B. Brain of Elasmobranchs(e.g.Scoliodon)

Brain of scolidon is an elongated, soft and slightly flattened structurepresentinthecranialcavityofcraniumoftheskull.Itis coveredbyathinvascularmembranecalledmeninxprimitiva. Their is a narrow space between the meninx primitiva and perchondrium(awhitefibroussheathofcranium)whuchisfilled with a wattery and transparent cerebrospinal fluid with many connective tissue strands. Perichindrium and meninx primitiva protectthebrainfrommechanicalinjurieswhilecerebrospinalfluid protects it from mechanical shocks and also resist the effect of external changes.

The brain is divided into three primary parts:
(a) The forebrainorprosencephalon,

(b) The midbrainormesencephalon

(c) The hindbrainorrhombencephalon.

Theforebrain consistsof a massive undividedcerebralhemisphere. Thecerebralhemisphereisrelatively largerthanthatof other fishes.From theanteriorendofcerebralhemispherearise twostout olfactorypeduncles;eachterminatesintoalargebilobedolfactory lobe(Fig.1).

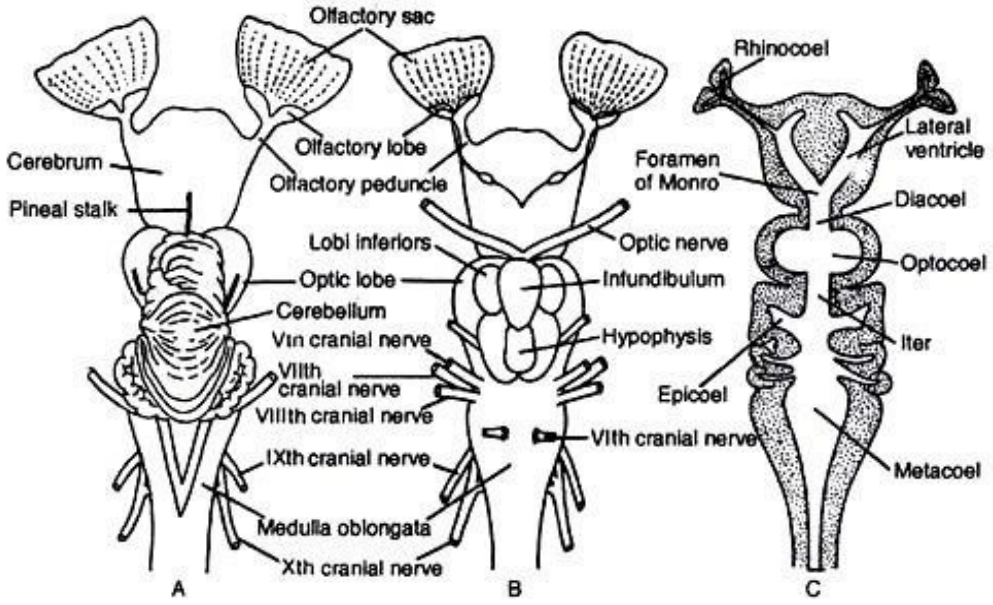

Fig. 1.38 : Brain of *Scoliodon* : A. Dorsal view. B. Ventral view. C. Diagrammatic longitudinal section showing the position of different ventricles

The olfactory lobes lie close to the olfactory capsules. Each olfactory nerve is composed of many bundles of nerve fibres. The surface of the cerebrum is smooth and the walls are thick. A small opening called the neuropore is present on the mid-ventral surface of the cerebrum. The posterior part of forebrain (diencephalon) is very short. The roof of the diencephalon is thin, non-nervous and contains the anterior choroid plexus.

The lateral walls of the diencephalon form two thickened bodies called thalami. A long and slender tube, the pineal organ or epiphysiscerebriprojectsfromtheroofofthediencephalon.The floor of the diencephalon (or hypothalamus) is well-formed. A hollowinfundibulumisgivenofffromthefloorofthediencephalon.

Theinfundibulumisdilatedtoformtwoovalthick-walledbodies calledlobiinferioreswhosedistalendsareproducedintotwothin-walled glandular sacs called sacci vasculosi. The lobi inferiores arethecentresforgustationandsmell.

Thehypophysisisattachedtotheinfundibulum. Theopticchiasma liesin frontofthe infundibulum. Theoptic chiasmaisformedbythe decussationofthenervefibresoftwoopticnerves(Fig.1-3).

Themidbrainislargeandconsistsoftworoundopticlobes.The opticlobesaresituatedbehindthediencephalon.Thefloorand thesidewallsarerelativelythicker.Themidbrainisconsideredas the centre ofcoordination.

The hindbrain consists of a highly developed cerebellum and a medulla oblongata. The dorsal surface of the cerebellum produces many irregular convolutions. The cerebellum contains a small cavity. The cerebellum is also a centre of co-ordination. The cerebellum is divided into three lobes by two well-marked transverse furrows.

Themedullaoblongataistriangularandtheanteriorendgivesa pair of hollow corpora restiformia with trace of convolutions in adults.Themedullacontrolsrespiration.Twocorporarestiformia are connected by the transverse nerve band. The roof of the medullaoblongataisnon-nervousandbearstheposteriorchoroid plexus.
The hind- brain controls swimming movements.

Theventriclesofthebrain aremoderatelydeveloped(Fig.1-3). Thecerebralhemispherescontain narrowlateral ventricle. The third ventricleisextendedforward abouthalf thelength of the cerebralhemispheres.Thefloorof thefourthventricleisvery much thickened.

The fourth ventricle is large and extends dorsally into the cerebellumandiscontinuousbehindwiththecavityofthespinal cord.Theiter(i.e.,thecommunicatingductbetweenthethirdand thefourthventricles)iswider.Althoughthecerebrumisundivided, there are two lateral ventricles which are continued to the rhinocoels(cavityoftheolfactorylobes).

Functions :

1. Olfactory lobes control the smell.

2. Cerebrum controls the voluntary movements of the fish.

3. Diencephalon acts as relay Center as conducts impulses to the cerebrum

4. Optic lobes control the sight

5. Crura cerebri acts as coordination centres to connect the hind brain with the fore brain.

6. Cereblum coordinates the voluntary movements and control the equlirium

7. Medulla oblangata controls the involuntary functions of internal organs like heart, gut, gonads etc.