

Homework Assignment for Dental Neuroanatomy 2012

Sensory Pathways and Cranial Nerves

DO AFTER REVIEWING THE LECTURE

This combines all that you learned about cranial nerves in gross anatomy, the brainstem and somatic sensations in this course.

Using color pens outline the following structures:

Figure 01 lumbar cord

- Ventral horn RED
- Dorsal horn BLUE
- ON THE **LEFT** SIDE OF THE DIAGRAM DRAW IN LIGHT BLUE a primary sensory neuron and its cell body carrying pain and temperature from the leg. Where does it synapse?
- Color the ALS or Spinothalamic tract that will carry this information. Be careful as to the correct side. LIGHT BLUE IF THERE ARE TWO BLUES
- Color the Gracile fasciculus DARK BLUE IF THERE ARE TWO BLUES

Spinal cord (Lumbar)



LEFT

ON ALL PICUTRES

RIGHT

Figure 02 thoracic cord

- Outline the Ventral horn RED
- Outline the Lateral horn ORANGE
- Outline the Dorsal horn DARK BLUE
- Outline the same ALS Tract LIGHT BLUE
- Outline Dorsal columns DARK BLUE
- DRAW IN THE CELL BODIES FOR THE SECOND NEURON IN THE ALS PATH LIGHT BLUE AND HAVE IT ENTER THE TRACT. Label the anterior white commissure.
- DRAW IN THE CELL BODY FOR THE PREGANGLIONIC SYMPATHETIC NEURON ORANGE AND HAVE IT LEAVE THE SPINAL CORD
- DRAW IN RED THE CELL BODY FOR THE MOTOR NEURON TO THE INTERCOSTAL MUSCLES

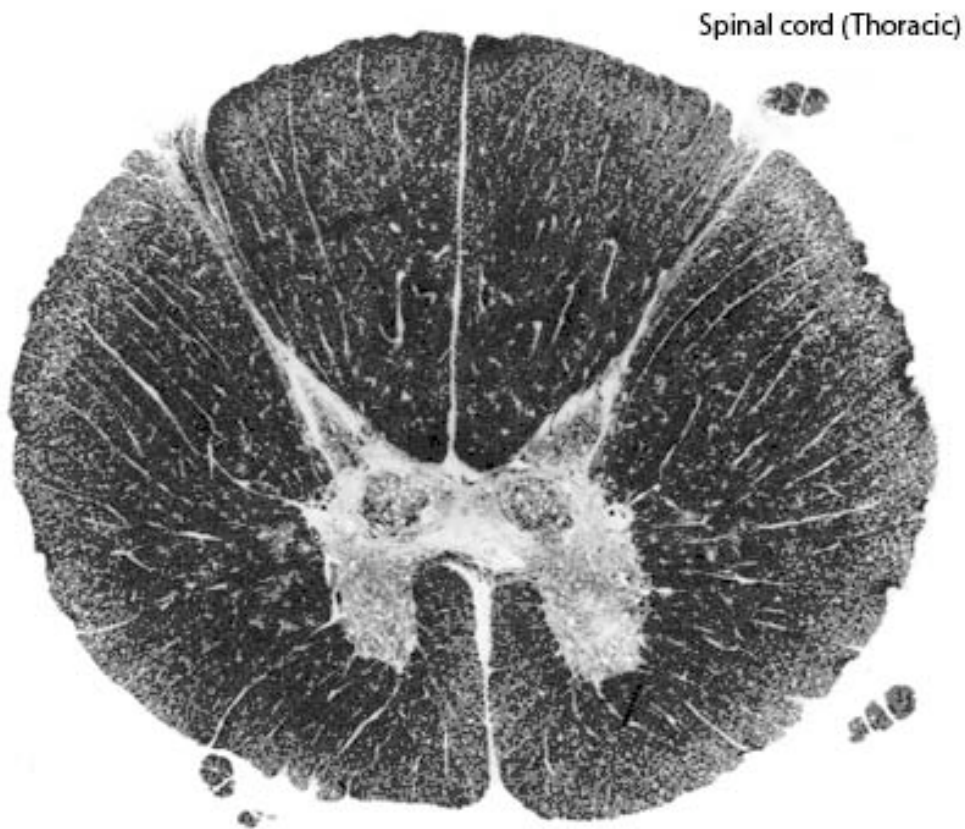


Figure 03 cervical cord

- Draw a ventral horn cell with its root passing through the white matter TO EMERGE IN ONE OF THE VENTRAL ROOTS YOU CAN SEE RED
- Dorsal horn BLUE
- ALS LIGHT BLUE
- DRAW A DORSAL ROOT GANGLION CELL ENTERING THE **LEFT** CORD CARRYING POSITION SENSE FROM THE ARM. DRAW ITS AXON ENTERING THE DORSAL COLUMN AND ASCENDING. Be careful as to which side you put it on
- Gracile fasciculus DARK BLUE LABEL G
- Cuneate fasciculus DARK BLUE LABEL C

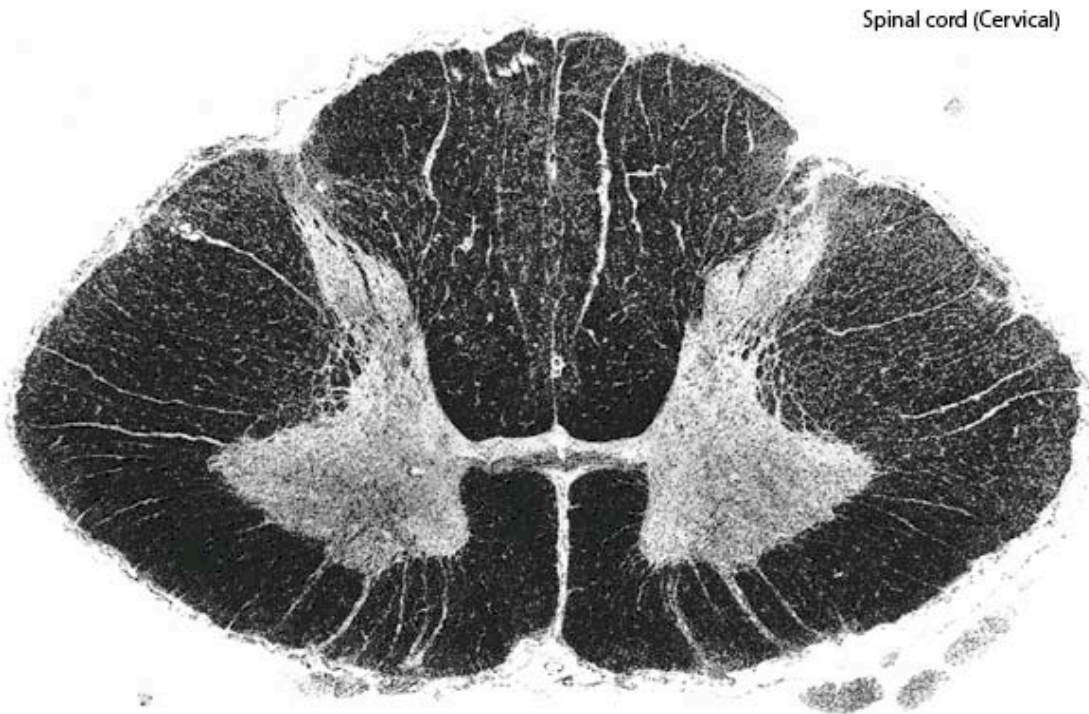


Figure 04 Level of the decussation of the pyramid or corticospinal tract

- Ventral horn RED
- Draw Motor neurons for the spinal accessory nerve XI on each side and their axons emerging laterally PINK OR MAGENTA
- The dorsal horn is very large because it is now getting Trigeminal input (Descending Nucleus of V not yet discussed in lecture) (since it is carrying pain and temperature from the face color it LIGHT BLUE
- Add the ALS to the photo LIGHT BLUE
- Outline Gracile fasciculus DARK BLUE G
- Outline cuneate fasciculus DARK BLUE C. What modalities are carried? From what part of the body?

Spinal cord (Decussation)



Figure 05 Caudal Medulla

- Indicate the remains of the dorsal columns (DARK BLUE)
- Outline the dorsal column nuclei (DARK BLUE) and label each. Add the second order neurons
- Draw the original of the medial lemniscus and its decussation to form the medial lemniscus tract (DARK BLUE).
- Add the ALS LIGHT BLUE
- Outline the hypoglossal nucleus and have a motor neurons emerge from the brainstem (RED)
- Add neurons on each side for the nucleus ambiguus. Should they be PINK or ORANGE?

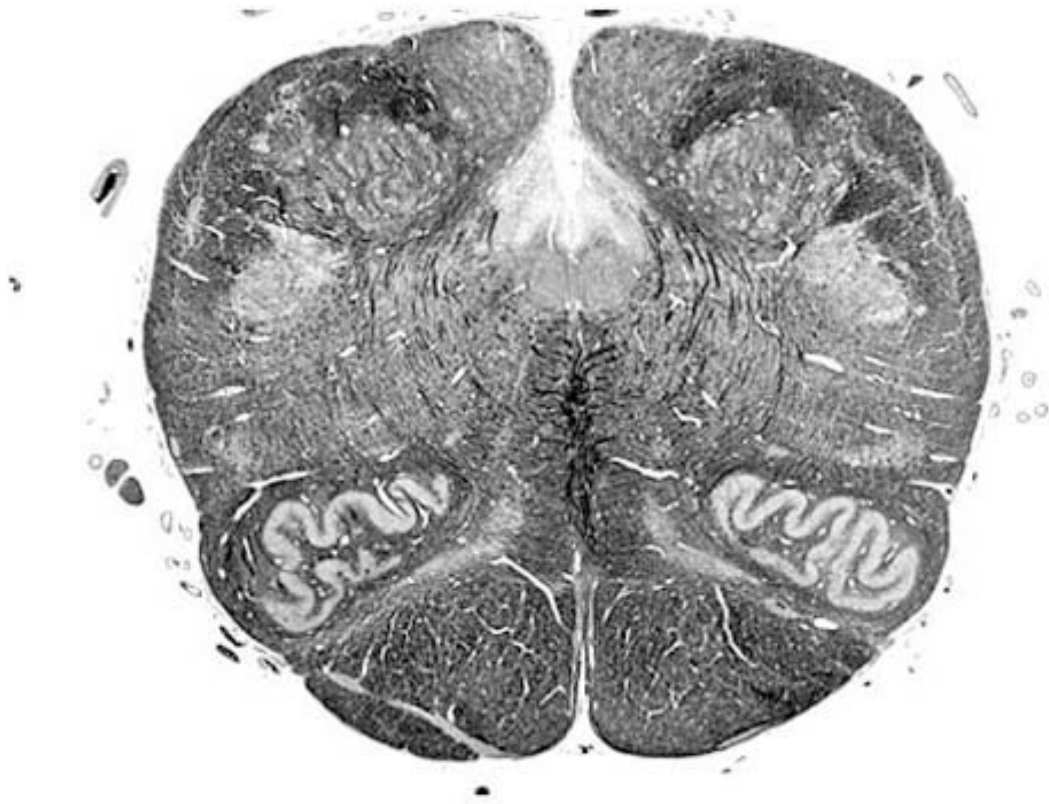


Figure 06 Mid-medulla

- Olive bulge on the outside DARK GREEN one of our landmarks
- Inferior cerebellar peduncle DARK GREEN one of our landmarks
- Pyramid DARK GREEN (it is missing on the right because not normal) one of our landmarks
- The 4th ventricle, add a roof and fill it with CSF - TOURQUOISE
- Medial lemniscus DARK BLUE. Remember which side of the spinal cord the information came in on. The information now is traveling on the ___ side.
- ALS LIGHT BLUE
- Draw a cell in the left hypoglossal nucleus RED. Draw its axon until it emerges on the ventral surface
- Draw 1 cell in the Dorsal nucleus of the vagus nerve ORANGE
- Draw 1 cell in the Nucleus Ambiguus and color it MAGENTA OR PINK

The Medulla Oblongata

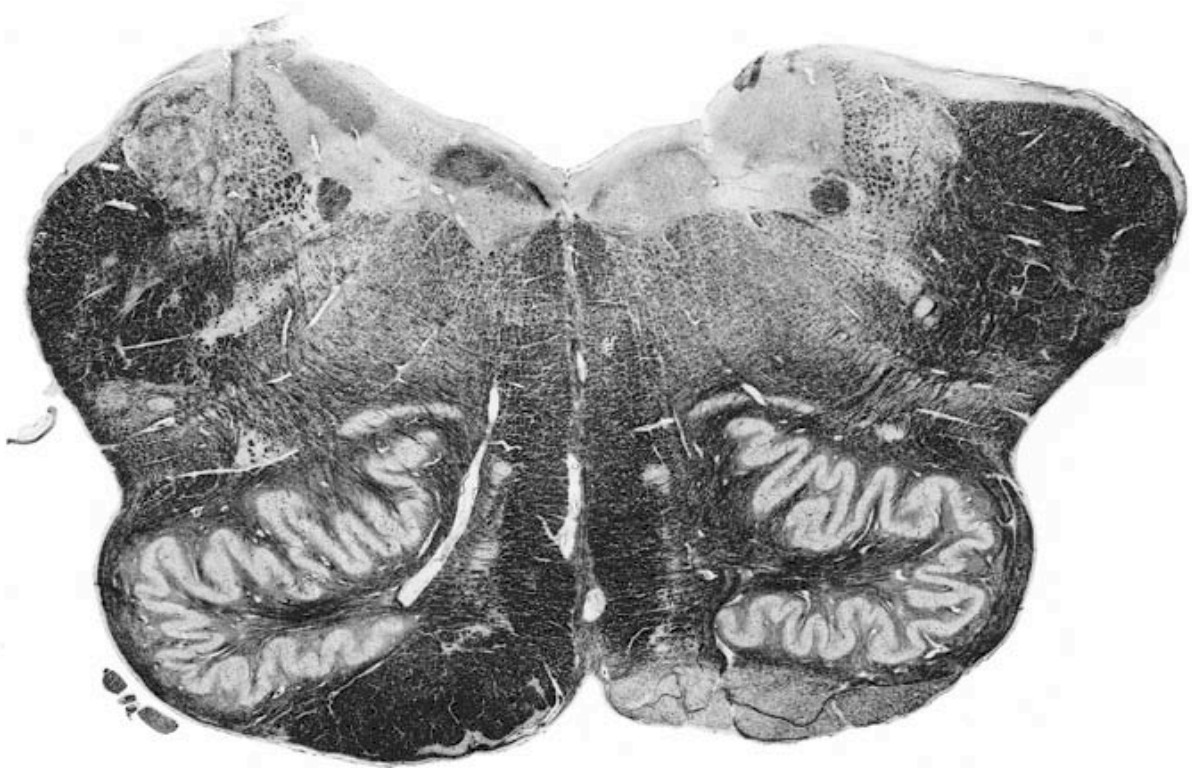


Figure 07 Pons (Caudal)

- Draw a neuron in the abducens nucleus RED and connect it to the VI n. axons you can see in the picture as they run through the basis pontis to emerge on the ventral surface.
- Draw a neuron in the facial nucleus PINK and connect to the VII n as it loops over the abducens nucleus and passes through the pons
- Continue tracing the ALS LIGHT BLUE
- Continue tracing the Medial lemniscus DARK BLUE
- Outline The 4th ventricle TOURQUOISE
- OUTLINE THE BASAL PONS OR BASIS PONTIS OR PONS PROPER IN DARK GREEN one of our landmarks
- PUT A STAR OR CHECK ON THE MIDDLE CEREBELLAR PEDUNCLE (MCP) DARK GREEN one of our landmarks
- DRAW IN THE BASILAR ARTERY AND SOME OF ITS PENETRATING CIRCUMFERENTIAL BRANCHES, RED one of our landmarks

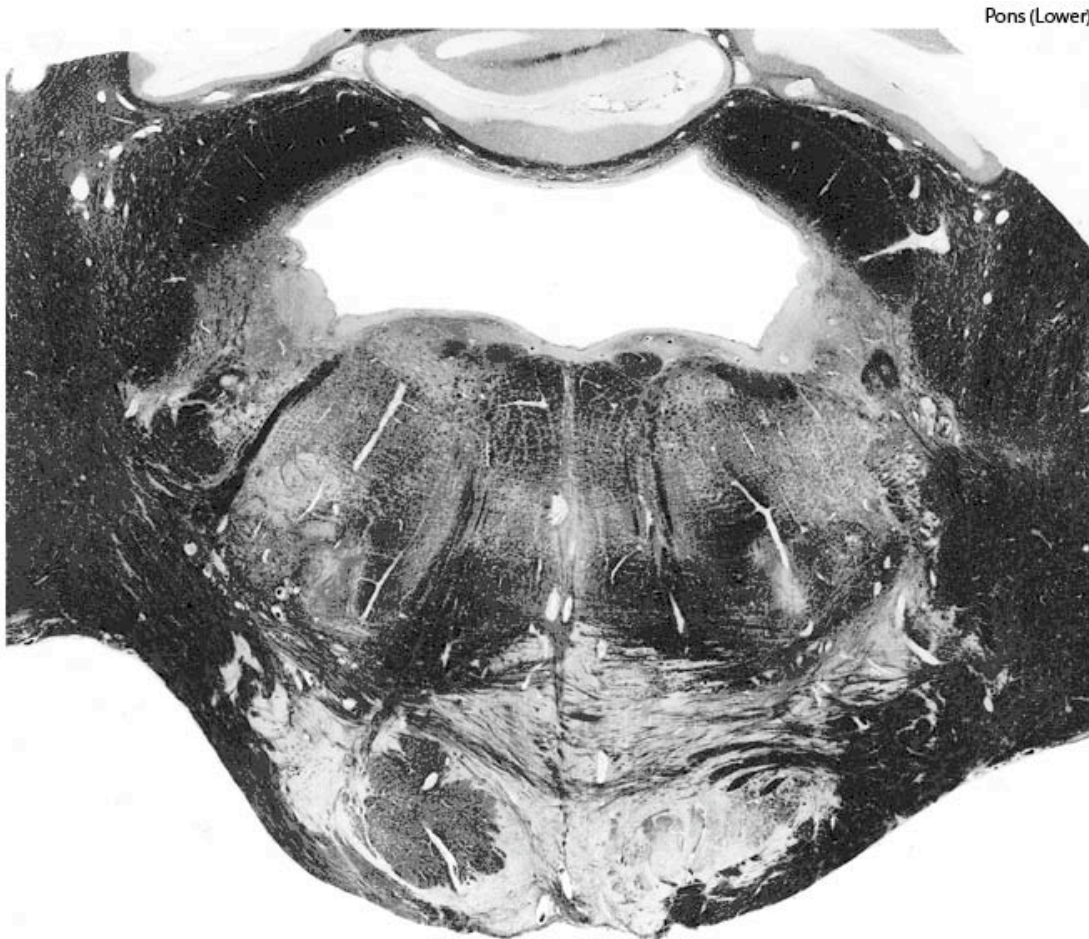


Figure 08 Pons (mid-pons) You can see the V CN on the both sides as it penetrates the middle cerebellar peduncles.

- Outline the Medial lemniscus DARK BLUE
- Outline the ALS in LIGHT BLUE
- The 4th ventricle TOURQUOISE
- Trace the axons of V through the middle cerebellar peduncle as they enter and leave.
- Outline the motor nucleus of V, and put a neuron in it and have its axon penetrate the MCP. What color should it be? Be consistent.
- Outline the pons proper or basis pontis, the middle cerebellar peduncle and CN V penetrating it DARK GREEN

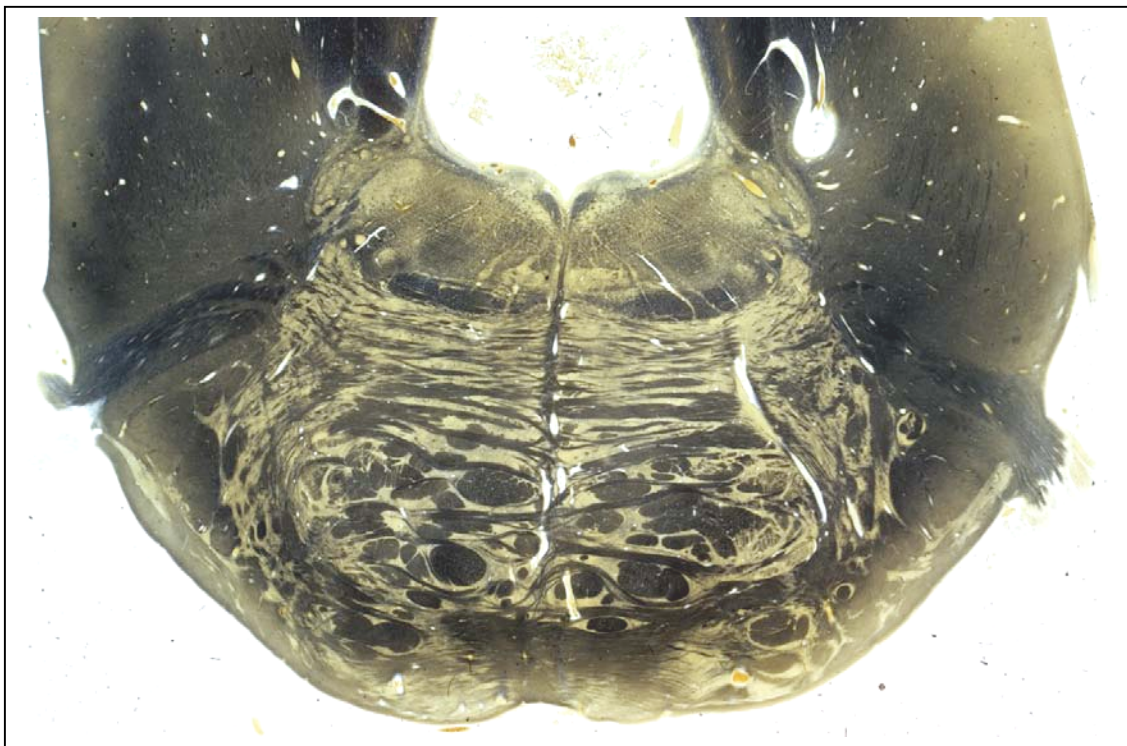
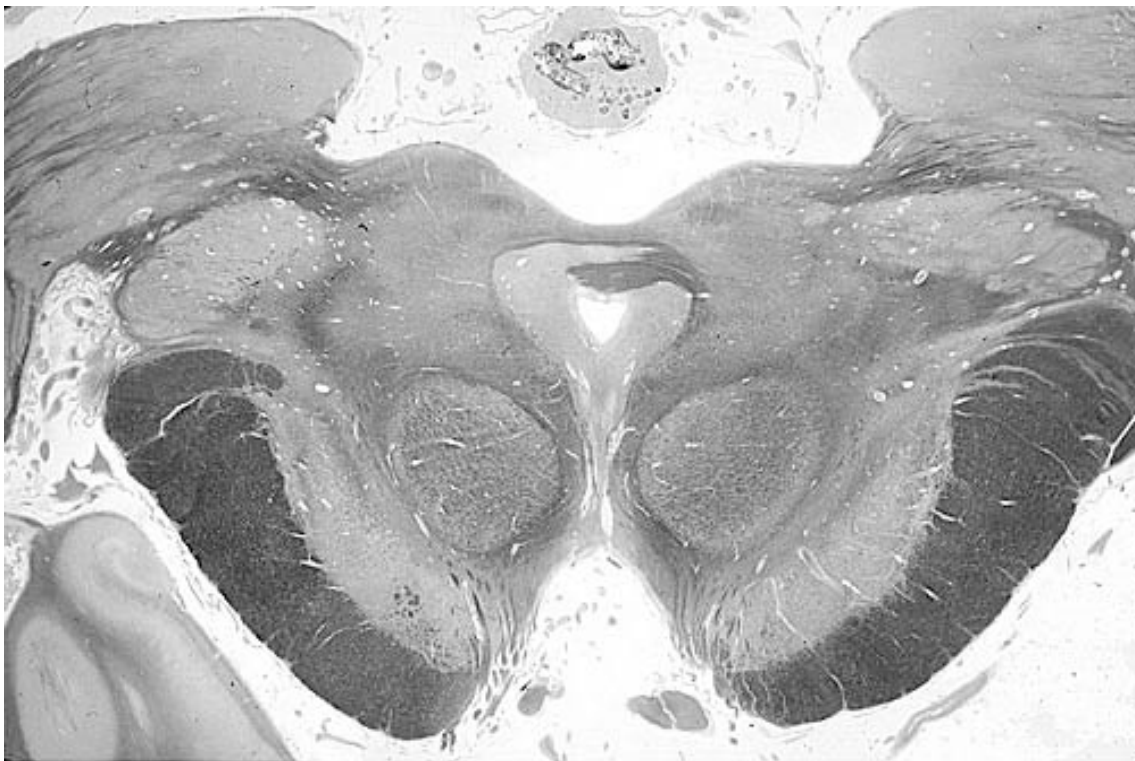


Figure 09 Midbrain level of the superior colliculus joining the thalamus

- Cerebral aqueduct TOURQUOISE
- Cerebral peduncles DARK GREEN
- Substantia Nigra DARK GREEN
- Superior Colliculus DARK GREEN
- Pineal DARK GREEN
- ALS LIGHT BLUE
- Medial lemniscus DARK BLUE
- Oculomotor nucleus RED
- Aqueduct TURQUOISE
- Imagine the smaller Edinger-Westphal nucleus. What color should you make it?
- Fascicles of the oculomotor nerve can be seen on the both sides emerging between the peduncles. What color(s) should you use for the nerve? Where are the cell bodies? DRAW in these nuclei and have the axons enter the III n.



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Figure 10 Posterior thalamus,

- Outline the thalamus DARK GREEN– a landmark
- Temporal lobe DARK GREEN – a landmark
- The 3rd ventricle TOURQUOISE
- VPL, ventralposterior nucleus inside of the thalamus. It should be both colors of blue because both pathways converge here.
- Internal capsule DARK GREEN– a landmark
- DRAW a neuron in the thalamus relaying pain and temperature information from the leg going to the cortex. What color should you use?
- DRAW a neuron in the thalamus relaying vibration and joint position information from the arm going to the cortex. What color should you use?
- Where will axons from VPL terminate? On the same or opposite side from the thalamic nucleus.

