Tracts part 1

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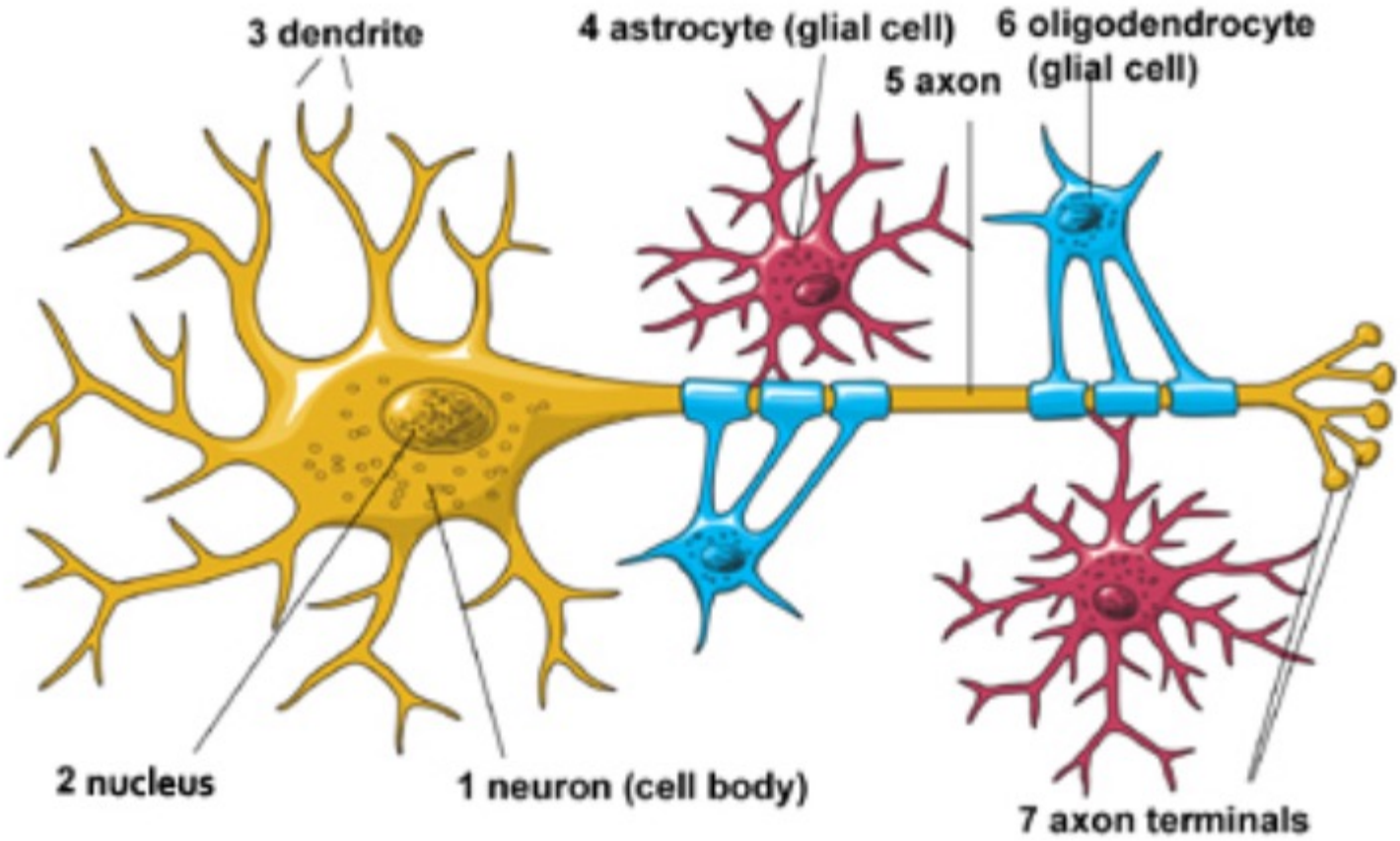
Neurons


3 dendrite
4 astrocyte (glial cell)
5 axon
6 oligodendrocyte (glial cell)
2 nucleus
1 neuron (cell body)
7 axon terminals

Parts of a neuron

1- Cell bodies:

Form the gray matter of the nervous system

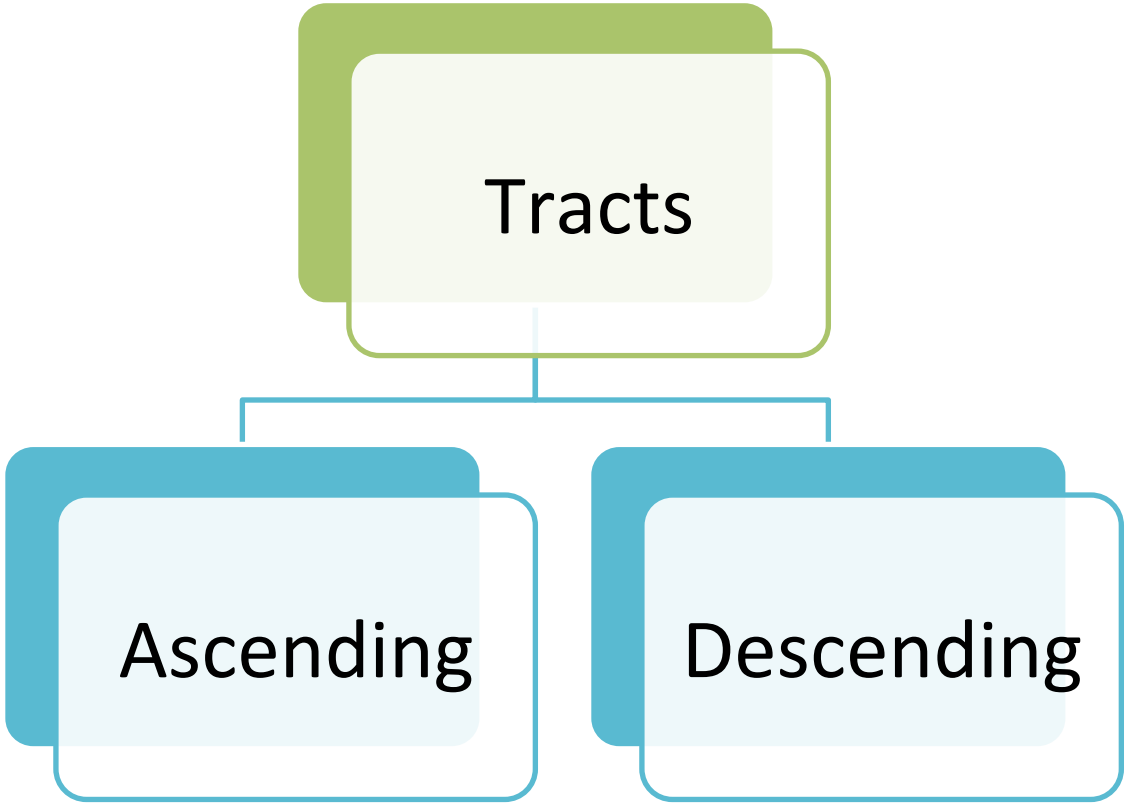
- If in the CNS –> they are called: ganglia
- If in the periphery -> they are called: nuclei

❖ an important exception is the basal ganglia situated within the CNS

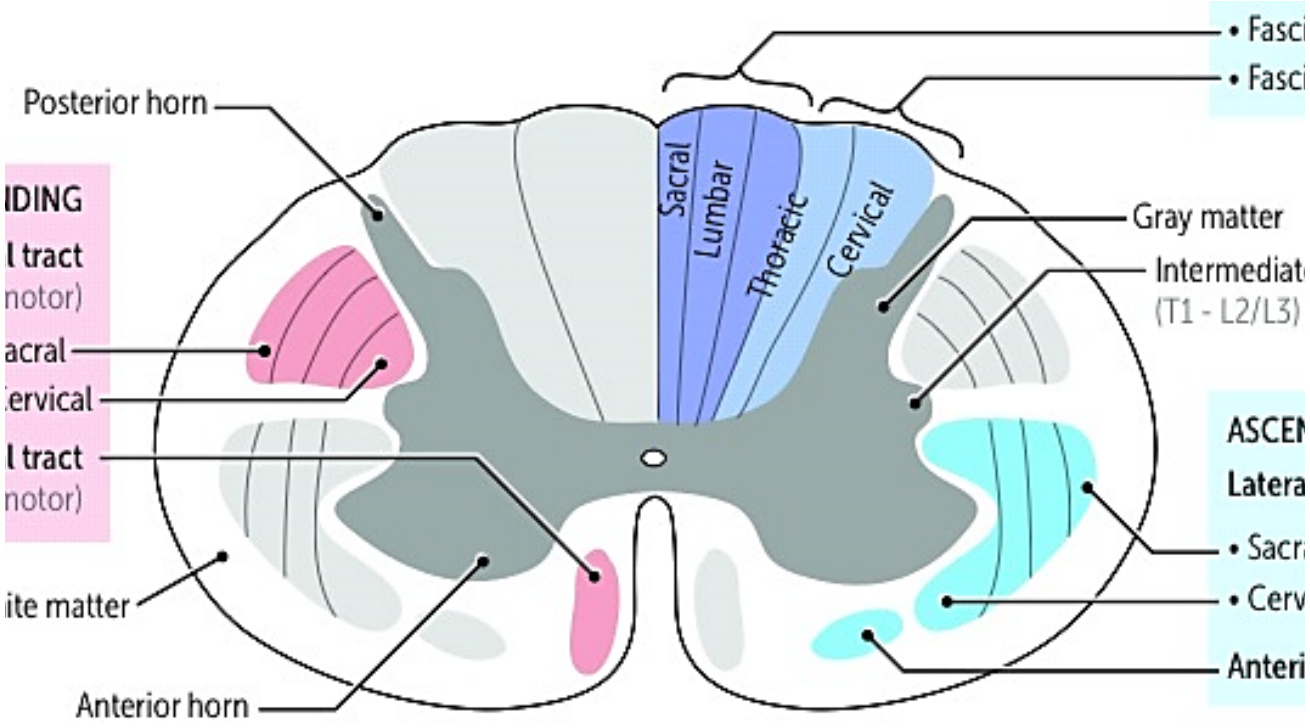
2- Axons:

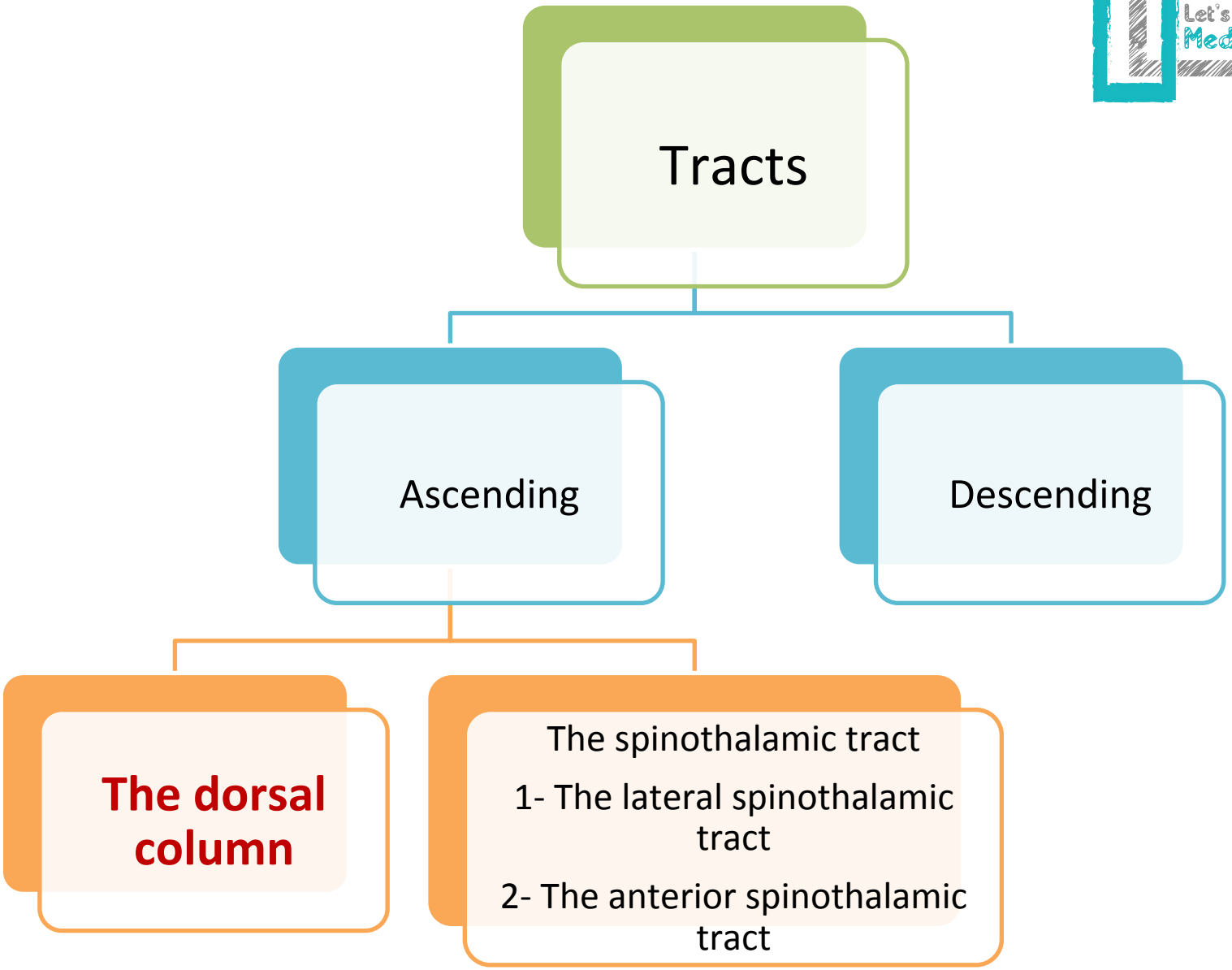
Form the white matter of the nervous system

- If in the CNS –> they are called: tracts
- If in the periphery -> they are called: nerves


Tracts
Ascending
Descending

The white matter




Tracts
Ascending
Descending
The dorsal column
The spinothalamic tract
1- The lateral spinothalamic tract
2- The anterior spinothalamic tract

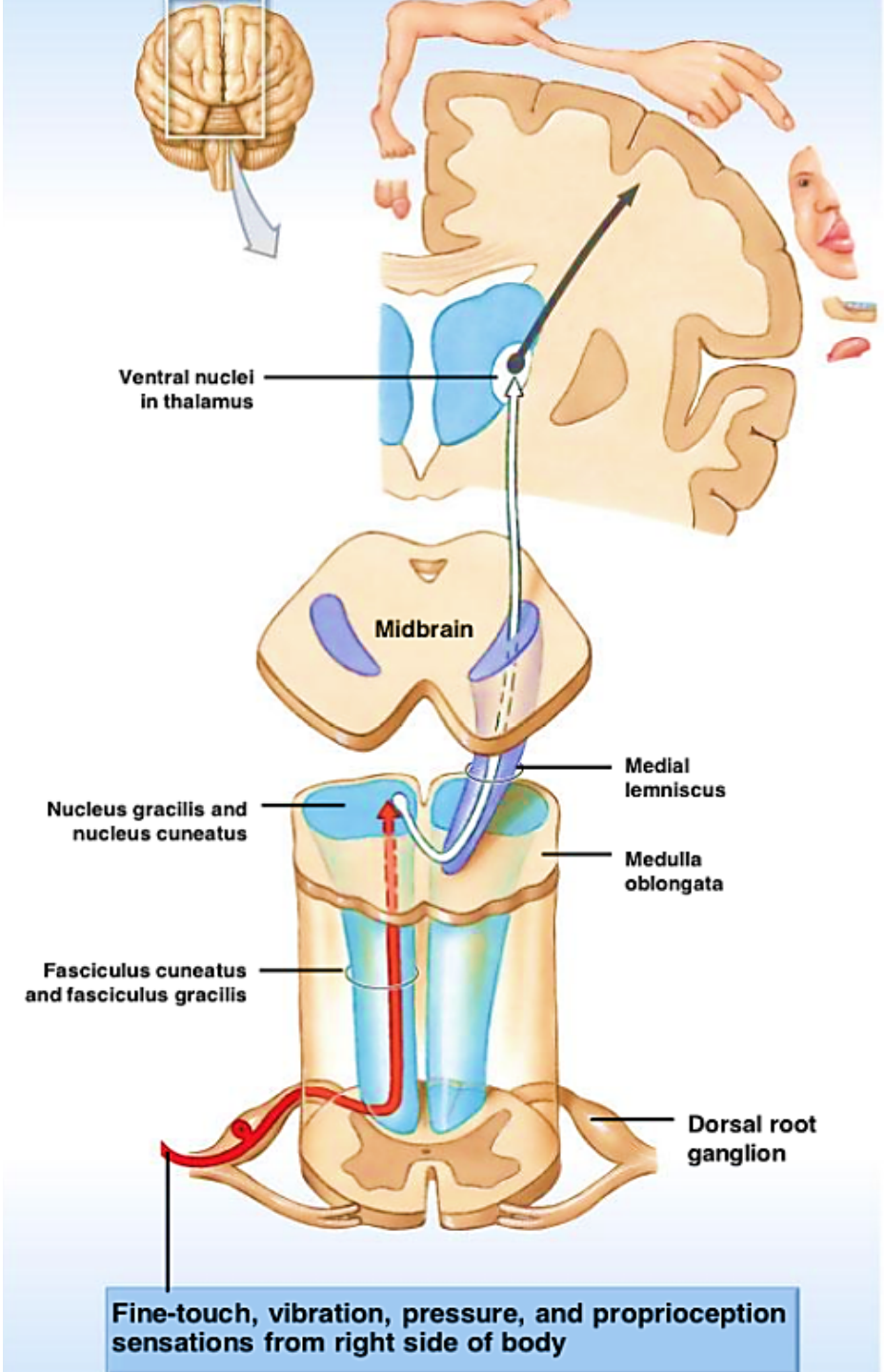
The dorsal column medial lemniscal pathway

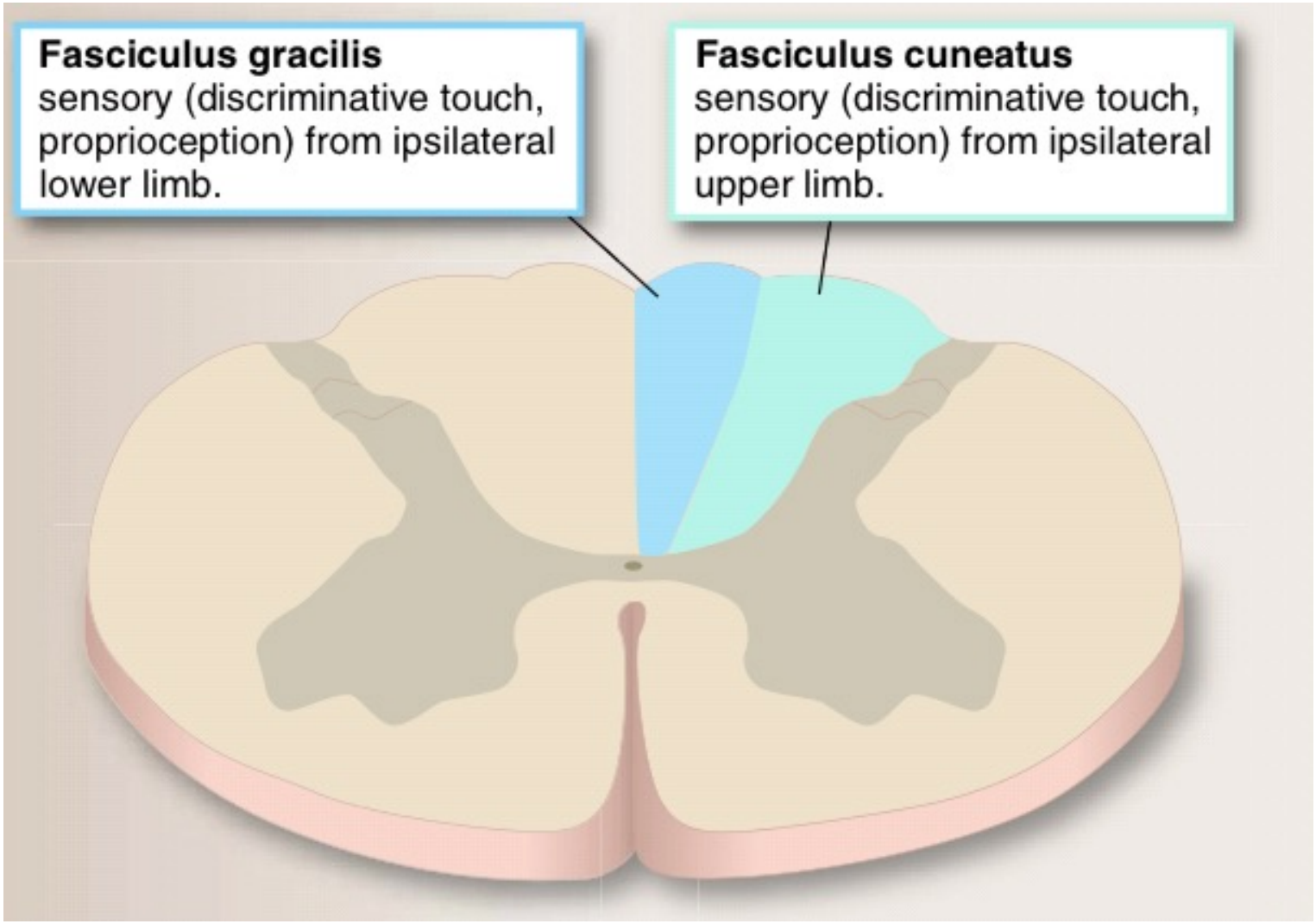
- Responsible for carrying the following information to the cortex:

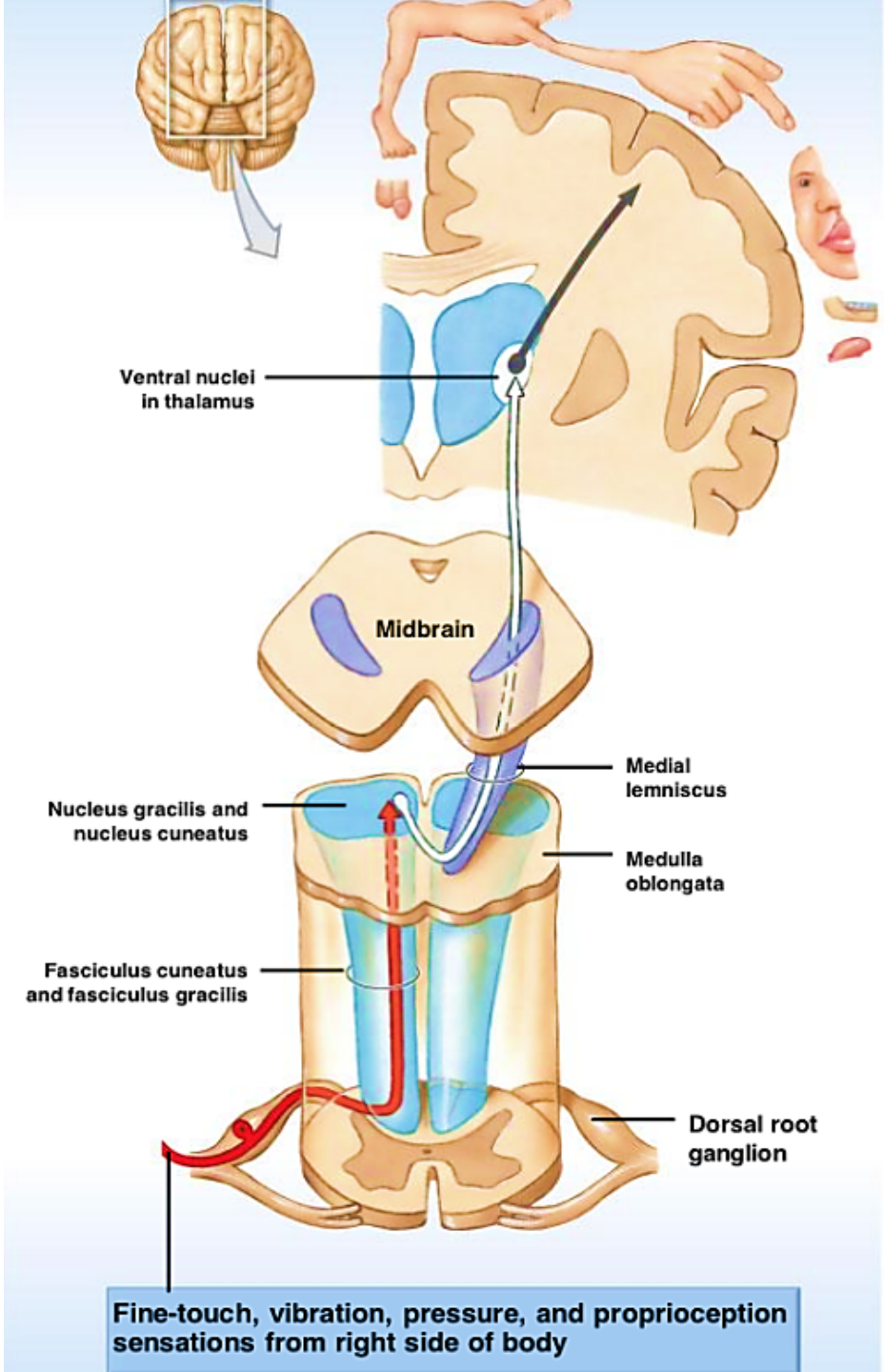
  1. Discriminative(fine) touch also called tactile sensation
  2. Pressure
  3. Vibration
  4. proprioception

The dorsal column medial lemniscal pathway

- Properties of this tract:
  1. High conduction velocity through the fast conducting large diameter fibers (Aβ)
  2. Sensory information reaching the cortex through this pathway will result in conscious awareness of the information quickly and with high resolution.


Ventral nuclei in thalamus
Midbrain
Medial lemniscus
Nucleus gracilis and nucleus cuneatus
Medulla oblongata
Fasciculus cuneatus and fasciculus gracilis
Dorsal root ganglion
Fine-touch, vibration, pressure, and proprioception sensations from right side of body


Fasciculus gracilis
sensory (discriminative touch, proprioception) from ipsilateral lower limb.
Fasciculus cuneatus
sensory (discriminative touch, proprioception) from ipsilateral upper limb.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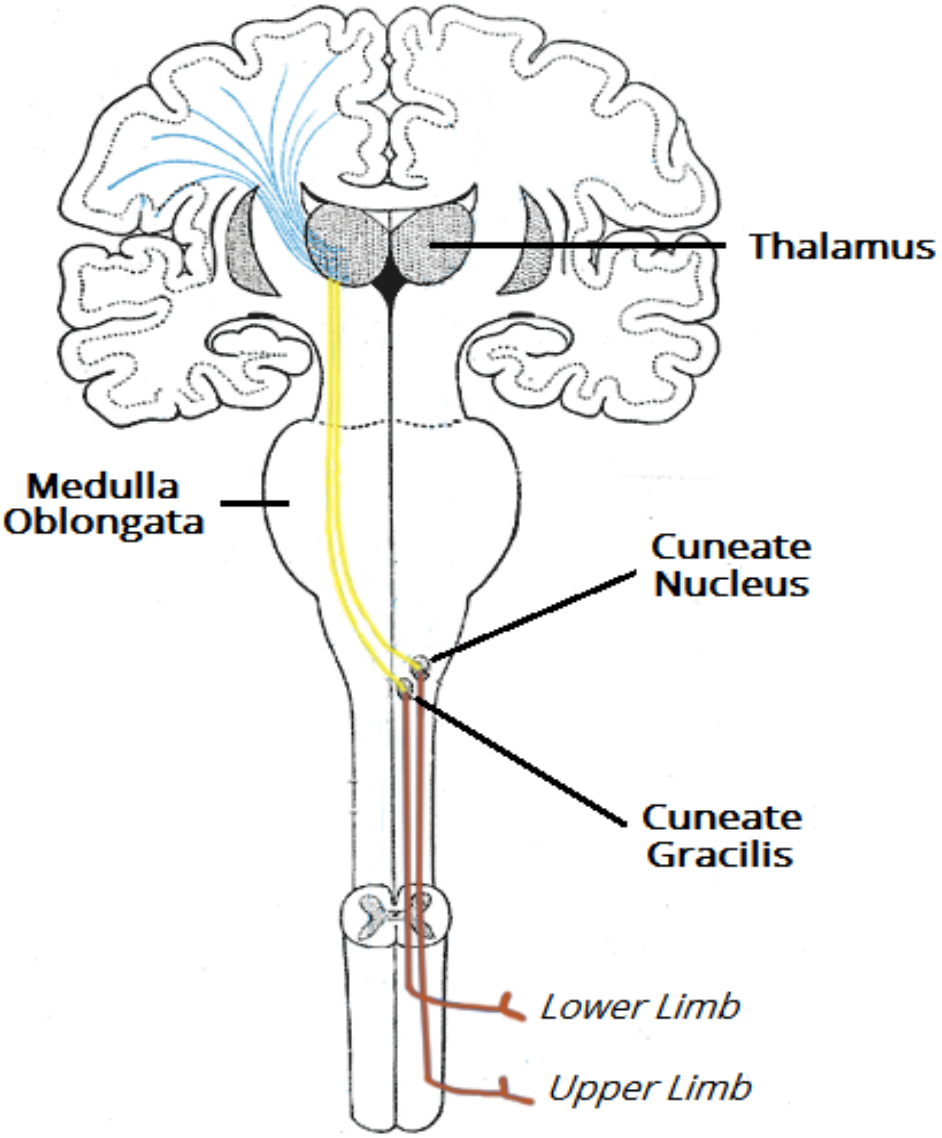
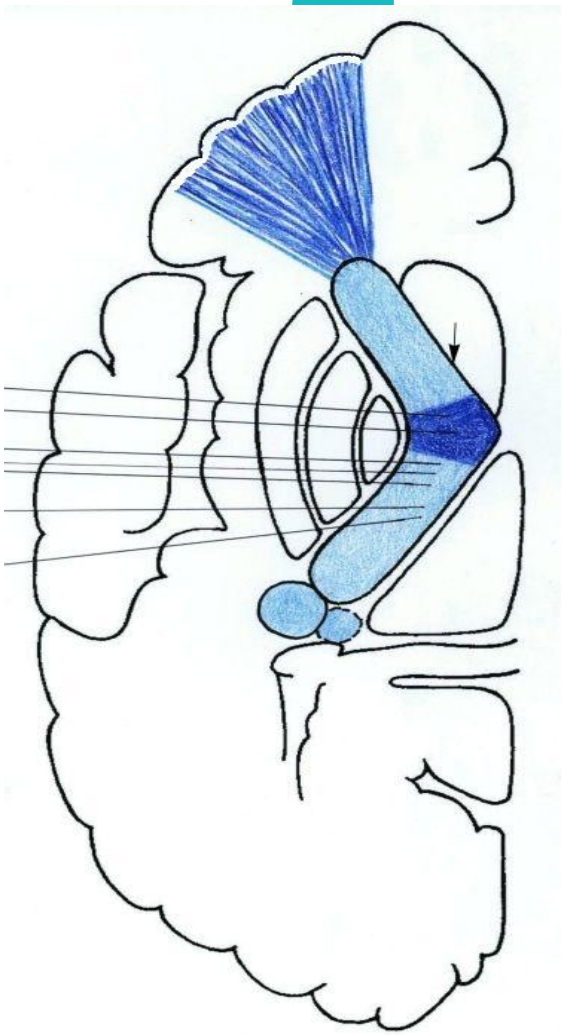
1st Order Neurones
2nd Order Neurones
3rd Order Neurones





Summary of the dorsal tract

Spinal Dorsal root ganglion

↓

Posterior horn gray matter

↓

Dorsal white column through fasciculus gracilis and cuneatus

↓

To nucleus gracilis and cuneatus in the medulla oblongata

↓

The fibers of the 2nd order neuron then cross over to the opposite side as the internal arcuate fibers

↓

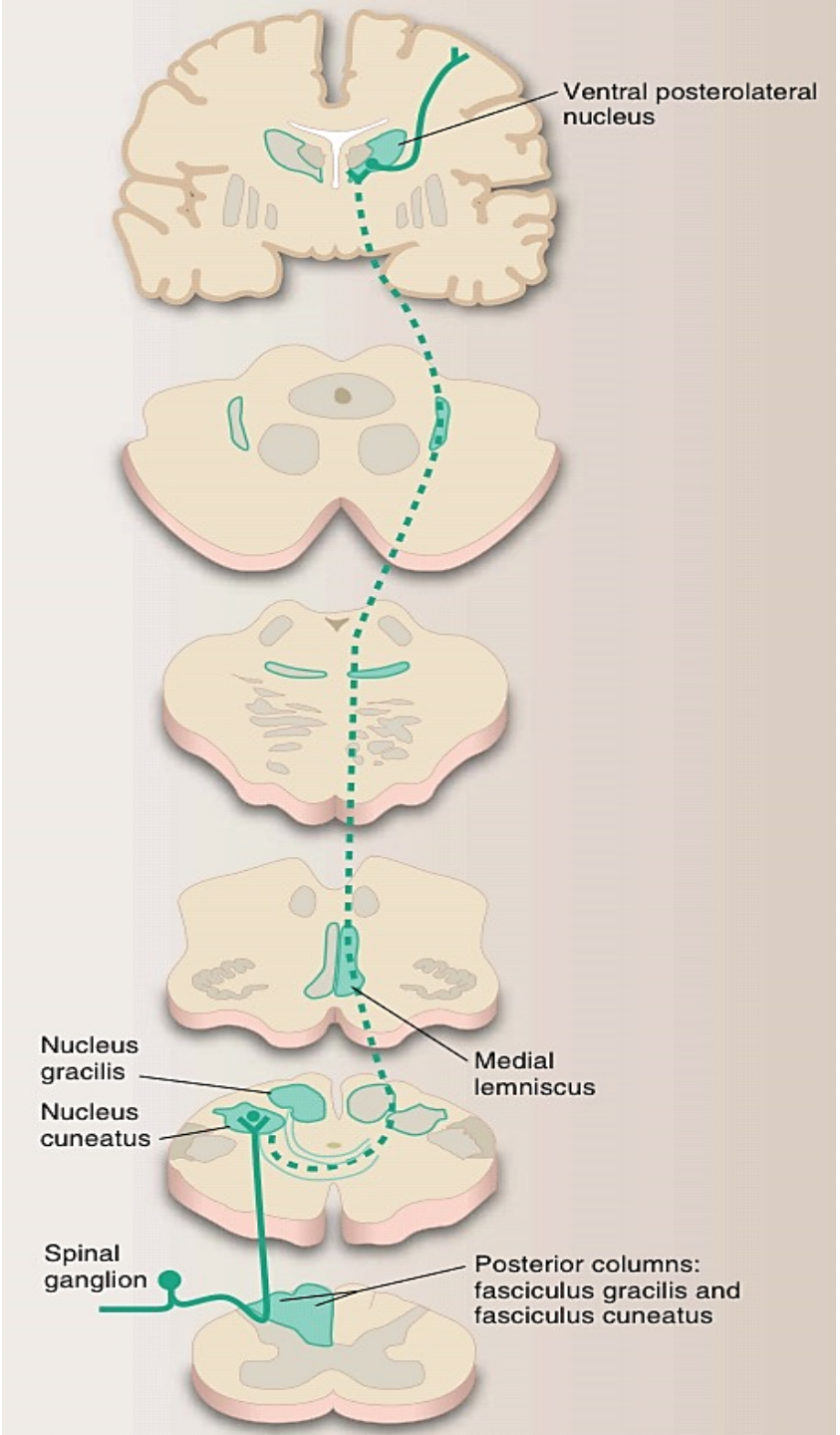
They then ascend through the pons and midbrain as the right and left medial leminisci to the ventro-postro-lateral nucleus of the thalamus

↓

They then enter the posterior limp of the internal capsule

↓

As cornoa radiata to the post central gyrus (the somato- sensory cortex of the parietal lobe)


Ventral posterolateral nucleus
Medial lemniscus
Nucleus gracilis
Nucleus cuneatus
Spinal ganglion
Posterior columns: fasciculus gracilis and fasciculus cuneatus

References

- First Aid for the USMLE Step 1 by Tao Le (Author), Vikas Bhushan
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- http://www.napavalley.edu/people/briddell/documents/bio%20218/15_lecture_presentation.pdf
- http://www.nan.upol.cz/neuro/cd797_en.html

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