THE UNIVERSITY OF CONNECTICUT
Graduate School
Meds 384, Mammalian Neuroanatomy
Reticular Formation and Cerebellum

Barr's: Chapters 9 & 10

RETICULAR FORMATION

The reticular formation is in the dorsal part of the brainstem where the neurons and fibers present a netlike (reticular) appearance in transverse sections. Identify the reticular formation in slice CNS-12, -17, -21, -24, -27.

Raphe nuclei is a source of serotonin innervation. See CNS-17.
Locus coeruleus is a source of noradrenergic innervation. See CNS-22.
Paramedian pontine reticular formation (PPRF) is important for conjugate horizontal eye movements. See CNS-22.

CEREBELLUM

Cerebellar Cortex and Deep Nuclei

Examine the gross anatomy of the cerebellum in your textbook or on a gross brain.

1. Identify the cerebellar white and gray matter in CNS-47. Identify the vermis and the hemispheres of the cerebellar cortex. Do this again in CNS-46, CNS-45, and CNS-44.

2. Identify the deep nuclei of the cerebellum in CNS-44 and CNS-20. What is the relationship of the deep nucleus to the cerebellar cortex? Observe the folia of the cerebellar cortex. Identify the fastigial nucleus (medial), interposed nuclei (emboliform and globose) and dentate nucleus.

3. The cerebellum is connected to the brain by three pairs of fiber bundles: the inferior, middle, and superior cerebellar peduncles. CNS-17, -21, -22.

INPUTS TO CEREBELLUM

Mainly enter through the inferior and middle cerebellar peduncles.

Inferior Olive

Identify the inferior olive in CNS-17. What type of fiber projects from the inferior olive to the cerebellar cortex? Are these projections crossed or uncrossed? Is this the same type of fiber that projects from the spinal cord?

Cerebrocerebellum

Locate the middle cerebellar peduncle in CNS-21. The pontine nuclei receive most of their inputs from the _____ and transmit information to the cerebellum via the middle peduncle.

Based on this information, what part of the cerebellum is most often associated with the cerebral cortex? What type of fiber projects from the pontine nuclei to the cerebellar cortex?

Vestibular Cerebellum

In CNS-18, the flocculus is just dorsal to the 8th nerve. What is the main input to the floccular-nodular lobe? Identify the vermis and the hemispheres.

Spinal Cerebellum

How is the body represented (somatotopic map) on the cerebellum? The right cerebellar hemisphere represents the _____ side of the body. The right *cerebral cortex* represents the _____ side of the body. Information from the limbs is carried to the cerebellum. Locate the dorsal spinocerebellar tract, ventrospinocerebellar tract, and inferior cerebellar peduncle in CNS-14, CNS-17, and CNS-18. Where do these originate and what limb is represented? What type of information is carried? Locate the external cuneate nucleus in CNS-13 or 15. Which limb is represented? Through which cerebellar peduncle will spinocerebellar and cuneocerebellar tracts project?

OUTPUTS OF THE CEREBELLUM

Outputs of the cerebellum mainly exit via the superior cerebellar peduncle and the fastigiobulbar tract .

There are four major outputs of the cerebellum that influence the four major motor tracts (corticospinal, rubrospinal, vestibulospinal, and reticulospinal). Find these in CNS-20. The fastigial nucleus projects via the fastigiobulbar tract to the lateral vestibular nuclei which makes the lateral vestibulospinal tract. Identify the vestibular nuclei in CNS-18.

The fastigial nucleus also projects to the reticular formation of the medulla that makes the lateral reticulospinal tract. Identify the reticular formation in CNS-18.

The interposed nuclei project mainly to the red nucleus and to a lesser extent to the thalamus. The rubrospinal tract descends from the red nucleus. In CNS-30, find the target of the projections from the interposed nuclei.

The dentate nucleus provides one of the major outputs of the cerebellum. It is the origin of the superior cerebellar peduncle (brachium conjunctivum). Locate the beginning of that peduncle in CNS-18. The dentate nucleus projects mainly to the VA-VL nuclei of the thalamus. These thalamic nuclei project to motor and premotor cortex. The corticospinal tract descends from these motor areas. Both the dentate and interposed projections are via the superior cerebellar peduncle. Find the superior peduncle in CNS-21 and CNS-22. Follow the superior cerebellar peduncle in CNS-22, CNS-23, CNS-24, and CNS-25. Where does it cross? How is the crossing related to the somatotopic map? In CNS-38, find the target of the projections from the dentate nucleus. Look at these structures again in a horizontal section, CNS-44.