

Histological study for the innervations of the adrenal gland of the camel (Camelus dromedaries)

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Abstract

Sixteen specimens of adrenal glands of both sexes of the adult camels were obtained for studying the distribution of nerve supply for both the cortex and medulla of the gland. The specimens were fixed in formalin 10% , after 24 hours these specimens were sectioned by freezing microtome at 10 µm thickness, followed by staining with Ramon Cajal method. The results revealed that there was myelinated nerve fibers in the different zones of the adrenal cortex intermingled with reticular fibers ,while the adrenal medulla was demonstrated the presence of the sympathetic preganglionic nerve fibers associated with the nerve cells located in the periphery of the adrenal medulla .

Introduction

The adrenal gland is formed by a pair of endocrine gland tissues differ in function and the function (1). The cortex is originated from the mesoderm and secrete the steroid hormones (2), and the medulla is originated from the ectoderm and secrete adrenaline and nor-adrenaline (3). The secretion of the cortical hormones are under the influence of the ACTH hormone which is secreted from the pars distalis of the pituitary gland and a small quantities of the sex hormones are secreted from the inner zone of the cortex under the influence of the GH(4), While the medullary hormones are secreted under the influence of the hypothalamus effect which are released in cases of the stress, pain, fight and flight(5) .

Literature Review

Robinson (6) stated that there is non-myelinated axons between the cortical cells of the adrenal cortex of the sheep pass to the medulla , while saleh et al(7) demonstrated multipolar neurons in the different cortical zones of the adrenal gland of the dog. Wilkinson (8), studied the nerve supply of the adrenal gland of different animals such as monkey, dog rabbit, rat and also the adrenal gland of human by using silver impregnation technique , the results was indicated the absence of the any nerve supply to the cortical parenchyma, but there is nervous plexus below the capsule passing to the medulla through the cortex and these fibers to be contact with the chromaffin cells of the adrenal medulla. Dellman et al (9) mentioned that the nerve supply of the adrenal gland of camel is from the adrenal plexus that formed mainly by the great splanchnic nerve with other visceral nerves which are originated from the thoracic and lumbar sympathetic ganglia. However; Migally (10) demonstrated that there are non-myelinated nerve fibers nearby the cells of the different zones of the cortex of the adrenal gland of the mice.

Materials and Methods

Sixteen specimen of adrenal glands of both adult sexes of the camels were collected . The surrounding fat was removed and the glands were sectioned into many parts , washed by physiological saline(0.9%) concentration, then fixed by 10% formalin for (16)hour, Vacca (11). The parts of the glands were

put on the wet filter paper ,then mounted on the stage of the freezing microtome and freeze by using gas of carbon dioxide. The sectioning of the specimens were done by the aid of the cooled knife of the microtome and the sections were 10 micrometer thickness collected in a petridish containing distille water , the sections were collected from the petridish by using glass hockey rods . The sections were mounted on the glass slides .The sections were stained by using silver nitrate salts impregnations through the technique of the Ramon Cajal method for the frozen sections (Mcmanus& Mowry)(12).

Results and Discussion

The present study was indicate that there was no nerve supply for the cortex of adrenal gland , but there was preganglionic sympathetic nerve fibers in the cortex intermingling with reticular fibers inbetween cortical cells and this result agree with that result mentioned by the Wilkinson(8)in the adrenal cortex of the human, monkey, dog , rat and rabbit, otherwise the present study was not agree with the results of Robinson(6) in the sheep, Migally (10) in the rat and Mikhail (13) in the rabbit when they mentioned that the adrenal cortex of that animals are supplied by a network of the myelinated and non-myelinated nerve fibers. The reason of that, the adrenal cortex is not containing any nerve supply so, the adrenal cortex is controlled by the influence of the ACTH and GTH so there is no need for any role for the nervous activity in the cortex and this interpretation was stated by (3,4), and the presence of the nerve fibers in the cortex was just for passing to the medulla. The present study was demonstrated that the adrenal medulla of the camel having an nerve supply in its periphery (Fig. 1) reflected by the presence of the nerve cell bodies and a network of the nerve fibers surrounding the medullary chromaffin cells of the peripheral zone (Fig.1). These preganglionic sympathetic fibers pass to the medulla through the cortex which are intermingled with the reticular fibers but not assist for any nerve supply to the cortical cells (Fig.2). The nerve cells and its fibers in the medulla sustain the concept that these nerve cells and chromaffin cells have the same origin

of the ectoderm and particularly from the neural crest (1), and the releasing of the hormones from the chromaffin cells is under the influence of the

stimulation of the sympathetic fibers and its nerve cells (3).

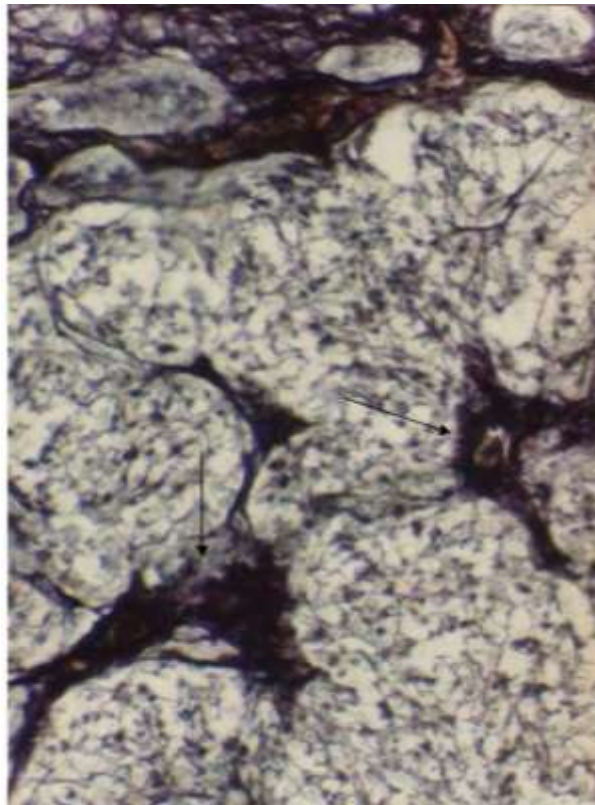


Fig.1;- Showing the multipolar ganglionic nerve cells in the periphery of the adrenal medulla arrow (Ramon-Cajal method-500X).

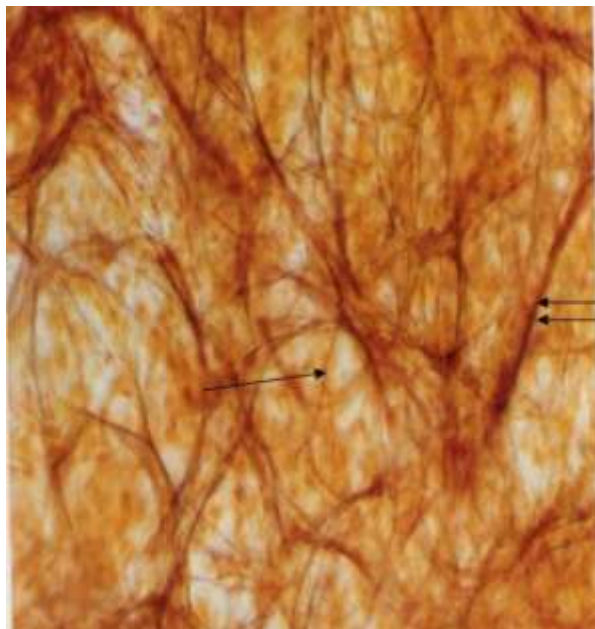


Fig.2;- Showing the intermingling of the reticular fibers (—→) and the preganglionic sympathetic nerve fibers (←←) in between the cortical Group cells (silver impregnation technique for reticular fibers – 500x)

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دراسة نسجية للتوزيع العصبي للغدة الكظرية في الجمل

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الملخص

سنة عشر عينة لغدة كظرية لكلا الجنسين لجمال بالغة قد تم الحصول عليها من مجزة النجف لدراسة توزيع التجهيز العصبي لقشرة ونخاع الغدة. العينات قد تم تقطيعها إلى أجزاء صغيرة ثم تثبيتها بواسطة ١٠% فورما لين ، وباستخدام المشرع الجليدي تم تقطيع العينات الى سماكة ١٠ مايكروميتر ثم صبغها بواسطة استخدام طريقة رامون كاجال للمقاطع الجليدية. النتائج بينت وجود ألياف عصبية نخاعينية في مختلف انطقه قشرة الغدة متداخلة مع الألياف الشبكية ، بينما نخاع الغدة اظهر وجود ألياف عصبية ودية قيل العقدية مشارك مع خلايا عصبية متواجدة في محيط نخاع الغدة.