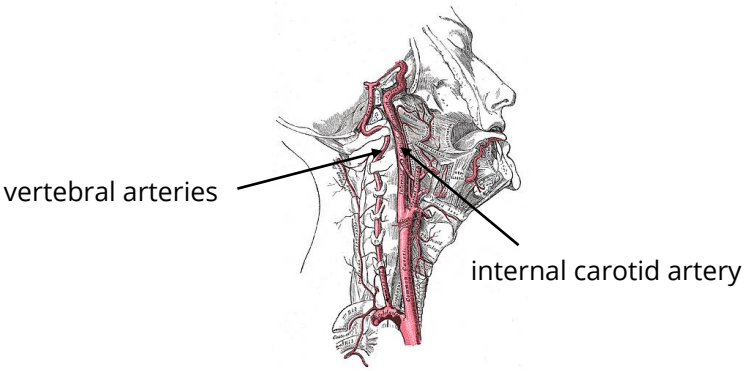
Blood vessels of the brain

Blood supply to the brain

The blood supply to the brain consists of an anterior portion originating from the internal carotid artery (ICA) and a posterior portion originating from the vertebral arteries.



Blood supply to the cerebrum

There are three main arteries that supply the cerebrum: anterior, middle and posterior cerebral arteries. The anterior and middle cerebral arteries are part of the anterior blood supply, and the posterior cerebral artery is part of the posterior blood supply. The anterior cerebral artery (ACA) branches sharply forward from the internal carotid artery (ICA). It ascends over the corpus callosum and its branches provide the anterior 2/3 of the medial surface of the cerebrum. The middle cerebral artery (MCA) branches from the ICA while keeping its general course. It enters into the lateral fissure and its branches run above the insula and supply the anterior 2/3 of the inferior and lateral surfaces of the cerebrum. Try to identify some of the small branches of the MCA. The most medial is the anterior choroidal artery that supply the choroid plexus. Lateral to it, the thin striate arteries penetrate the anterior perforated substance and supply the striatum and internal capsule. The posterior cerebral artery (PCA) is a part of the posterior blood supply. In their superior part, the two vertebral arteries merge to form the basilar artery. At the most superior part, the basilar artery splits into the two posterior cerebral arteries. The PCA provides the posterior 1/3 of the cerebrum surfaces. The posterior choroidal arteries branch from the PCA and supply the choroid plexus of the lateral ventricles and the tela choroidea of the third ventricle.

Cerebral arterial circle

The main arteries that supply the cerebrum are connected in an arterial circle (circle of Willis). This circle consists of the two anterior cerebral arteries that are connected by the anterior communicating artery and the two internal carotid arteries each connected to the posterior cerebral artery by the two posterior communicating arteries.

Blood supply of the cerebellum

Three arteries supply the cerebellum, they are all part of the posterior blood supply of the brain. The superior cerebellar artery branches from the rostral part of the basilar artery, below the posterior cerebral artery. Notice the oculomotor nerve that originates between them. Follow the basilar artery caudally, identify small branches that supply the pons, the pontine arteries. The anterior inferior cerebellar artery (AICA) branches from the lower part of the basilar artery near the merging point of the vertebral arteries. Try to find the thin labyrinthine artery that supply the inner ear and the abducens nerve that are located above it. The posterior inferior cerebellar artery (PICA) branches from the vertebral artery.

Blood supply of the spinal cord

There are three main arteries that supply the spinal cord, they are part of the posterior blood supply of the brain.

In the superior part of the vertebral arteries, two small medial branches merge into the anterior spinal artery that supplies the anterior part of the spinal cord. Two posterior spinal arteries branch from the lateral part of each vertebral artery and supply the posterior part of the spinal cord.

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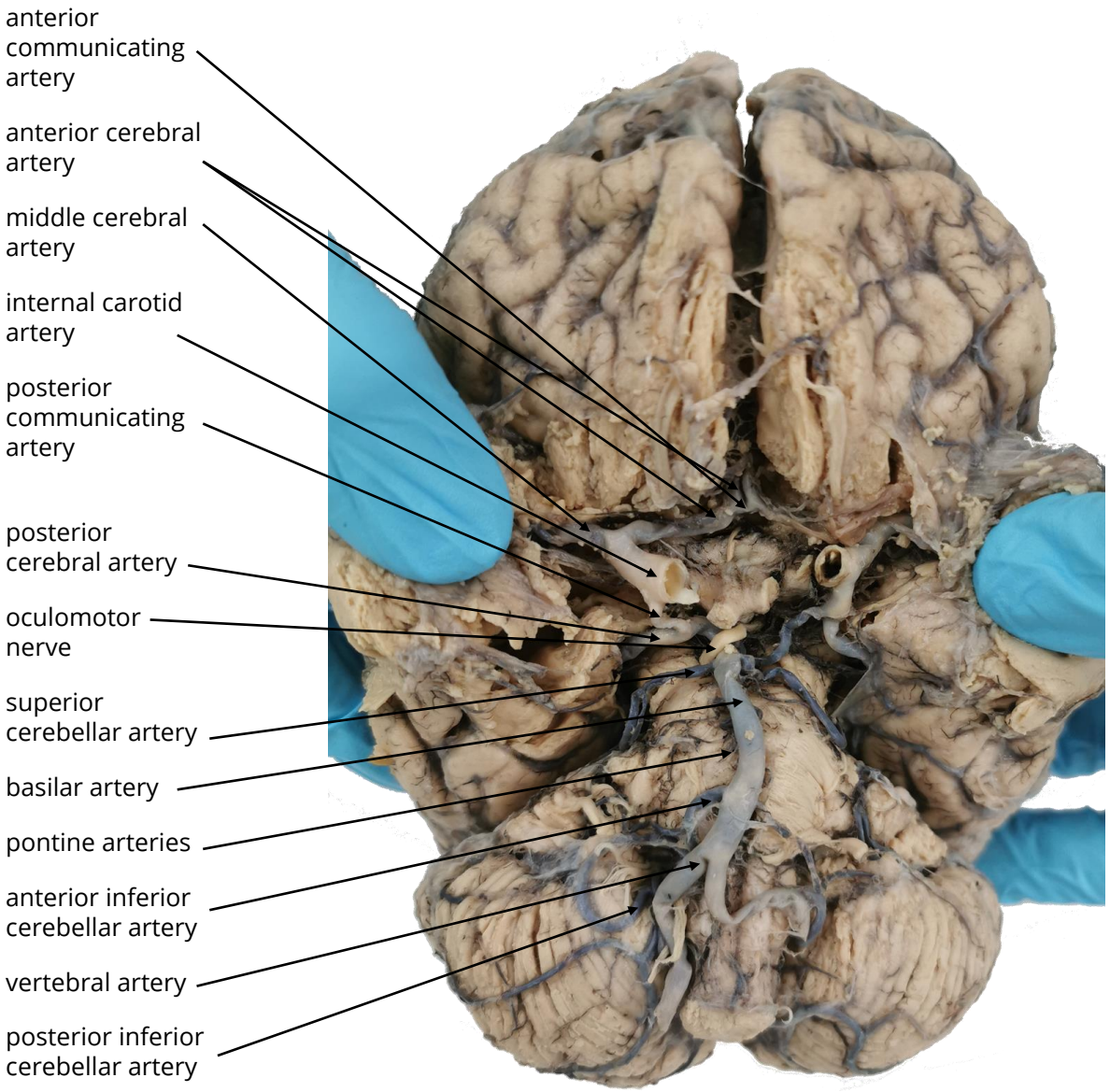
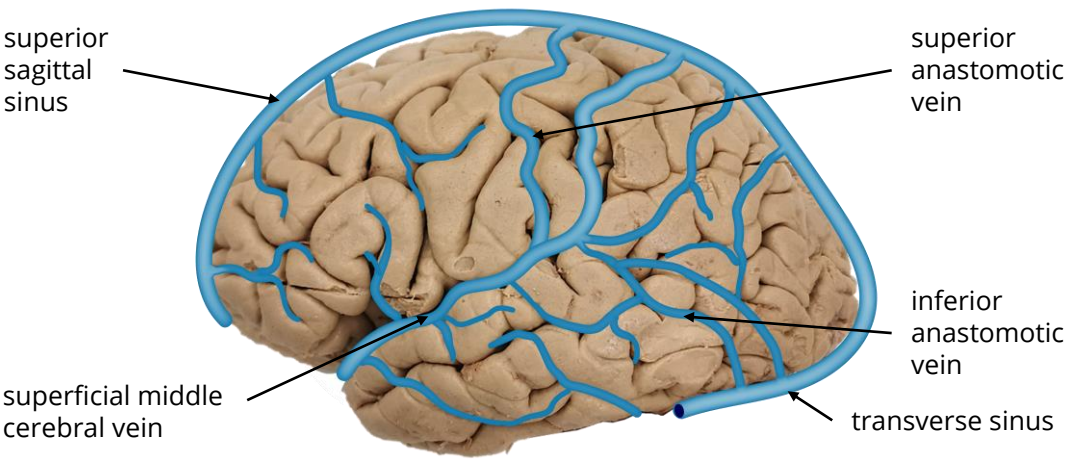
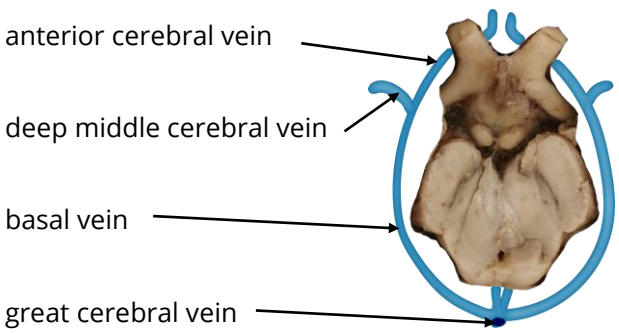
Blood supply to the brain



External venous system

On the lateral surface of the hemisphere, find the superior cerebral veins that drain into the superior sagittal sinus. Superficial to the lateral fissure, find the superficial middle cerebral vein that drains into the cavernous sinus. Two anastomotic veins branch from the superficial middle cerebral vein: the superior anastomotic vein (of Trolard) that drains into the superior sagittal sinus and the inferior anastomotic vein (of Labbe) that drains into the transverse sinus. It is difficult to differentiate between these veins and other veins in the preserved brain. In the depth of the lateral sulcus lies the deep middle cerebral vein. It is easier to identify it at its posterior part where the anterior cerebral vein drains into it and both form the basal vein (of Rosenthal). This vein encircles the midbrain and drains into the great cerebral vein (of Galen).





Internal venous system

The internal venous system consists of two internal cerebral veins that lie within the tela choroidea of the third ventricle. Each such vein is formed from the drainage of the thalamostriate vein, septal vein and choroidal vein. Posteriorly, the two internal cerebral veins merge to form the great cerebral vein (of Galen) that also drains the basal vein. The great cerebral vein drains into the straight sinus.