ORGANIZATION OF MYELENCEPHALON (MEDULLA OBLONGATA) OF INDIAN HOUSE WALL LIZARD *HEMIDACTYLUS FLAVIVIRIDIS*

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ABSTRACT
Topological organization of the myelencephalon (medulla oblongata) of Indian house wall lizard has been studied by Eager’s method. The myelencephalon (medulla oblongata) is well developed in Indian house wall lizard *Hemidactylus flaviviridis*. The anterior part of the myelencephalon (medulla oblongata) joins with the posterior caudal part of the metencephalon (cerebellum). The posterior part of the myelencephalon (medulla oblongata) joins with the anterior part of the spinal cord. The myelencephalon is developed. The myelencephalon is triangular. It is broad in front by narrow and tapering behind. The thin and highly vascular roof of myelencephalon (medulla oblongata) forms the posterior choroid plexus. Posteriorly, the myelencephalon shows a strong ventral flexure where it passes into the spinal cord. The rostral part of the myelencephalon has fasciculus longitudinalis medialis, nervus abducens, nervus trigeminus, nucleus cochlearis angularis, nucleus descendens nervi trigemini, nucleus nervi abducentis, nucleus motorius nervi trigemini, pars dorsalis, nucleus motorius nervi trigemini, pars ventralis, nucleus princeps nervi trigemini, nucleus raphes inferior, nucleus reticularis medianus, nucleus vestibularis dorsolateralis, nucleus vestibularis ventromedialis and oliva superior. The caudal part of the myelencephalon includes dorsal fissure, fasciculus longitudinalis medialis, nucleus funiculi dorsalis, nucleus tractus solitii and ventral fissure.

Keywords: Myelencephalon Organization, Eager’s Method 1978

INTRODUCTION
The lizards are among the most commonly spotted of all reptiles. There are over 3500 different types of lizards existing in all climates throughout India. The walls and ceilings are their niche where they walk and live their lives. The house wall lizard *Hemidactylus flaviviridis* belongs to the family Gekkonidae of Suborder Sauria or Lacertilia is second largest family of this suborder. It is said that lizards are poisonous except two species *Heloderma suspectum* and *Heloderma horridum* are poisonous. The lizards are predator of insects hence they are useful for farmers and agriculture. They can be used for pest management.

In our present study the myelencephalon (medulla oblongata) region of the brain of *Hemidactylus flaviviridis* for better understanding of its anatomy and phylogenetic character has been preoneted.

MATERIALS AND METHODS
Ninety seven adult lizards, sauria or lacertilia of both sexes weighing 45 to 70 gms were used in this experiment. Animals were kept in the cage in the light and cool atmosphere at a room temperature (25 to 30°C). The experimental lizards were kept isolated in the separate cage from normal animal. Prior to the experiment, the specimens were acclimatized at room temperature for one day. Surgical procedures were performed with sterilized dissecting instruments. The specimens were anaesthetized by immersing with 10% formalin for 10 to 15 minutes prior to the surgery.

Operation Procedure
For perfusion, animals were anaesthetized with chloroform for 2 to 5 minutes. Completely anaesthetized lizard was kept in the operating tray. After fixing the lizard, a small longitudinal incision was made in the middle of the thorax (1 cm). The rib cage was cut open right from the middle to expose the viscera. The thorax was opened to expose the heart. The pericardium was removed. Fine syringe of the perfusion set was inserted in the aorta through the posterior part of the ventricle. First of
all 50 ml of physiological saline (0.75%) was allowed to pass through the aorta to the entire body, lower part of the ventricle was cut and blood was allowed to release. The whole blood of the body was replaced by physiological saline. One hundred ml. of fixative (10% formalin) was allowed to perfuse through the heart in continuation with saline. Precaution was taken to avoid the clotting of the blood which actually leads to incomplete perfusion. After the perfusion of the fixative, the animal becomes totally stretched. Following perfusion for about 15 minutes, the whole brain and spinal cord were dissected out and post fixed in the perfusion fluid at 4°C for twenty four hours. The brain and spinal cord were cut at 40 μm thick on AO HistoSTAT microtome at –20°C. The serial sections were put in section collecting trays containing 2 to 10% formaldehyde solution. For maintaining the serial orders only 5 sections were placed in each bin of the tray. The sections were processed with Eager’s method (1970).

**Perfusion**

This method is conventional technique for preserving the whole animal body by pumping the fixative through the heart in to the whole body, via vascular system. The perfusion is performed by a simple infusion set. This technique works on the gravity flow principle. The perfusion bottle was kept three feet above to the operating table. The infusion set comprises to ordinary infusion set, a bottle with lid having two outlets, in one of them infusion needle was inserted and in other normal injection needle was inserted to avoid air lock. The infusion set comprises of plastic tube, an air column on both side, needle and a stopper.
RESULTS
The myelencephalon (medulla oblongata) is well developed in Indian house wall lizard *Hemidactylus flaviviridis*. The anterior part of the myelencephalon (medulla oblongata) joins with the posterior caudal part of the metencephalon (cerebellum). The posterior part of the myelencephalon (medulla oblongata) joins with the anterior part of the spinal cord. The myelencephalon is developed. The myelencephalon is triangular. It is broad in front by narrow and tapering behind. The thin and highly vascular roof of myelencephalon (medulla oblongata) forms the posterior choroid plexus. Posteriorly, the myelencephalon shows a strong ventral flexure where it passes into the spinal cord.

The rostral part of the myelencephalon has fasciculus longitudinalis medialis, nervus abducens, nervus trigeminus, nucleus cochlearis angularis, nucleus decedens nervi trigemini, nucleus nervi abducentis, nucleus motorius nervi trigemini, pars dorsalis nucleus motorius nervi trigemini, pars ventralis, nucleus princeps nervi trigemini, nucleus raphes inferior, nucleus reticularis medius, nucleus vestibularis dorsolateralis, nucleus vestibularis ventromedialis, and oliva superior. The caudal part of the myelencephalon includes dorsal fissure, fasciculus longitudinalis medialis, nucleus funiculi dorsalis, nucleus tractus solitri and ventral fissure.
Figure 3A, B
Figure 4A, B
Figure 5A, B

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Figure 6A, B
Figure 7A, B
Figure 10A, B, C
DISCUSSION

The myelencephalon (medulla oblongata) is well developed in Indian house wall lizard *Hemidactylus flaviviridis*.

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The nuclear complex of the abducens nerve of monitor lizard *Varanus exanthematicus* consists of the principal and accessory abducens nuclei. The principal abducens nucleus is located just below the fourth ventricle laterally adjacent to the medial longitudinal fasciculus. The accessory abducens nucleus has a ventrolateral position in the brain stem (Barbas-Henry and Lohman, 1988). However, in the present study on Indian house wall lizard the accessory abducens nucleus has not been found. This nucleus is identical in shape and size with respect to nucleus nervi oculomotorii like frog (Srivastava, 1989). According to Addens (1933) in *Rana catesbeiana* an accessory nucleus is present lateral to the main abducens nucleus. Opdam *et al.*, (1976) observed similar structure in frog but described it as a part of lateral reticular zone. The accessory abducens nucleus is also reported in *Bufo marinus* which was described as a part of reticularis medius by Opdam *et al.*, (1976). It seems that in the present study the accessory abducens nucleus is absent because there is no clear demarcation between abducens and reticular formation. The possibility cannot be ruled out that accessory abducens nucleus observed by Addens (1933) and Abbie and Adey (1950) is a part of lateral reticular formation described by Opdam *et al.*, (1976).

The motor nucleus of XII cranial nerve – nucleus nervi hypoglossi is found in the caudal most region of rhombencephalon like myelencephalon below the XIth motor cranial nerve nuclei in wall lizard. Topological position of this nucleus is comparable with that of mammals. This nucleus is developed in *Varanus* comparable with that of mammals. This nucleus is developed in *Varanus* with respect to cells as compared to the present observation in *Hemidactylus*.

Senn (1972) has reported that there are two parts of nucleus nervi hypoglossi – a dorsal and a ventral but this division has not been observed either in frog – *Rana tigrina* (Srivastava, 1989; Srivastava and Srivastava, 1992) or in *H. flaviviridis* presently studied. Further studies are required in different groups of animal to find out evolutionary significance of this nucleus.

The brain stem reticular formation has been studied in many species of reptiles (Newman and Cruce, 1982). They have found that reticular neurons in crocodilians and snakes are larger than those found in lizards and turtles. The reticular formation is divided into seven nuclei. A reticularis inferior (RI) is found in myelencephalon, a reticularis medius (RM) in the caudal two third of the metencephalon and a reticularis superior in the rostral metencephalon and caudal mesencephalon. Reticularis inferior can be subdivided into a dorsal and a ventral region. All reptilian species possess reticularis inferior (dorsal) and reticularis medius but ventral portion of reticularis inferior is absent in turtles. These divisions are clearly observed in the present investigation on Indian house wall lizard but quite variable in appearance. The myelencephalic raphes nucleus is also quite variable in its morphology among the different reptilian families. A reticularis ventrolateralis observed in the present study is also found in snakes and teiid lizards.

It is concluded that fewer number of nuclei in reticular formation of old reptilian lineages and more number of nuclei in modern reptiles are found. Certain reticular nuclei are present in those reptiles in which prominent axial musculature is found (Newman and Cruce, 1982; Newman *et al.*, 1983).
The motor nuclei of nerve IX are located ventrally in the rhombencephalon and are constituted medially by the large celled glossopharyngeal part of nucleus ambiguus and laterally by the small celled nucleus salvatorius inferior in Varanus exanthematicus (Barbas-Henry and Lohman, 1984). Although the divisions of nucleus nervi glossopharyngei have not been observed in the present investigation on Indian wall lizard but the topological location of this nucleus is comparable with other amphibians and reptiles (cf. Srivastava, 1989).

REFERENCES