September 1, 2023 - Dr. Vogl (wayne.vogl@ubc.ca)

Dissector

Objectives:

- Describe the embryological basis for the segmental organization of the nervous system
- Indicate the two major subdivisions of the nervous system (peripheral and central)
- Indicate the two major classes of nerve fibers (somatic, visceral) and the general functions of each
- Describe a simple somatic reflex arc
- Define a peripheral ganglion
- Indicate the vertebral regions of the body and describe how spinal nerves are numbered from C1 to Co (coccygeal) in relation to vertebrae
- Define (as used clinically): a dermatome, a myotome

Spinal Nerve:

- ◯ Anterior and posterior roots
- ◯ Spinal ganglion
- ◯ Spinal nerve
- ◯ Anterior and posterior rami

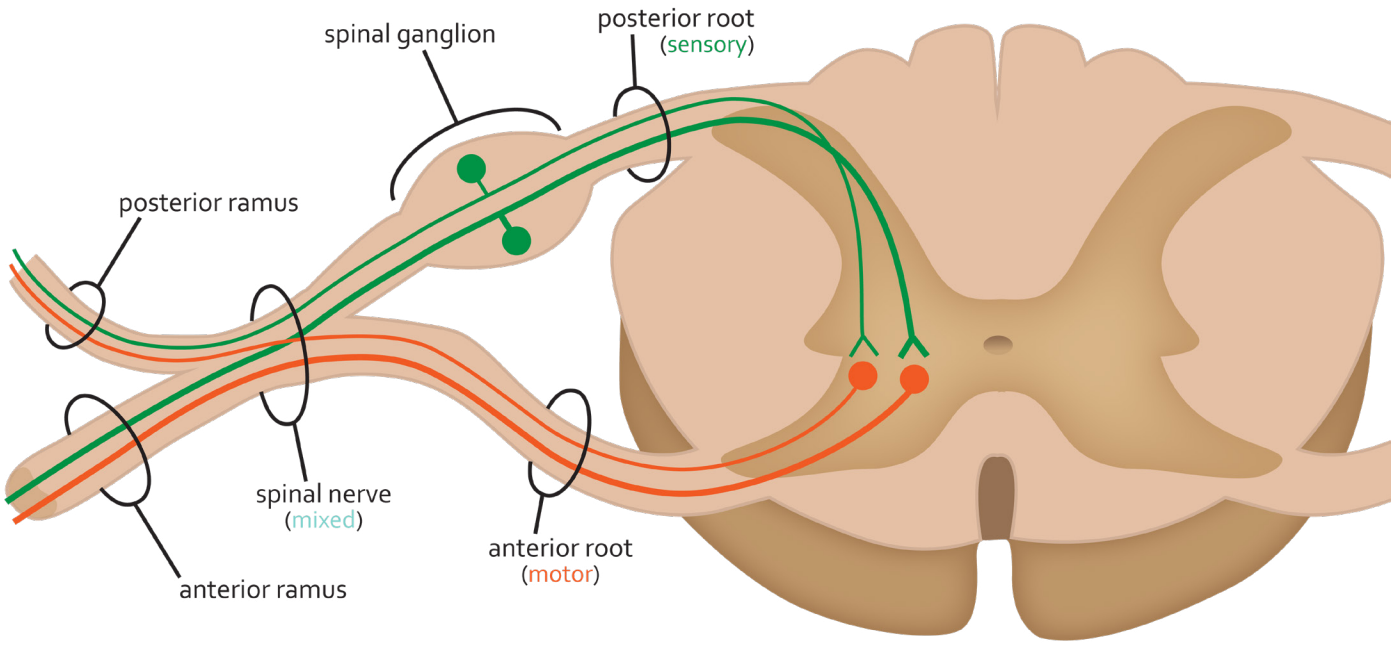
(be able to indicate the sensory and/or motor components contained in each of the structures above)

These two videos will supplement the lab and lecture content:

Spinal Cord (Video) Spinal Nerves (Video)

View *Section 2* and *Section 4* in this module:

Spinal Cord (Module)



Schematic of Spinal Nerve Components

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Take note of the following in addition to the labels on these 3D specimens:

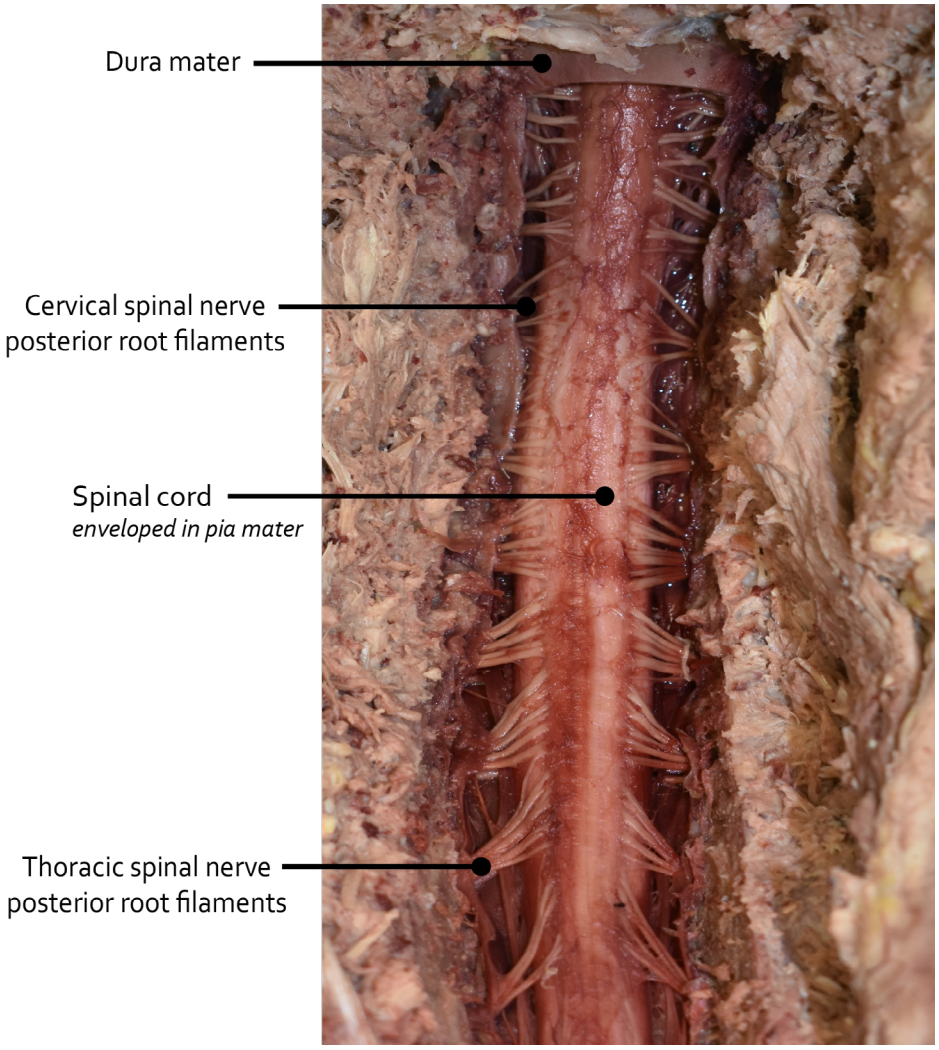
Thoracic Spinal Column (3D)

- position of the thoracic vertebrae relative to each other
- articulation with the ribs
- intervertebral discs
- vertebral foramen
- position of the spinal nerves

Posterior Thoracic Wall (3D)

- erector spinae muscles (as a group)
- position of spinal cord
- position of spinal ganglia
- posterior rootlets
- cervical enlargement of spinal cord
- dura mater

Hide Labels



Dissection of Thoracic Spinal Cord in situ

Typical Vertebra:

- ◯ Body
- ◯ Pedicles
- ◯ Laminae
- ◯ Spinous process
- ◯ Superior and inferior articular processes
- ◯ Superior and inferior vertebral notches
- ◯ Vertebral foramen
- ◯ Positions of intervertebral discs
- ◯ An intervertebral foramen (describe borders and contents)

Identify these structures on the following specimens in the virtual lab:

Lumbar Vertebra (3D)

Thoracic Vertebra (3D)

Cervical Vertebra (3D)

Rib (3D)

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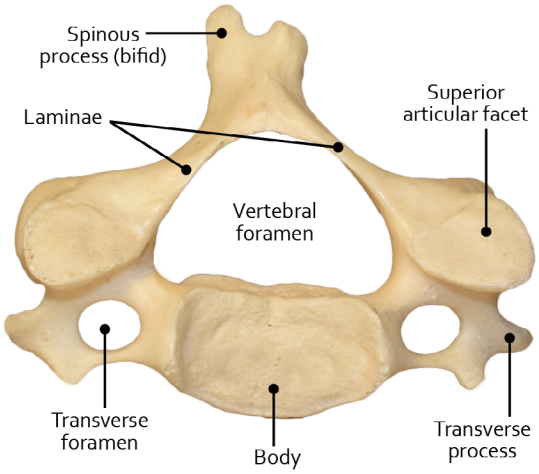
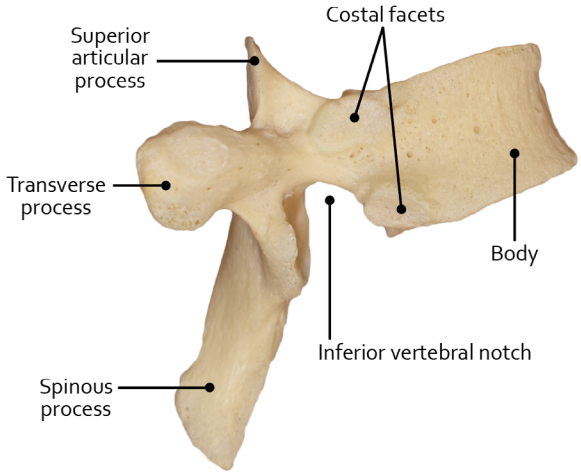
Use these labeled images to orient yourself to the specimens in the virtual lab:



Cervical Vertebra (superior)



Thoracic Vertebra (lateral)

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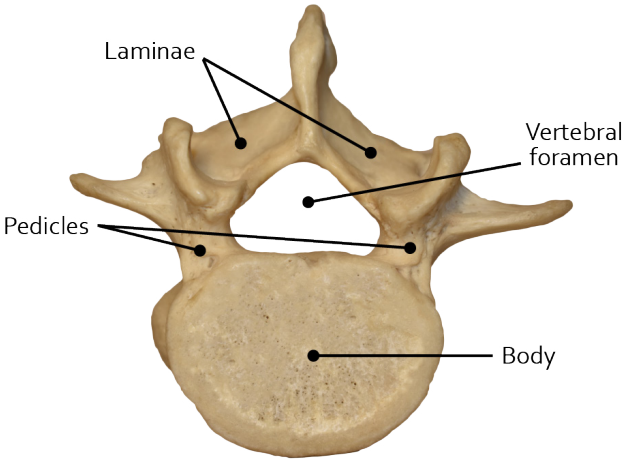
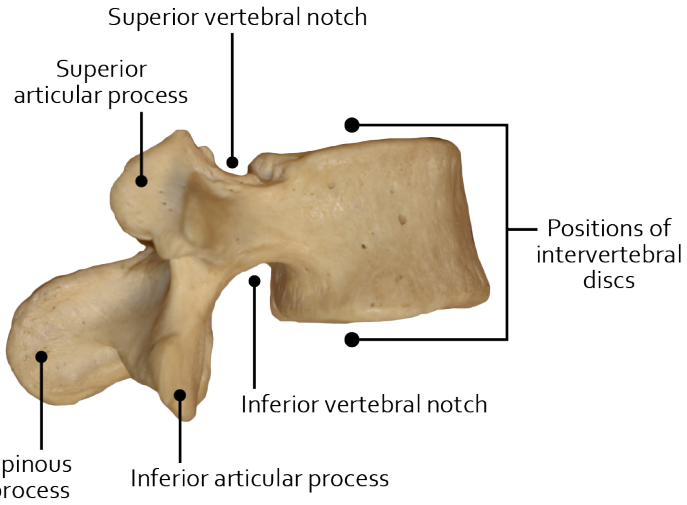
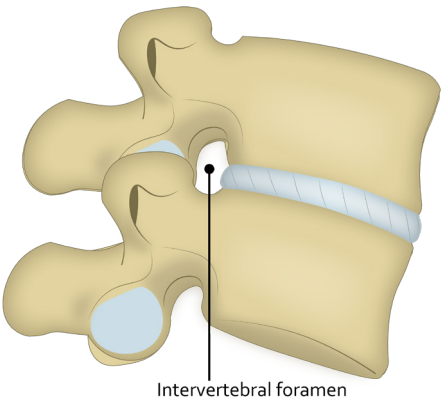


(inferior)



(lateral)

Lumbar Vertebra



Spinal Cord and Spinal Nerves

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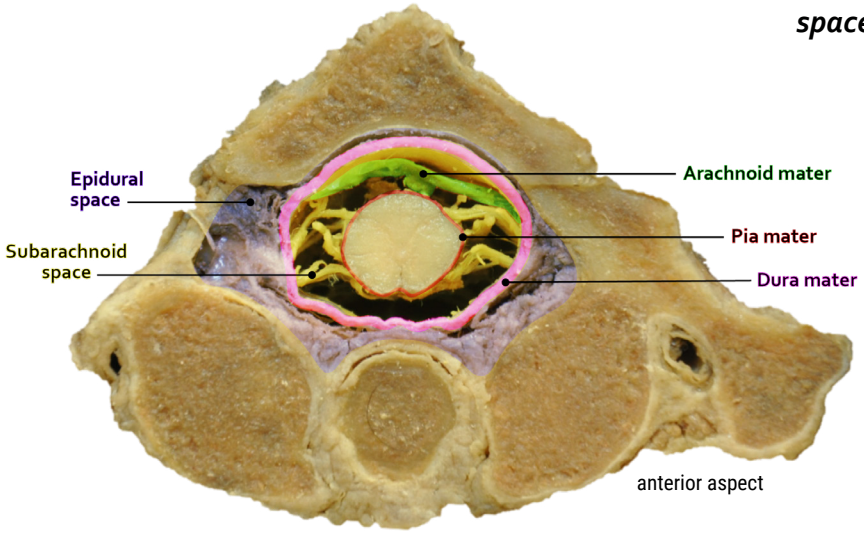
Spinal Cord:

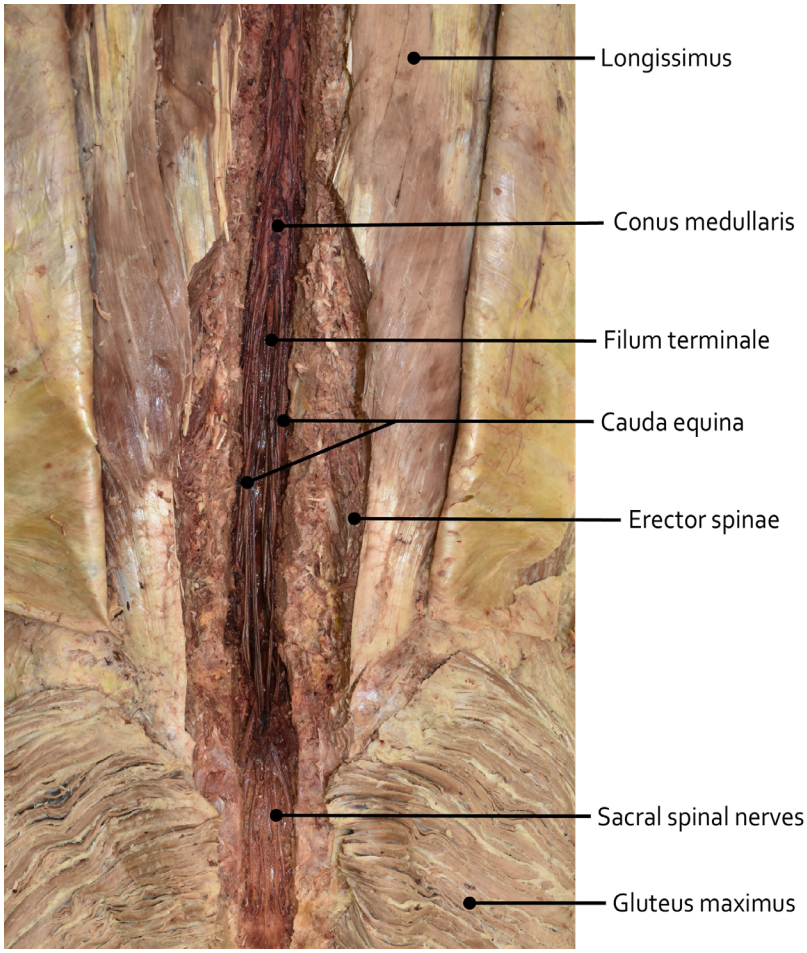
- Spinal dura, arachnoid and pia
- Subarachnoid space and epidural space
- Cauda equina and filum terminale

*Be able to indicate, in children and adults, at which vertebral level the **spinal cord** terminates:*

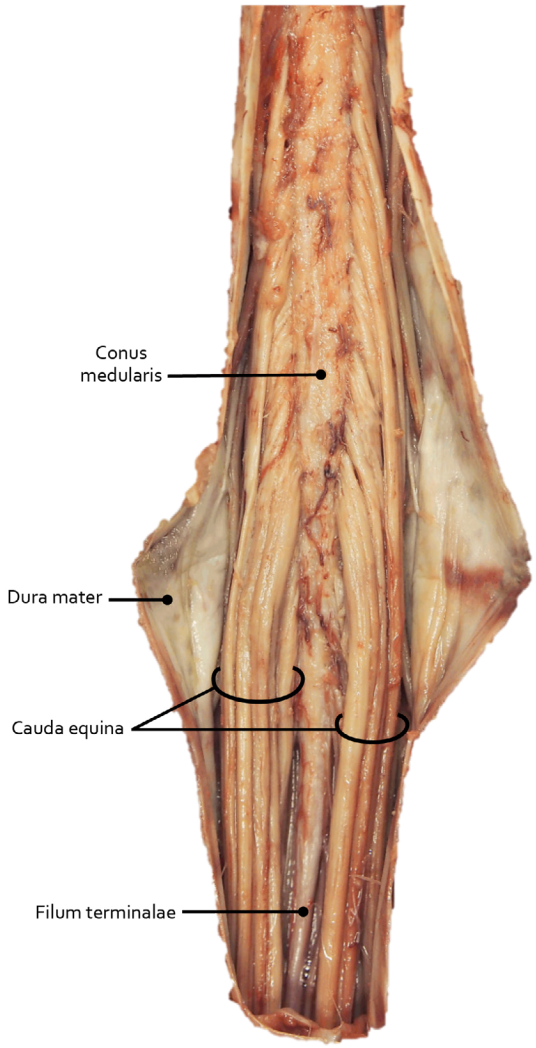
*and at which vertebral level the **subarachnoid space** terminates:*



Cervical Spinal Cord (cross-section)



Dissection of Lumbar Spinal Cord in situ



Terminal Portion of Spinal Cord

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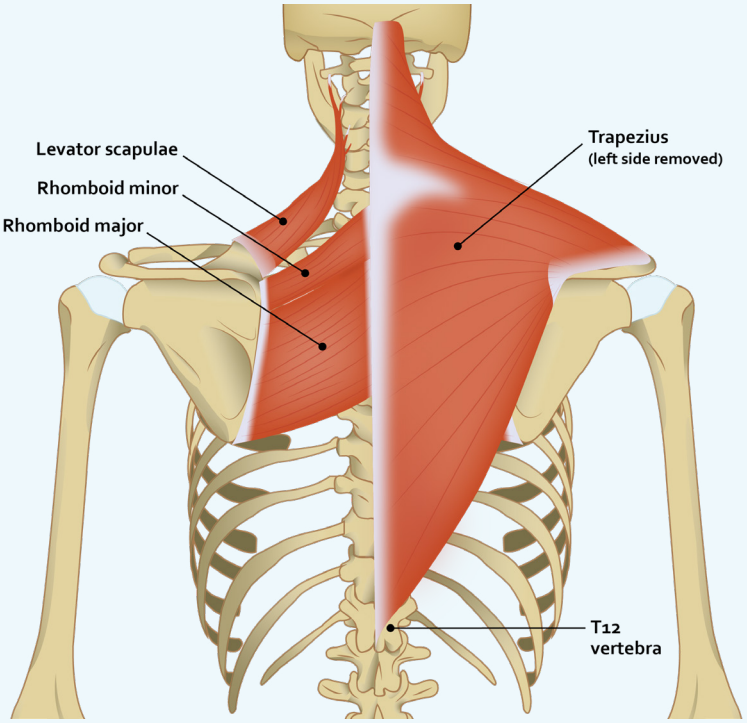
Note: Tables with an even table number will be working on the thoracic region and those with an odd table number will be working on the lumbar region of the vertebral column.

Deep Back Dissection Guide (Video)

Lumbar Group

1. *Palpate the vertebrae, find vertebral level T12 (the last origin point of trapezius):*
   - Make a rectangular incision, starting with a midline incision at the origin of the trapezius muscle and continue inferiorly until 3 to 4 vertebrae have been exposed
2. *Make vertical incisions one inch on each side of the midline.*
3. *Go as deep as you can until you hit the transverse processes on either side of the midline incision and remove the intrinsic muscles of the back (erector spinae, etc.).*
4. *Using your hammer and chisel, chisel though the laminae of the vertebrae to expose the spinal cord:*
   - You should be able to remove the entire roof of the vertebral canal
5. *Angle the chisel medially and try not to cut through the dura mater underneath.*



Notes:
- You may find the "bone crushers" helpful in cutting through and levering the bone out
- Make sure you do not enter the abdominal cavity
- Note any epidural fat external to the dura mater
- Note spinal ganglia (=dorsal root ganglion, DRG) emerging laterally between two vertebrae and the spinal nerve

6. *Using scissors cut open dura mater medially and reflect the tissue on either side of the incision.*

Note: Dorsal (sensory) and ventral (motor) rootlets and the denticulate ligament which separates the two.

Thoracic Group

1. *Repeat the same steps as above **except**:*

2. *Begin incision just below the midline origin of the rhomboid major and superiorly expose 3 to 4 vertebrae as above.*