

HISTOLOGICAL INVESTIGATION OF TRIGEMINAL V, ABDUCENT VI, FACIAL VII AND VESTIBULOCOCHLEAR VIII NERVE NUCLEI IN ONE HUMPED CAMEL (*Camelus Dromedarius*)

T.A.Abass

Department of Anatomy and Histology, College of Veterinary Medicine, University of Baghdad.
Baghdad, Iraq.

(Received 10 April 2008, Accepted 25 August 2008)

Keywords: Liver, Mannitol, Syaphylococcus.

ABSTRACT

The present work making histological investigation of certain part of medulla oblongata on seven one humped camel (*Camelus dromedarius*) in different ages and sexes, the Trigeminal V, Abducent VI, Facial VII, and Vestibulocochlear VIII nerve nuclei in camel was noticed.

These nuclei are in close resamble in other mammals in location and the cells (neuron) type found in these nuclei. This study help to present an information on these nuclei cytoarchitecture and thier location, and may answers of many question about this animal (Camel) which walking across huge deserts.

INTRODUCTION

The purpose of this work was to study the nuclei of cranial nerve of the trigeminal, Abducent, Facial and Vestibulocochlear nerve nuclei V, VI, VII, VIII, in camel (*Camelus Dromedarius*) and to compare with another animal.

The earlier communication on this subject (1) exam an avian cocatunae on trigeminal V, abducent VI and facial VII, with it's nuclei of these nerve, also investigation in sheep by using serial section on medulla oblongata (2), found closed resemblance between the medulla oblongata in sheep and other domesticated mammals cells (neuron) shape and nuclei.

(3) use cattle study by investigated microscopic examination of trigeminal and Vestibulocochlear nerve nuclei. In Cat (4) study the facial nerve by using cutting the root fibers and exam degeneration in cell of nucleus.

Also (5) in Cat exam the cytoarchitecture of nuclei of trigeminal V, abducent VI, facial VII, vestibulocochlear VIII nerve, by using serial section of brain stem of Cat.

(6) investigation in rodent, the structure of the central nervous system, found the Vestibulocochlear nuclei resemble that in gunia pig and rabbit. (7) study the vestibular nerve nuclei and trigeminal nerve V in coypu Monkey.

Degeneration study of nerve fibers by cutting nerve fiber of trigeminal nerve V and facial VII in Cat (8), (9) exams facial VII, Abducent VI in mammals by using serial section intra medullary course and observe the nuclei of nerve in mammals.

In Pig (10) investigation cytoarchitecture of brain stem and explain the nucleus of trigeminal V, abducent VI, facial VII and vestibulocochlear VIII nerve nuclei.

In Monkey, Cat and Rat (11) studying the connection of facial nerve VII, also studying abducent nerve VI, facial VII and trigeminal V nerve in the domestic animal (12), also (13) (14) studies the structure and functional of nervous system in human being and (15) exam the medulla oblongata in camel in Iraq and compare with other animal.

MATERIAL AND METHOD

Seven brain of one hump camel (Camelus Dromedarius) in different ages and sexes, obtain from Najaf slaughter house were used in this investigation .

The head are directly removed their muscles and bones of the skull and embedded in 10% formalin for 4 week to 3 months; and then take the medulla oblongata with spinal cord and cutting serial section by frozen microtome 40 μ and every 20th. Section was stain with toludin blue and put this section in plate over night and then fixed in special glass slid and investigated by light microscope .

RESULT

1. Nucleus of spinal tract of trigeminal nerve V nucleus :

This nucleus in one humped camel extended from pons to spinal cord. In spinal cord it from the dorsal horn of first cervical segment.

In medulla oblongata the nucleus located in caudal region of medulla oblongata dorso – lateral and in middle region located lateral area and cranially it located ventro – lateral region of medulla oblongata and pons. This location of nucleus, it divided into three parts caudally (par caudal) it extended from spinal cord to obex . This part consist of subnucleus :-

- a) Zonalis : it located peripheral region.
- b) Gelatinous : it is horse shoe shape.
- c) Gianto cellar : it is located in central horse shoe (Fig 1).

Each subnucleus consist of medium cells spindle or mutltipolar or triangular and small cell are oval or rounded. Each cells consist of nucleus with dark Nissle bodies.

This middle region (Fig 2) contain interpolar (par interpolar) nucleus of spinal tract of trigeminal nucleus V. This region in one humped camel characterized by large multipolar cells and medium spindle shape and small oval or round cells each consist of central nucleus with dark Nissle bodies.

The cranial region (par oralis) (Fig 3) of spinal tract of trigeminal nucleus V. In camel have medium rounded and small oval shape cells each one contain nucleus with dark Nissle bodies.

2. Facial nerve nucleus VII :

The facial nucleus in one humped camel extended from inferior olivary nucleus (Fig 2, 3) to caudal border of pons through investigation of nucleus.

Observed three groups of nuclei { dorsal smaller, medial more larger and bigger one is ventral nucleus }(Fig 2, 3).

The nuclei is represent the source of root fiber of nerve (Fig 3) it pass dorso - medial to form genu of facial nerve, it located in the floor of the fourth ventricle (Fig 2, 3), this genu also located dorso – medial of the abducent nucleus and lateral to medial longitudinal fasciculus [MLF] (Fig 3).

The facial nucleus VII, consist of three types of cells large multipolar medium spindle or multipolar and small oval or round shape, all cells contain nucleus and dark Nissle bodies.

3. Abducent nerve nucleus VI :

This nucleus in camel extended from in front the cranial extremity of the inferior olivary nucleus (Fig 2, 3) to pons, this nucleus located ventro – lateral to the genu of facial nerve nucleus VII (Fig 2, 3).

This nucleus is the source of abducent nerve root fiber which it emerge and pass ventro –medial to the medial border of abducent nucleus and pass ventrally through reticular formation and then emerge lateral to pyramid (Fig 2), the nucleus contain large multipolar neuron and medium spindle shape and, all types of cells characterized by dark nucleus and Nissle bodies.

4. Vestibulocochlear nerve nucleus VIII :

A. Vestibular nerve nucleus:

The vestibular nerve is part of vestibulocochlear nerve VIII. The vestibular nerve nucleus consist of four nucleus :-

1. spinal vestibular nucleus (Fig2, 3) .

This nucleus in camel located at the caudal region of the medulla oblongata to the caudal extremity of lateral vestibular nucleus. This nucleus contain all types of cells, large multipolar and medium mostly multipolar and small oval in shape and each one contain central nucleus with dark

Nissle bodies.

2. *Lateral vestibular nucleus (Fig2, 3)*

This nucleus in one humped camel located at cranial extremity of the spinal vestibular nucleus and extended into caudal extremity of pons.

Through investigated section, it occupy dorso – lateral to medial vestibular nucleus.

This nucleus consist giant and large size mutltipolar cells with central nucleus and dark Nissle bodies.

3. *Medial vestibular nucleus. (Fig2, 3).*

The nucleus extended from cranial extremity of inferior olivary nucleus caudally to pons cranially in camel, and dorsal of medulla oblongata dorsally.

The cells of nucleus are large mutltipolar and spindle and small oval cells with dark nucleus and Nissle bodies.

4. *Superior vestibular nucleus (Fig2, 3).*

In camel the nucleus extended from cranial part of medulla oblongata to pons.

This nucleus take position dorsal to lateral vestibular nucleus and contain medium rounded with small oval shape cells with dark nucleus and Nissle bodies.

B. Cochlear nerve nucleus :

The second part of vestibulocochlear nerve VIII . The cochlear nerve have two nucleus :

1. *Dorsal cochlear nucleus (Fig2, 3).*

The nucleus occupy at superior lateral part of medulla oblongata in one humped camel, with shape of neuron, large mutltipolar and medium oval and small rounded cells with central nucleus and dark of Nissle bodies

2. *ventral vestibular nucleus (Fig2, 3).*

In camel the nucleus located ventral to dorsal vestibular nucleus, and contain large mutltipolar and medium spindle shape with central nucleus and dark Nissle bodies.

DISCUSSION

In general the nuclei of V ,VI,VII and VIII nerve in one humped camel in present paper similar in principle with animal and Human being and to the discussion this result which obtain and compare with other studying investigate this nuclei :-

1. *spinal tract of trigeminal nerve V nucleus.*

This nucleus in one humped camel it's similar to that in Human being (13)(14), Sheep (2),

Cattle (3), Pig (10) , Cat (5), and all Mammals (12).

This division of nucleus in caudal region into sub nucleus{ Zonalis, gelatinous and giantocellar }it is found like this division in Cat (5) and Pig (10).

The cell type and shape of this nucleus is same which investigate in Cat (5), Pig (10) and The middle and oral region of spindle tract of trigeminal nerve V nucleus in Camel is location and cell type is resemble that studying in other animal (10), Cat (5) .

2. Abducent nerve VI nucleus :

The location and cells contain this nucleus in Camel is similar in Pig , Rabbit, Dog, Guinea Pig (9), (10) and Cat (5) only and different to other animal ,other Mammals (9) (12), about source fiber of abducent nerve VI is like in most animal (5),(10), (9),(15).

3. Facial nerve VII nucleus :

The location of facial nucleus in one humped Camel contain three groups of accumulation cells while contain three nuclei, it's similar in Ox, Rodent (9), which in other animal contain six groups of cells like in Cat (5), Pig (10), Avian (1).

The facial root fiber in camel located in floor of fourth ventricle and passing dorso – medially to form geno, that is like in Guinea Pig, Rabbit and Dog (9) this geno located dorsal to the abducent nucleus in camel, in Guinea Pig dorsal, rodent dorso – lateral and in Rat lateral to abducent nucleus (9), (5), (10), about cell type of facial nucleus it's like in Cat (5), Ox and Rabbit (9).

4. Vestibulocochlear nerve VIII :

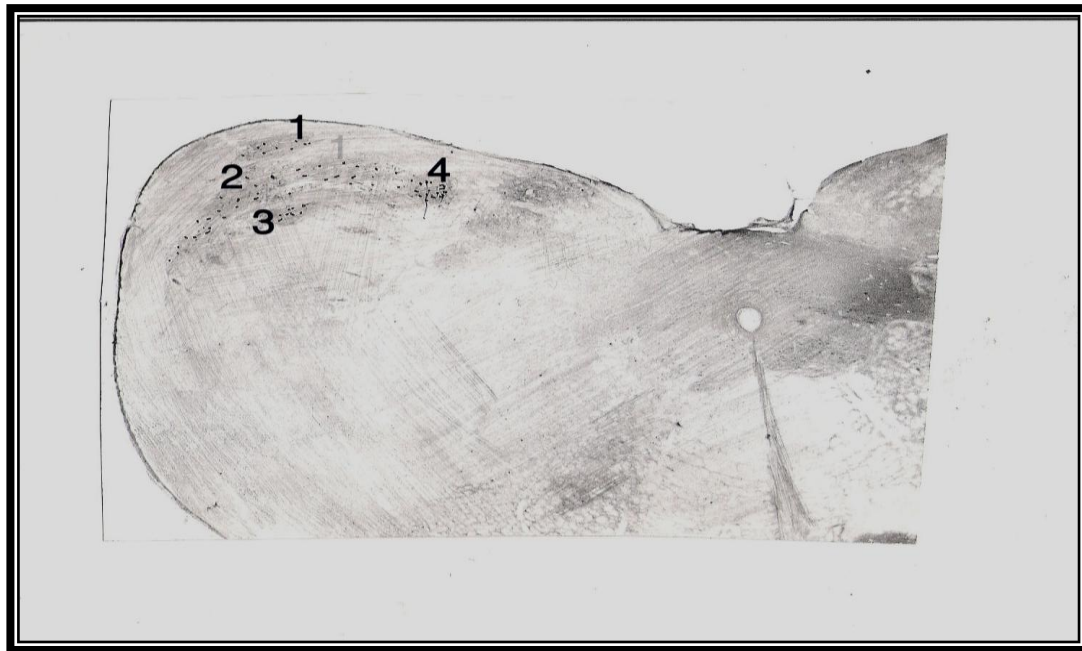
A. Vestibular nucleus :

In camel the vestibular nucleus in camel compose of four nucleus spinal vestibular, lateral vestibular, medial vestibular and superior vestibular nuclei.

These nuclei in location and cell shape range between large stellate mutltipolar and medium spindle and small oval or round is like in Sheep (2), Cat (5), Cype (7), Cattle (3), Pig (10).

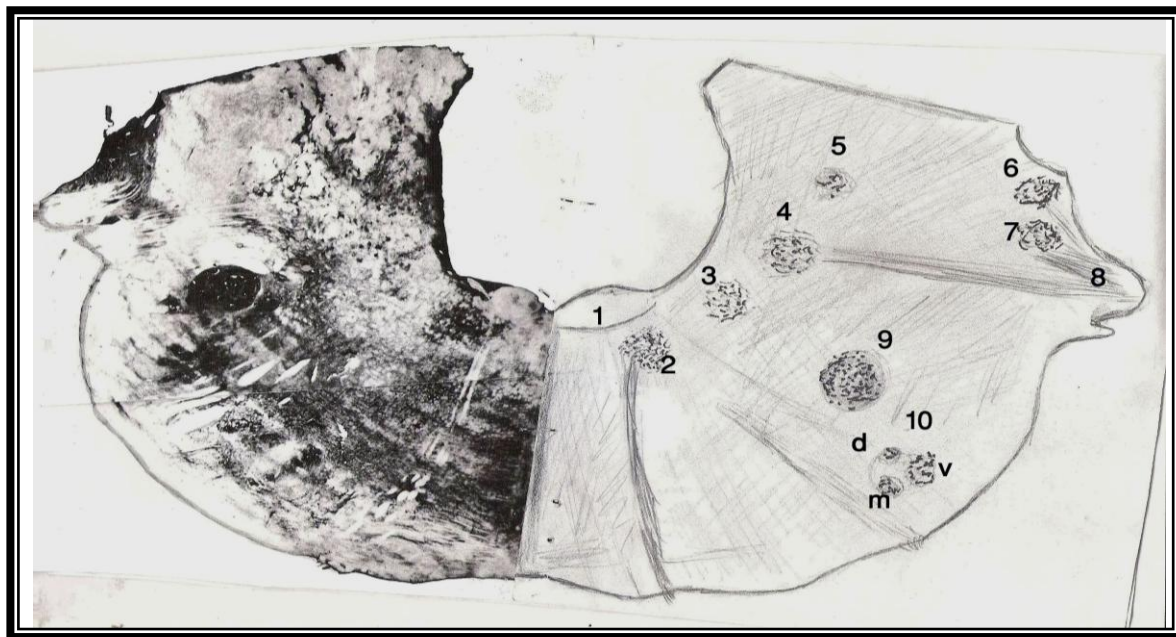
B. Cochlear nucleus :

The cochlear nucleus consist of two nucleus, dorsal cochlear, ventral cochlear nucleus and it's type of cells in these nuclei in camel is resemble that is found in other animal like Cat (5), Cattle (3), Sheep (2) and Rodent (6).



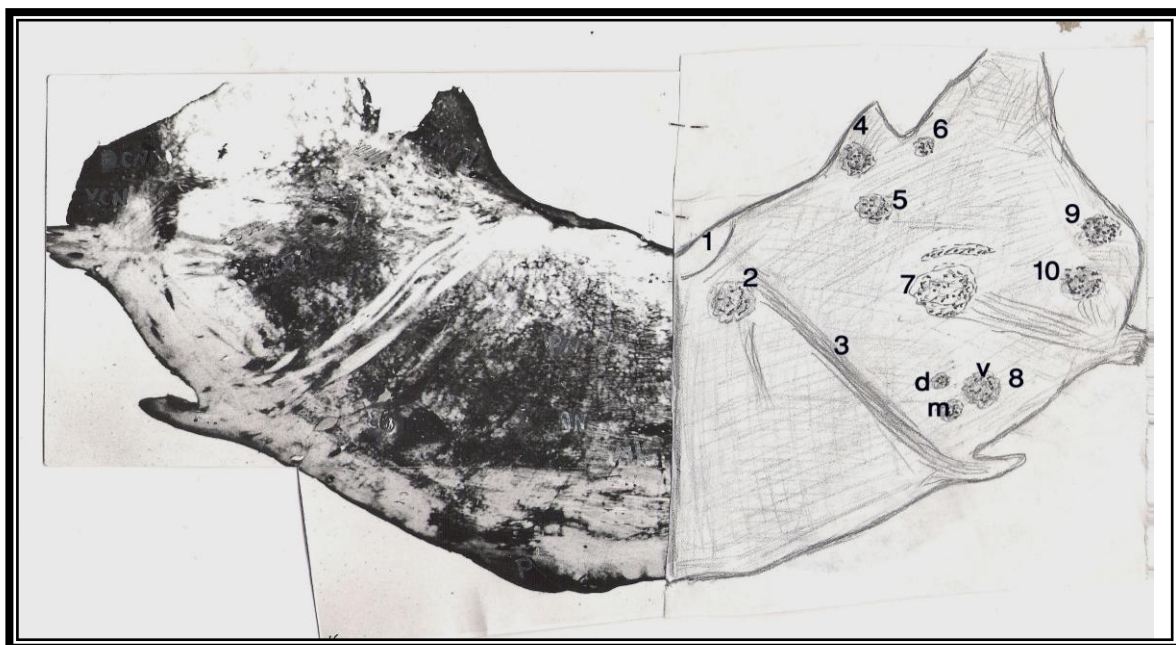
(Fig 1) show trigeminal sub nuclei in caudal part X 14

1. Subnucleus zonalis ,2.Subnucleus gelatinosus, 3.Subnucleus magnocellularis 4.spinal vestibular nucleus



(Fig 2) medulla oblongata cranial to obex X 12

1. Geno 2. Abducent nucleus 3. Medial vestibular nucleus 4. Lateral vestibular nucleus
 5. Superior vestibular nucleus 6. Dorsal cochlear nucleus 7. Ventral cochlear nucleus 8.
 Vestibulocochlear root fiber 9. Spinal tract trigeminal inter polar part
 10. Facial nucleus d. Dorsal nucleus m. Medial nucleus v. Ventral nucleus



3) Junction medulla oblongata with pons X 12

1. Geno 2. Abducent nucleus 3. Root fiber of abducent nucleus 4. Medial vestibular nucleus 5. Lateral vestibular nucleus 6. Superior vestibular nucleus 7. Spinal tract of trigeminal and part 8. Facial nucleus d. Dorsal nucleus m. Medial nucleus v. Ventral nucleus 9. Dorsal cochlear nucleus 10. Ventral cochlear nucleus

دراسة نسيجية للأعصاب، الوجهي والقوقعي التوازني، المبعد، الثالوثي لحيوان الجمل ذي السنام الواحد

ثامر عبود عباس

فرع التشريح والانسجة، كلية الطب البيطري، جامعة بغداد، بغداد، العراق.

الخلاصة

اشتمل البحث على دراسة نسيجية لمقاطع النخاع المستطيل لسبعة أدمغة في الجمل ذي السنام الواحد وبأعمار وأجناس مختلفة على انويه الأعصاب الثالوثي، المبعد، الوجهي والقوقعي التوازني .
ومن خلال هذا البحث وجد إن هناك تشابه وثيق لما موجود في الجمل مع بقية اللبائن من ناحية الموقع والمحتوى الخلوي للأنوية.
وهذا يساعد على تهيئة أطلس يشمل (التراكيب الخلوية والموقع) للأنثوي ، وكذلك يساعد على الإجابة على معظم الأسئلة لحيوان الجمل والذي يجوب الصحاري القاحلة.

REFERENCES

1. Black, D. (1922). The motor nuclei of cerbrophylogency. A study of phenomena of neurobiotaxis. J. comp. neur 34:233 -275
2. Pattison R. Holman, N.H. (1943). A count of nuclei in medulla oblongata in Sheep. J. comp. path 53:130 - 139.
3. welento, J. (1955). The nuclei of anterior part of medulla oblongata and pons of brain of Cattle. Annls – univ – Curia – sklodowaka sect 10:185 – 237.
4. Kerr. F. W. L. N. Rochester. M. (1961). Structure relation of trigeminal spinal tract to upper cervical root and solitary nucleus in Cat exper. Neural 4:134 – 148.
5. Taber, E. (1962). The cytoarchitecture of brain stem of the Cat. I . brain stem nuclei of Cat . J. comp. neur 116:27 - 70
6. Tastrzebski, M. (1962). Nuclei of anterior part of medulla oblongata and pons in rodent. Annls. Univ. Mariae. Curia sklodowaka 17:1 – 19.
7. Szteyn, S. (1962). Nuclei in medulla oblongata in monkey nutria. Annls. Univ. Marie. Curia, Sklodowaska 17:21 – 43.
8. Arther, J. (1964). The position of coetaneous component of the facial, glossopharyngeal and Vagus nerve in spinal tract of X . J. comp. Neur 122:389 – 394.
9. Nishi, M. (1965).Intra medullary course of facial nerve and facial accessory, facial and abducent nuclei of several Mammals. Okajimae Phli anat. Jap. 41:233 – 265.
10. Breazile, J. E. (1967). Cytoarchitecture of brain stem of domestic pig. J. Comp. Neur 129:169 – 180
11. Rhoton, A. L. (1968). Afferent connection of facial nerve. J. Comp. Neur 133:89 - 100
12. De Lahunta, A. (1977). Veterinary neuroanatomy and clinical neurology. (W. B. Saunders comp. Philadelphia, London) .
13. Carpenter, M. B. (1976).Human neuroanatomy (7th Ed.). pub WILLEM & WILKINS comp. Baltimore
14. Adel K. Afifi and Ronald, A. (1986). Basic neuro - science (2nd Edition). A structure and functional approach. Urban & schwazenberg Baltimore Munich.

15. Abbas, T. A. (1986). Topographical and histological studies on the brain of one humped camel (Camelus Dromedarius) Thesis for master degree.