BRAIN OF REPTILES

The brain of reptile (lizard) is divisible into 3 parts:

(1) Forebrain or Prosencephalon.
(2) Midbrain or Mesencephalon.
(3) Hindbrain or Rhombencephalon.

(1) Forebrain: Forebrain is the anterior part of the brain. It consists of 3 parts, the olfactory lobes, cerebral hemisphere and diencephalon.

(a) Olfactory lobes: The olfactory lobes are the anterior most part of the forebrain. They have two long, slender olfactory tracts or peduncles and small, dilated, distal olfactory bulbs that lie close together. The olfactory peduncles are attached to the cerebral hemispheres on the posterior side. Each olfactory lobe encloses a cavity called an olfactory ventricle or rhinocoel.

(b) Cerebral Hemisphere: The Cerebral hemispheres are a pair of large sized, oval, smooth bodies that are narrow in front and broad behind and are collectively called Cerebrum. A deep dorsal median longitudinal fissure separates the two hemicpheres from each other. Each hemisphere encloses a lateral ventricle or paracoel. Anteriorly, the lateral ventricles are continuous with the olfactory ventricles of their own side. Posteriorly, they open into the third ventricle of diencephalon through a common passage called Foramen of Monro. The thick floor and ventrolateral walls of the lateral ventricles or paracoels form the corpora striata (singular Corpus striatum). The two corpora striata are inter-connected by Anterior Commissure. Above the Anterior Commissure is another commissure called Hippocampal Commissure which connects the Hippocampal regions of the Cerebral hemisphere (Hippocampal region

is located in the inner region of the temporal lobe of cerebral hemisphere. Its structure resembles with that of a sea horse, so the name hippocampus is given to it. This region of the brain is primarily associated with memory ie concolidates information from short-term memory to long term memory. and also is spatial memory that enables navigation Lizards also have spatial memory to some extent which help them to navigate and mark their boundaries).

The roof of the lateral ventricles is relatively thin and is called pallium

In certain reptiles, a new area, called neopallium or cerebral cortex, appears ~~between~~ ~~the~~ in addition to archipallium + paleopallium Cerebral cortex is an outer layer of the cerebrum and here more gray matter starts migrating and thus show improvement over the cortex of amphibians. (Gray matter is primarily composed of cell bodies or soma, branching dendrites + unmyelinated axons).

(iii) Diencephalon: The diencephalon is small and largely covered by cerebral hemispheres dorsally. It encloses a cavity called third ventricle or diacoel which communicates with the paracoels through foramen of Monro. The roof of the diencephalon is called epithalamus. It is non nervous and along with piamater (a vascular connective tissue covering) constitutes the tela choridea. The latter sends into the cavity of diencephalon finger like folds forming the anterior choroid plexus (cavity of diencephalon is third ventricle or paracoel). This plexus is composed of blood vessels and specialized epithelial tissue called ependyma. The anterior choroid plexus secretes cerebrospinal fluid.

Behind the choroid plexus, the epithalamus bears epiphysial or pineal apparatus. This apparatus consists of two parts: anterior eye like parietal body or pineal eye and posterior pineal body. It is held that the parietal body or pineal eye was earlier a functional eye opening out through the parietal foramen of the cranium. It is able to percieve light in some lizards such as Varanus Anguis etc and in young forms of lizard like reptiles like Sphenodon (it is vestigeal in adults).

The lateral walls and the floor of the diencephalon are thick and are called optic thalami and hypothalamus respectively. A mass of grey matter connects the two thalami. It is called intermediate mass or soft commissure. The thalami give rise to the primary optic vesicles that take part in the formation of the eyes. The hypothalamus is well developed and gives out a tubular ~~out~~ downgrowth called infundibulum which meets a non-nervous pharyngeal upgrowth, called hypophysis or Rathke's pouch. Distal part of the infundibulum forms the posterior lobe of pituitary and the Rathke's pouch produces the anterior and intermediate lobes of pituitary. The pituitary body acts as important endocrine gland. Just infront of the pituitary, there is a cross of two optic nerves, called optic chiasma. The two optic nerves cross on their way from eyes to the brain.

Midbrain: It consists of 2 parts:

(a) Optic lobes: The optic lobes are relatively small, oval bodies present on the dorsal side of the midbrain. Each lobes encloses the optic ventricle or mesocoel. Both the optic ventricles or mesocoels open into a narrow median passage, the iter or aqueduct of Sylvius. The latter connects ~~the~~ with the third ventricle in front and with the fourth ventricle or myelocoel behind. Thus it connects the third ventricle or diocoel with the fourth ventricle or myelocoel. The optic lobes receive most of the fibres from the optic nerves.

(b) Crura Cerebri: The crura cerebri are thick longitudinal bands of nerve fibres present below the optic lobes. They connect the diencephalon with the medulla oblongata.

Hindbrain: It is the posteriormost part of the brain and consists of two parts:

(a) Cerebellum or Metencephalon: It is poorly developed as in frog. This is perhaps due to the fact that lizards move mainly in one plane. It is merely a narrow, flat transverse band on the dorsal side, just behind the optic lobes.

(b) Medulla Oblongata: The medulla oblongata is broad in front and narrow behind. It has a prominent ventral flexure, where is passes into the spinal cord. It encloses the fourth ventricle or myelocoel which communicates with the central canal of spinal cord. The thin roof of the fourth ventricle forms posterior choroid plexus. The sides and floor of this ventricle are quite thick.

Meninges - same as in frog.

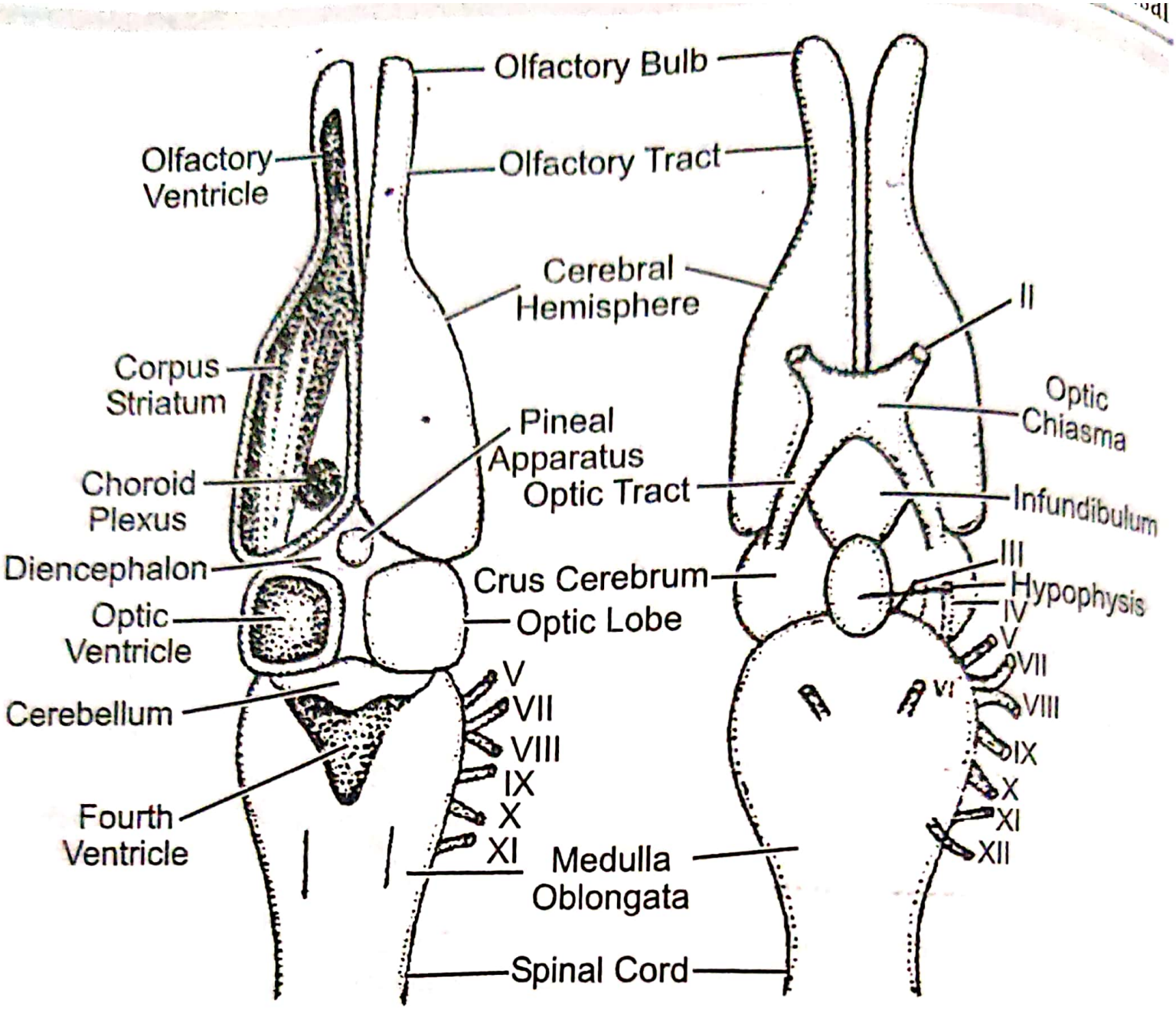

FIGURE 7.18. Brain of lizard. A – dorsal view. B – ventral view.

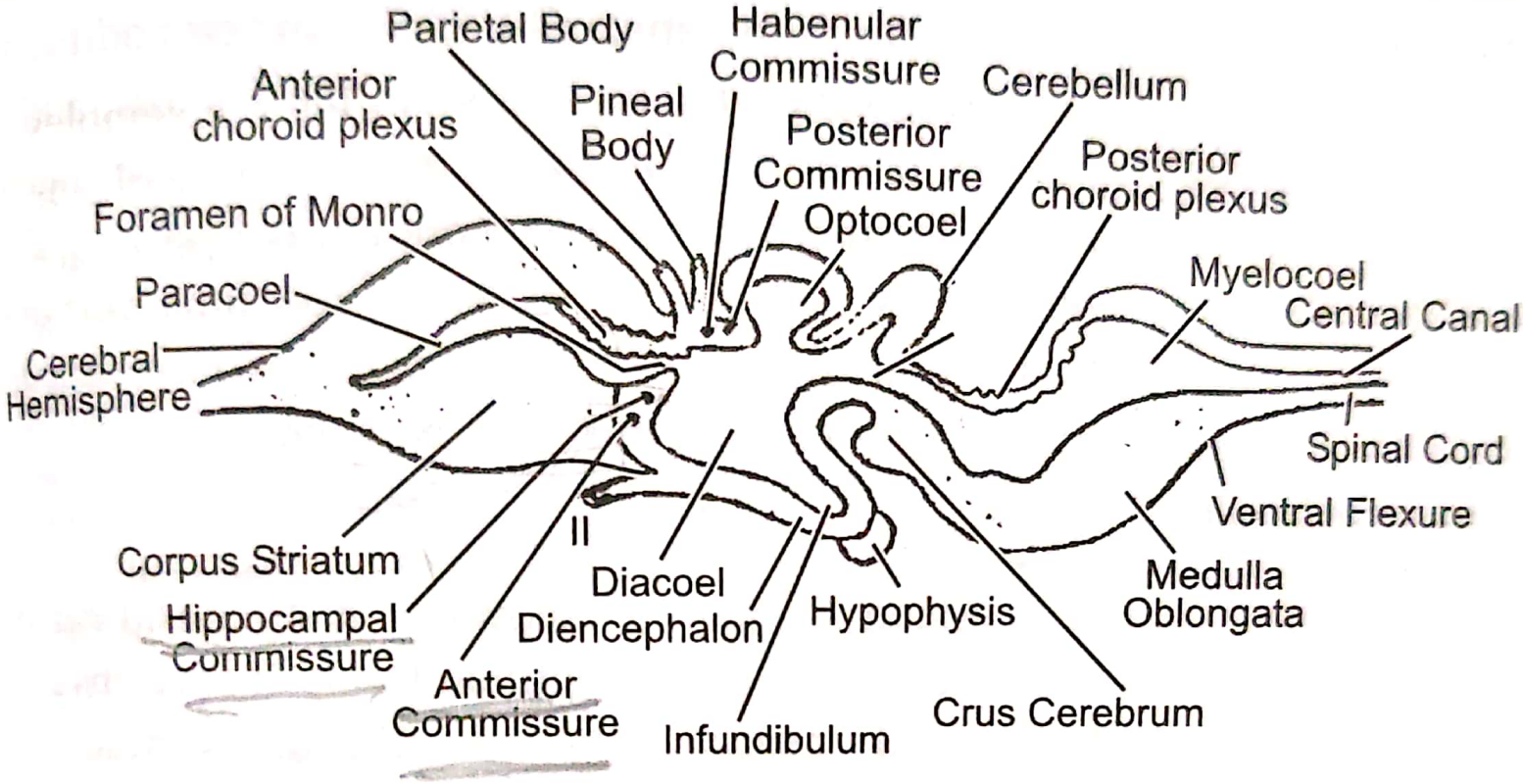

FIGURE 7.19. Sagittal section of the brain of lizard.