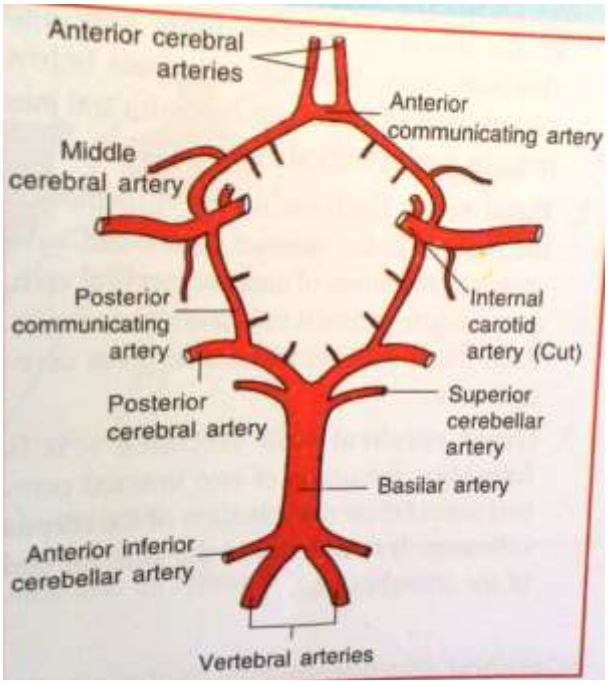
BLOOD SUPPLY OF BRAIN

WRITE DIAGRAM OF CIRCLE OF WILLIS AND ANTERIOR CEREBRAL ARTERY AND ITS BRANCHES. NAME THE AREAS ANTERIOR CEREBRAL ARTERY SUPPLIES.

Circle of willis

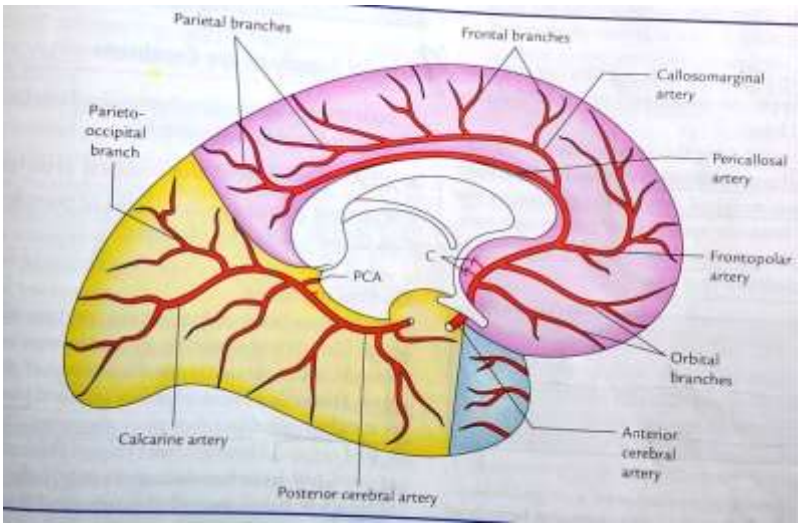


Circle of Willis is an arterial circle situated at the base of the brain in the interpeduncular fossa. It is formed by the anterior and middle cerebral branches of internal carotid artery and posterior cerebral branches of basilar artery.

The circle of Willis is formed
Anteriorly- anterior communicating and anterior cerebral arteries
Posteriorly- basilar artery dividing into two posterior cerebral arteries
Laterally on each side- posterior communicating artery connecting the internal carotid artery with posterior cerebral artery.

The circle of Willis provides a collateral circulation to the brain in the event of obstruction to one of its components.

Anterior cerebral artery –



It is a terminal branch of internal carotid artery.
Runs above the optic nerve to follow the curve of corpus callosum.
Close to its origin the artery is joined by anterior communicating artery.

Branches

It gives off central and cortical branches.
Central branches of the artery supply part of internal capsule,and basal nuclei.
Cortical branches supply the medial surface of the cerebral hemisphere by the following branches:-

- Orbital
- Frontal
- Parietal branches

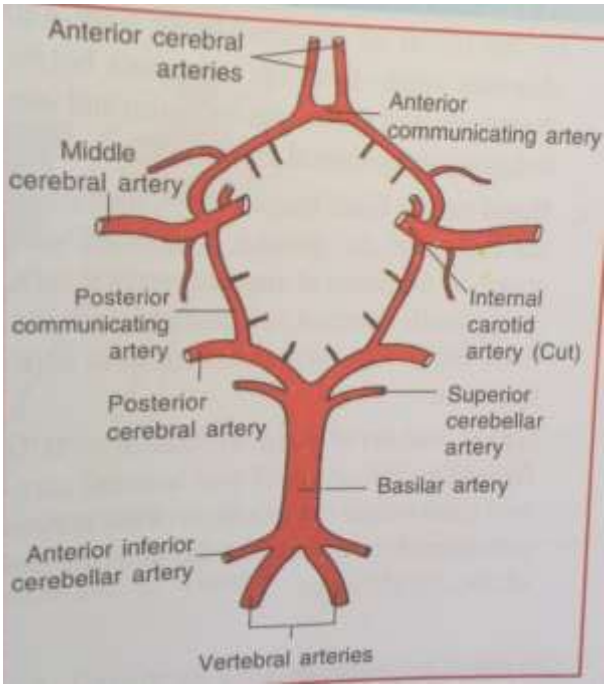
The regions supplied by anterior cerebral artery are

- Parts of motor and sensory areas (paracentral lobule)
- Upper parts of primary motor and sensory area
- Medial part of the orbital surface of the frontal lobe.

Applied anatomy

The occlusion of anterior cerebral artery produces:
-Contralateral hemiparesis and hemianaesthesia involving mainly the leg and foot due to involvement of primary motor and sensory area.
-Inability to identify the objects correctly-due to involvement of superior parietal lobule.
-Apathy and personality changes-due to involvement of frontal lobe

CIRCLE OF WILLIS (SE)



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The circle of willis is formed

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Posteriorly- basilar artery dividing into two posterior cerebral arteries

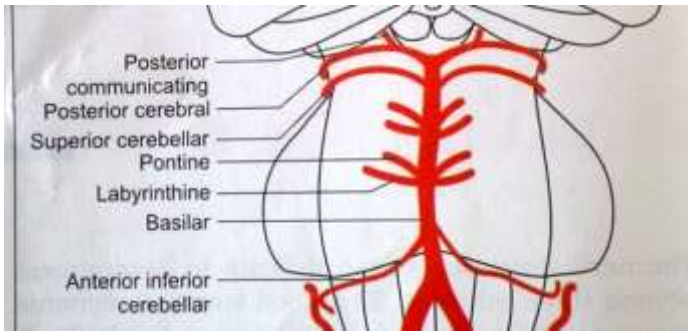
Laterally on each side- posterior communicating artery connecting the internal carotid artery with posterior cerebral artery.

The circle of willis provides a collateral circulation to the brain in the event of obstruction to one of its components.

BASILAR ARTERY (SE)

Ans:- Basilar artery is formed by the union of two vertebral arteries at the lower border of pons.

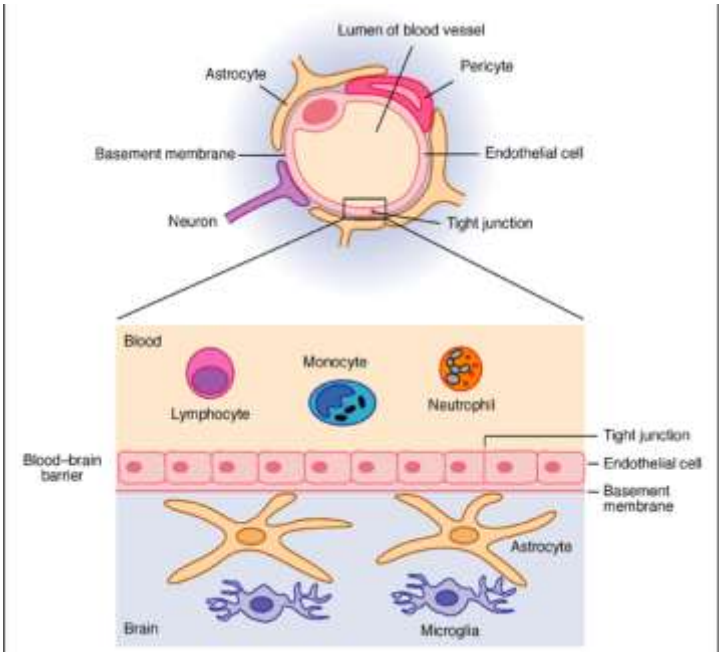
It ascends in the basilar sulcus on the ventral aspect of pons and terminates at the upper border of pons into right and left posterior cerebral arteries.



branches

a) Anterior inferior cerebellar artery
b) Labyrinthine artery
c) Pontine branches
d) Superior cerebellar artery
e) Posterior cerebral artery

BLOOD- BRAIN BARRIER (SE)



Blood-brain barrier is a semipermeable barrier that protects the brain and spinal cord from potentially harmful substances(toxic drugs and exogenous materials) while allowing the gases and nutrients to enter the nervous tissue.

This barrier is formed by structures between the blood and nerve cells of brain.

The blood brain barrier consists of the following structures:-

Capillary endothelial cells and tight junctions between them

Basement membrane of the endothelial cells

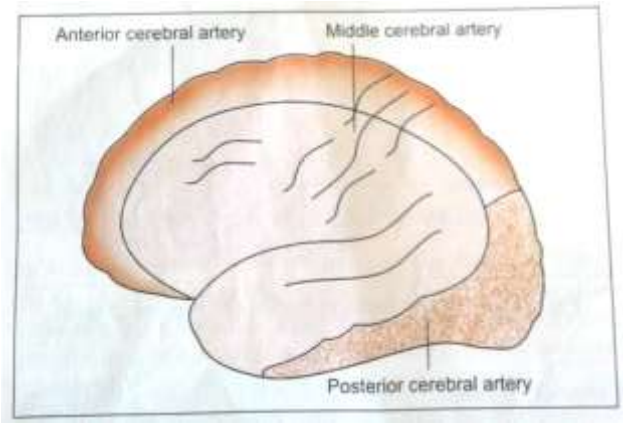
Foot processes of the astrocytes which adhere to the capillary wall.

BLOOD SUPPLY OF SUPEROLATERAL SURFACE OF CEREBRUM? (SE)

ANTERIOR CEREBRAL ARTERY

supplies a narrow strip of cerebral cortex adjoining superomedial border upto parieto occipital sulcus

The upper parts of primary motor and sensory areas lie in this region.



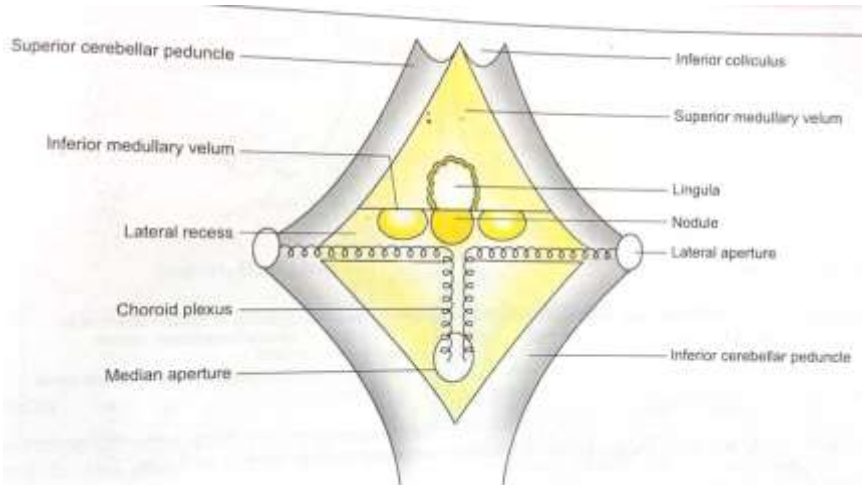
MIDDLE CEREBRAL ARTERY

The superolateral surface of cerebrum (about 2/3rds) is mainly supplied by middle cerebral artery. The region of cerebral cortex includes the greater part of primary motor and sensory areas and frontal eyefield area. In the left (dominant) hemisphere it includes the Broca`s and Wernicke`s speech area.

POSTERIOR CEREBRAL ARTERY

A narrow strip along the lower border of temporal lobe (excluding temporal pole) and occipital lobe are supplied by posterior cerebral artery

CHOROID PLEXUS (SE)



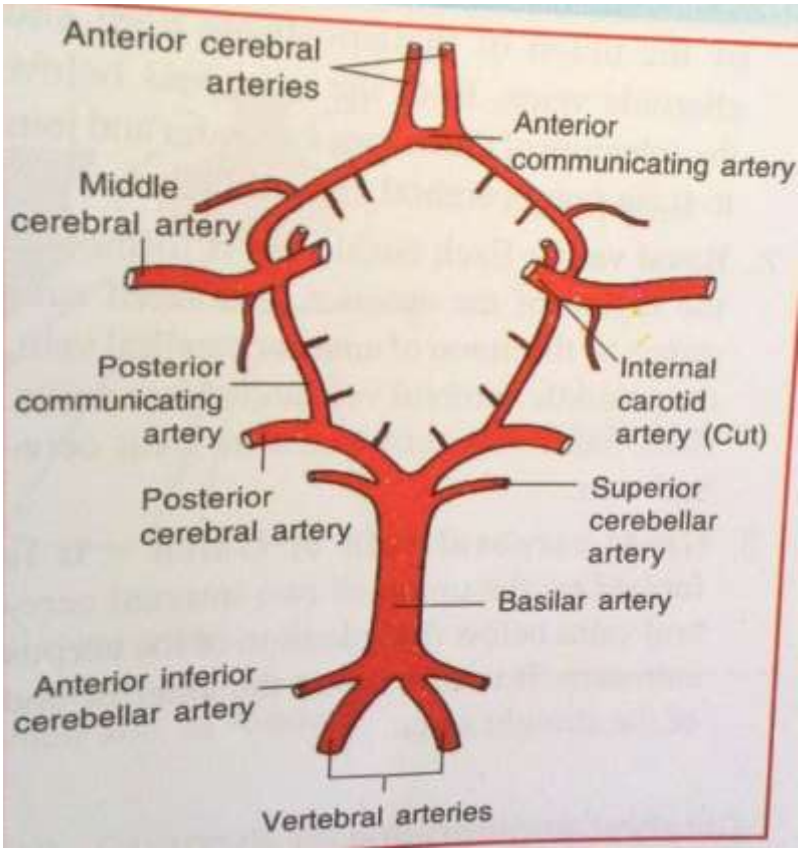
Choroid plexus is a capillary plexus of blood vessels between the two layers of tela choroidea which project into the ventricular system of the brain. It is responsible for secreting CSF.

Choroid plexus of fourth ventricle – derived from branches of posterior inferior cerebellar artery. The plexus projects into the ventricle through the lower part of the roof. The entire plexus is T shaped , with the foramen of magendie placed between the vertical limb and the horizontal limb and extends into the lateral recess

The choroid plexus of third ventricle projects into the roof as two longitudinal folds. The blood vessels of this plexus is derived from anterior choroidal arteries.

The choroid plexus of lateral ventricle project into the central part and inferior horn of lateral ventricle. It is derived from anterior and posterior choroidal arteries.

DRAW AND LABEL CIRCLE OF WILLIS (SA)



BASILAR ARTERY (SA)

Basilar artery is formed by the union of two vertebral arteries at the lower border of pons.

The branches of basilar artery are

Anterior inferior cerebellar artery
Labyrinthine artery
Pontine branches
Superior cerebellar artery
Posterior cerebral artery

BRANCHES OF BASILAR ARTERY (SA)

The branches of basilar artery are

Anterior inferior cerebellar artery
Labyrinthine artery
Pontine branches
Superior cerebellar artery
Posterior cerebral artery

CHOROID PLEXUS (SA)

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Choroid plexus of third ventricle – derived from anterior choroidal arteries

Choroid plexus of lateral ventricle – derived from anterior and posterior choroidal arteries.

WHAT IS SUBARACHNOID HEMORRHAGE? MENTION ONE CAUSE (SA)

Subarachnoid hemorrhage results from rupture of a congenital berry aneurysm in the subarachnoid space at the base of the brain.

Symptoms are of sudden onset. Severe headache, stiffness of neck and loss of consciousness.