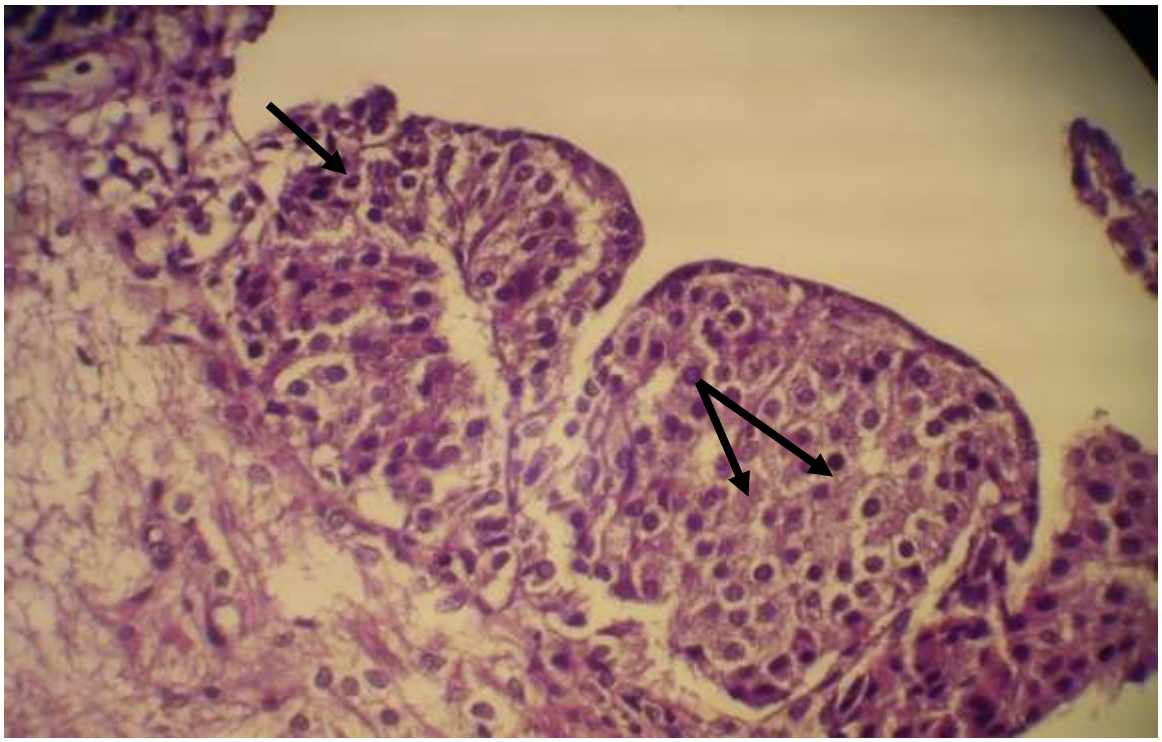
These types of cells characterized by cytoplasm of this type contain fine granules and don't found any boundary between these cells which appearance as a syncitium state filled with fine purple granules (Fig. 2).

4-Purple irregular cells

The present study found this type of cell was small, irregular in shape the cytoplasm was contain purple fine granules. The nuclei was dark, irregular in shape, the diameter of this type (5) µm (Fig.1).



(Fig, 1)Pars tuberalis showing Epithelial cells (short arrow) and Irregular cell (long arrows). H&E stain.40X.



(Fig, 2)Pars tuberalis showing the Water- clear cells (small arrows), Magenta- syncytial cells (large arrows). PAS stain.40X.

Discussion

There are four types of cells in the pars tuberalis gives it a special functional importance. Three types of these cells contain fine purple secretory granules with prominent nucleoli that may indicate a special metabolic and hormonal activity. The classification of these cells in the present study differ with that of (13),(14). The presence of pars tuberalis at the gate of adenohypophysis, its juxtapositioned to the blood circulation of the hypophyseal portal system, the difference of their cell types to that of the cells of adenohypophysis and the presence of a variety of cell types among which the high secretory activity of syncytial cells. All the foregoing considerations give an exclusive importance to the role of pars tuberalis and creating the impression that the pars tuberalis was not as ordinary gland which secretes one or two types of hormones (10),(17) and give another impression that the pars tuberalis may secrete a special type of enzymes or hormones not related to the secretory function of adenohypophysis, otherwise have a relation with blood circulation and blood pressure. In this we agree with (6),(11),(18) whom give an importance role to the pars tuberalis. The present result different with the finding of (4) who described the squamous cells as nests and with (6),(7) whom referred to the cells of pars tuberalis as columnar clusters. This is similar to the result of (8),(9),(10) whom explained that the cuboidal cells of pars tuberalis were contain no cytoplasm granules. It seems that the pale cuboidal cells may be loaded with glycogen to serve as energy source in regulating the blood circulating – hypophyseal portal system. As the sites occupied by glycogen appear as clear empty areas (2),(4). Instead of capsule, the aggregated double layer of squamous surface epithelium constitutes the external surface of the pars tuberalis. Epithelial cells as specialized for a variety of different functions, among which are protection, secretion, absorption, excretion and barriers for selective permeability. The squamous cells closely apposed and adhere to one another by mean of special junction (19). It is difficult to measure the diameter of the magenta- syncitial cells because their limits were unclear. The current study revealed the presence of four cell types in the pars tuberalis in rat, this is reinforced with the finding of (20) who found that the pars tuberalis encircles the infundibulum of neurohypophysis. Firstly, the present study recognized four cell types; Light cell, Magenta-syncytial cell, Double squamous cells and Water-clear cells, I agree partially with (20) in this study showing one type of these cell different with shape this type called purple irregular shape also in this study don't found light cell, the present work revealed the presence the types of cells, not similar to any other cell types of pars distalis and not registered.

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