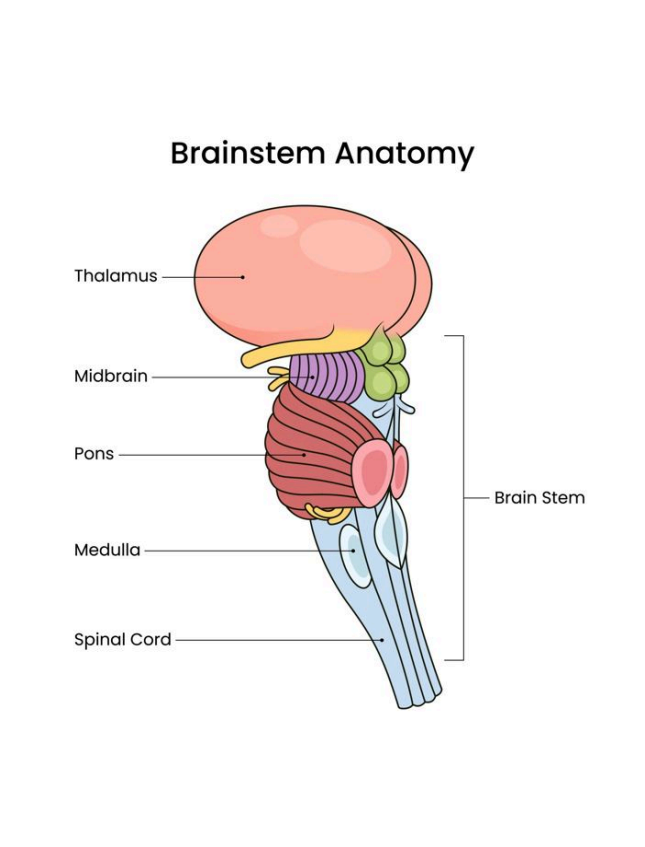
The Brainstem

Neuroanatomy · Lecture 4



Transcription 0:00:00

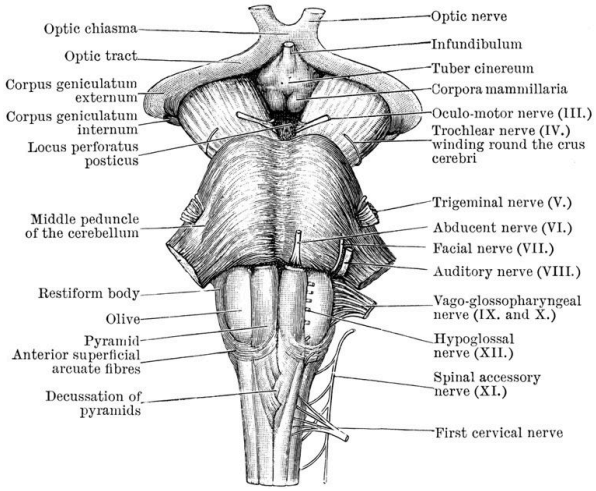
Three parts, one pathway

- Midbrain (top), pons (middle bulge), medulla (bottom, continues as the spinal cord).
- Every tract between the cerebrum and the spinal cord passes through it.
- Holds the nuclei of cranial nerves III to XII, so a small lesion gives many signs.

Exam point: a brainstem lesion is suspected when cranial nerve signs and long-tract signs appear together.

Medulla oblongata

- Pyramids: corticospinal tracts
- Decussation of the pyramids
- Olive and CN XII rootlets



Transcription 0:06:00

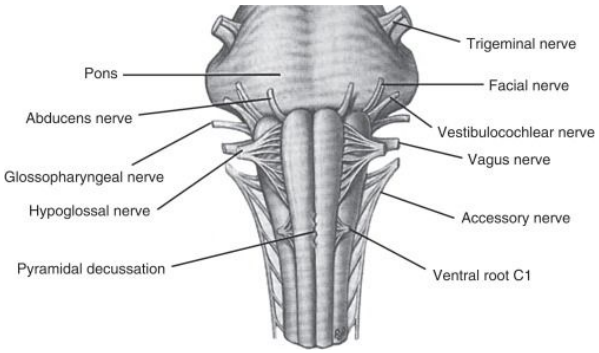
Front of the medulla: pyramids, olive, CN XII

- Pyramids carry the corticospinal tracts; about 85 to 90% of fibres cross at the decussation.
- The olive sits lateral to the pyramid (inferior olivary nucleus, projects to the cerebellum).
- CN XII exits between pyramid and olive; CN IX, X and XI exit behind the olive.
- Holds the cardiovascular and respiratory centres.

Exam point: a lesion above the decussation gives weakness on the opposite side; below it, the same side.

Pons

- Transverse fibres to the cerebellum
- CN V from the lateral pons
- CN VI, VII, VIII at the lower border



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Transcription 0:16:00

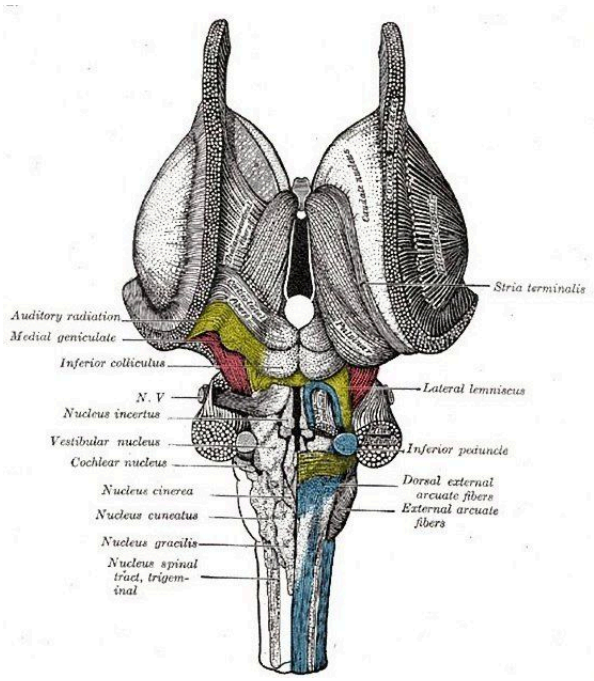
The pons links the cortex to the cerebellum

- Transverse pontine fibres cross to the cerebellum through the middle cerebellar peduncle.
- CN V (trigeminal) exits from the lateral pons.
- At the pontomedullary junction: CN VI near the midline, CN VII and VIII at the cerebellopontine angle.

Exam point: a cerebellopontine angle tumour (vestibular schwannoma) affects CN VIII first, then VII and V.

The midbrain

- Back: superior and inferior colliculi
- Inferior colliculus: hearing pathway
- CN IV exits from the back



Transcription 0:25:00

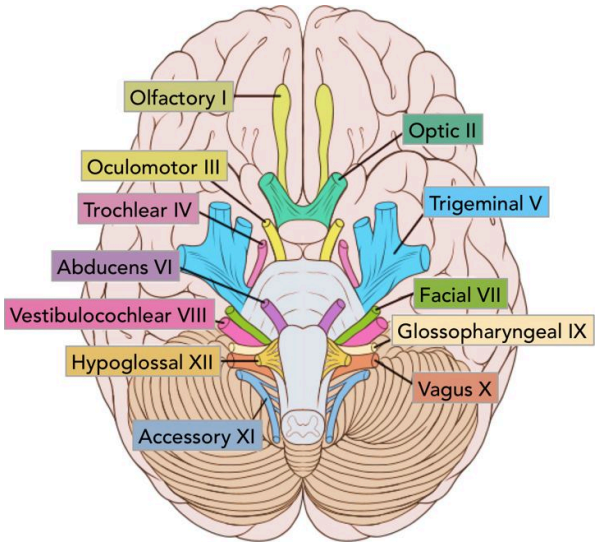
The midbrain from behind

- Superior colliculi: visual reflexes. Inferior colliculi: hearing.
- Hearing pathway: lateral lemniscus to the inferior colliculus, then to the medial geniculate.
- Front (not seen here): cerebral peduncles and CN III.
- Inside: the red nucleus and the substantia nigra (dopamine; its loss causes Parkinson's disease).
- CN IV is the only cranial nerve that exits from the back, just below the inferior colliculus.

Exam point: substantia nigra loss is the cause of Parkinson's disease.

Cranial nerves by level

- Midbrain: III, IV
- Pons: V to VIII
- Medulla: IX to XII



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Transcription 0:37:00

Which cranial nerves sit at which level

- Midbrain: III and IV.
- Pons: V, VI, VII and VIII.
- Medulla: IX, X, XI and XII.
- I and II are not brainstem nerves.

Exam point: know this table to localise a lesion from the cranial nerves involved.