

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

رَبِّ زِدْنِي عِلْمًا

اللَّهُمَّ أَرِنِي حَقِيقَةَ الْأَشْيَاءِ كَمَا هِيَ

“O Allah! Show me the reality of all things as it (really) is..”

Sensory Physiology

Tayyab Hamid (MBBS, PhD)

LECTURER in Physiology

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1 ORGANIZATION OF NERVOUS SYSTEM

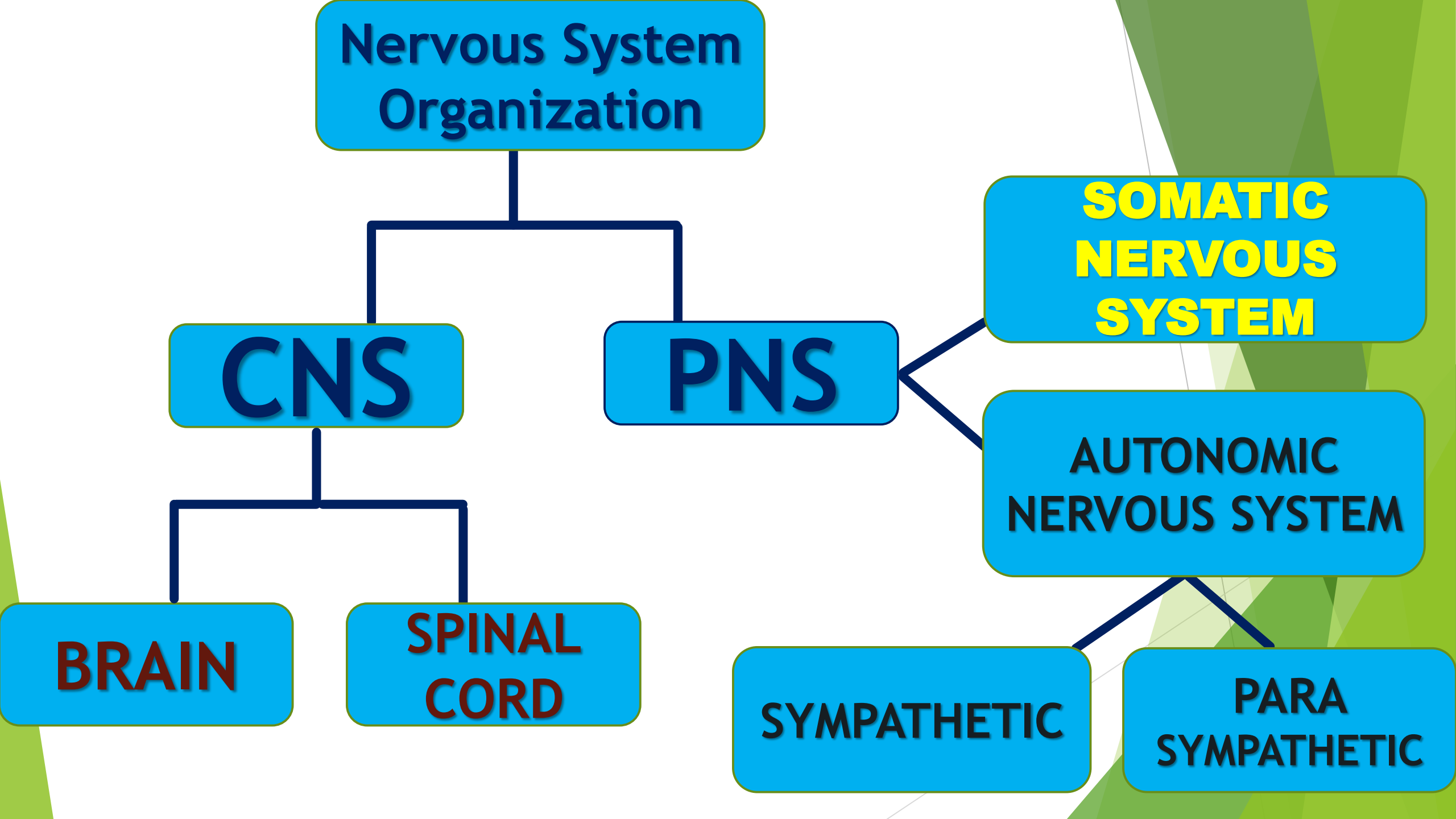
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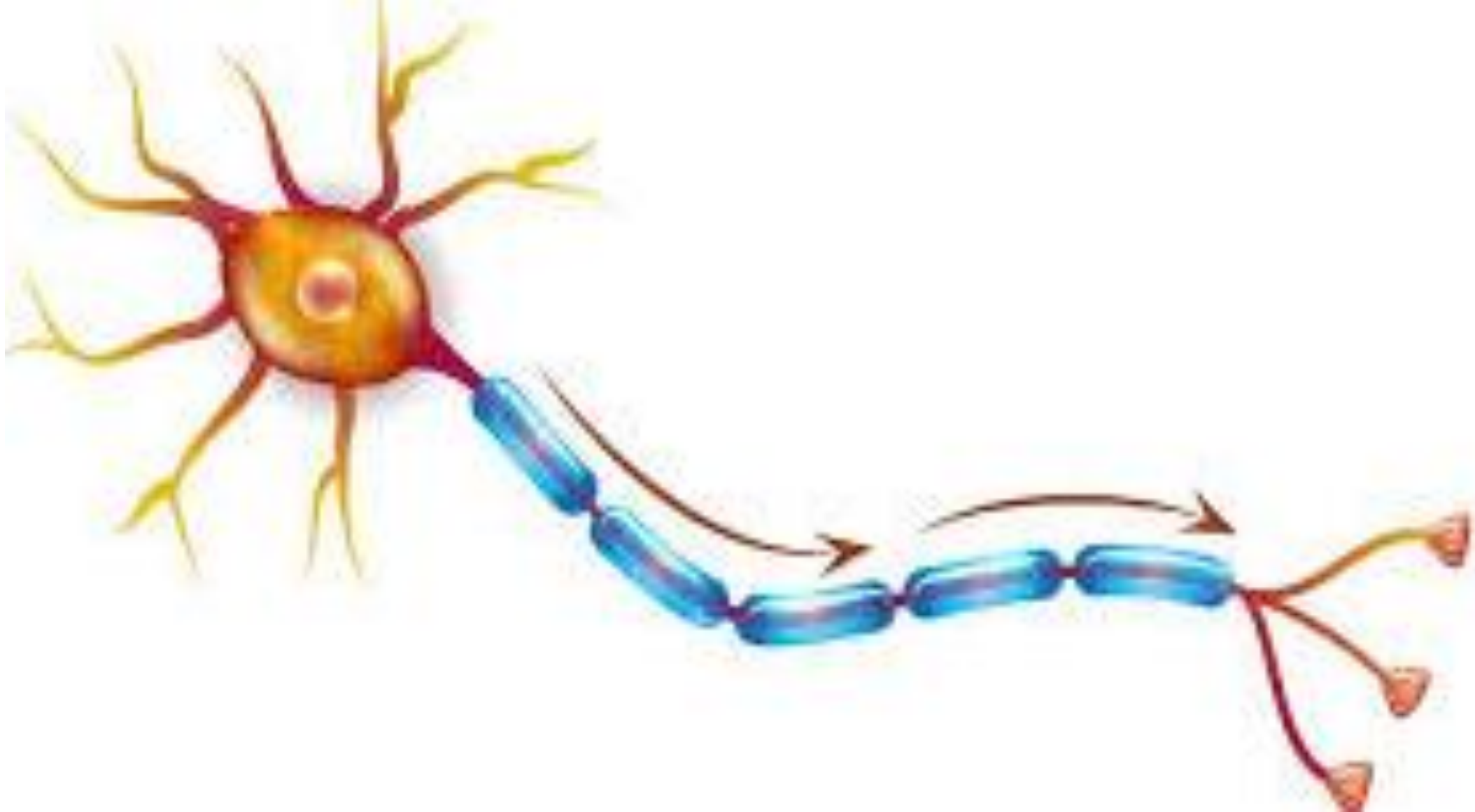
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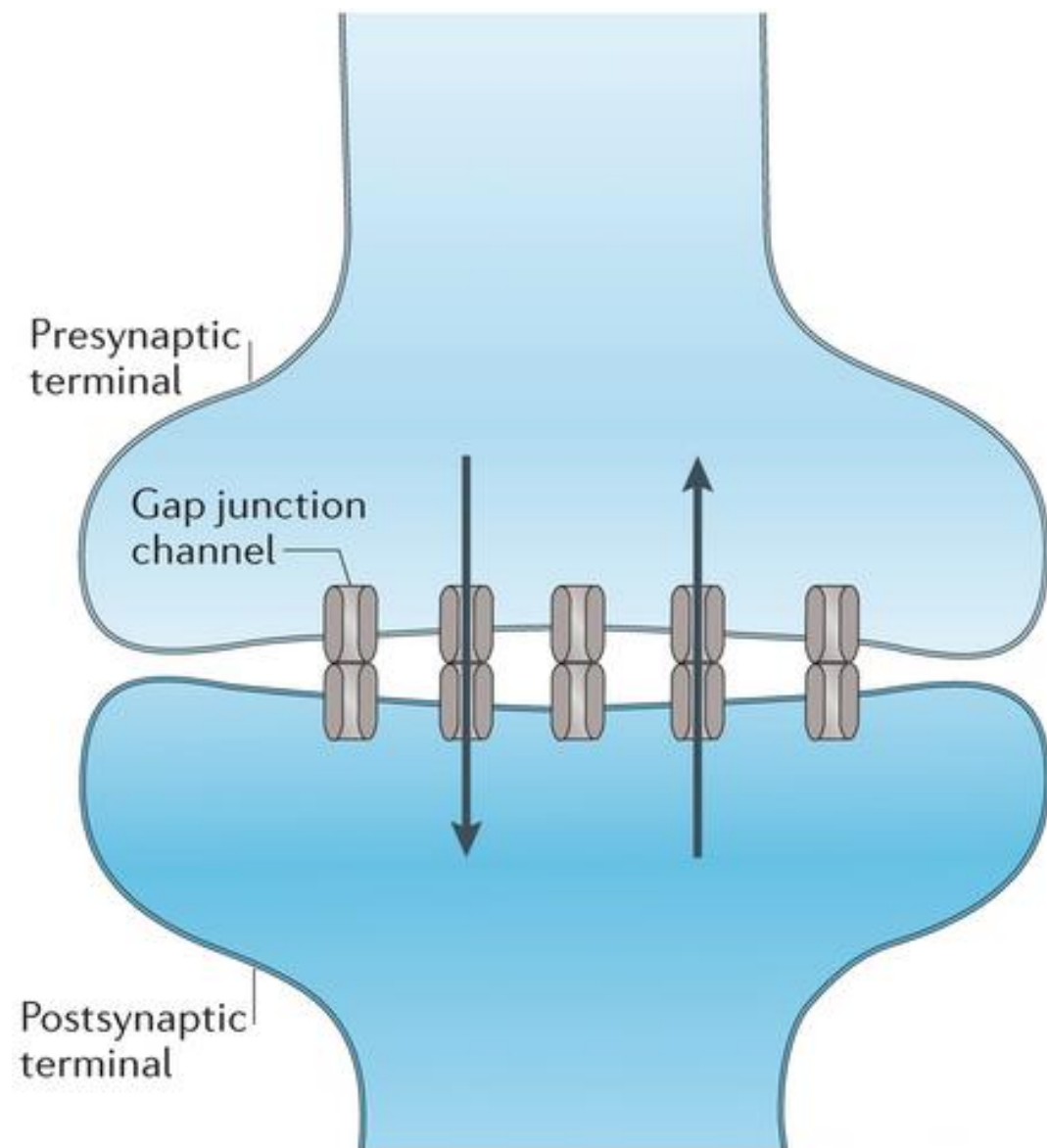
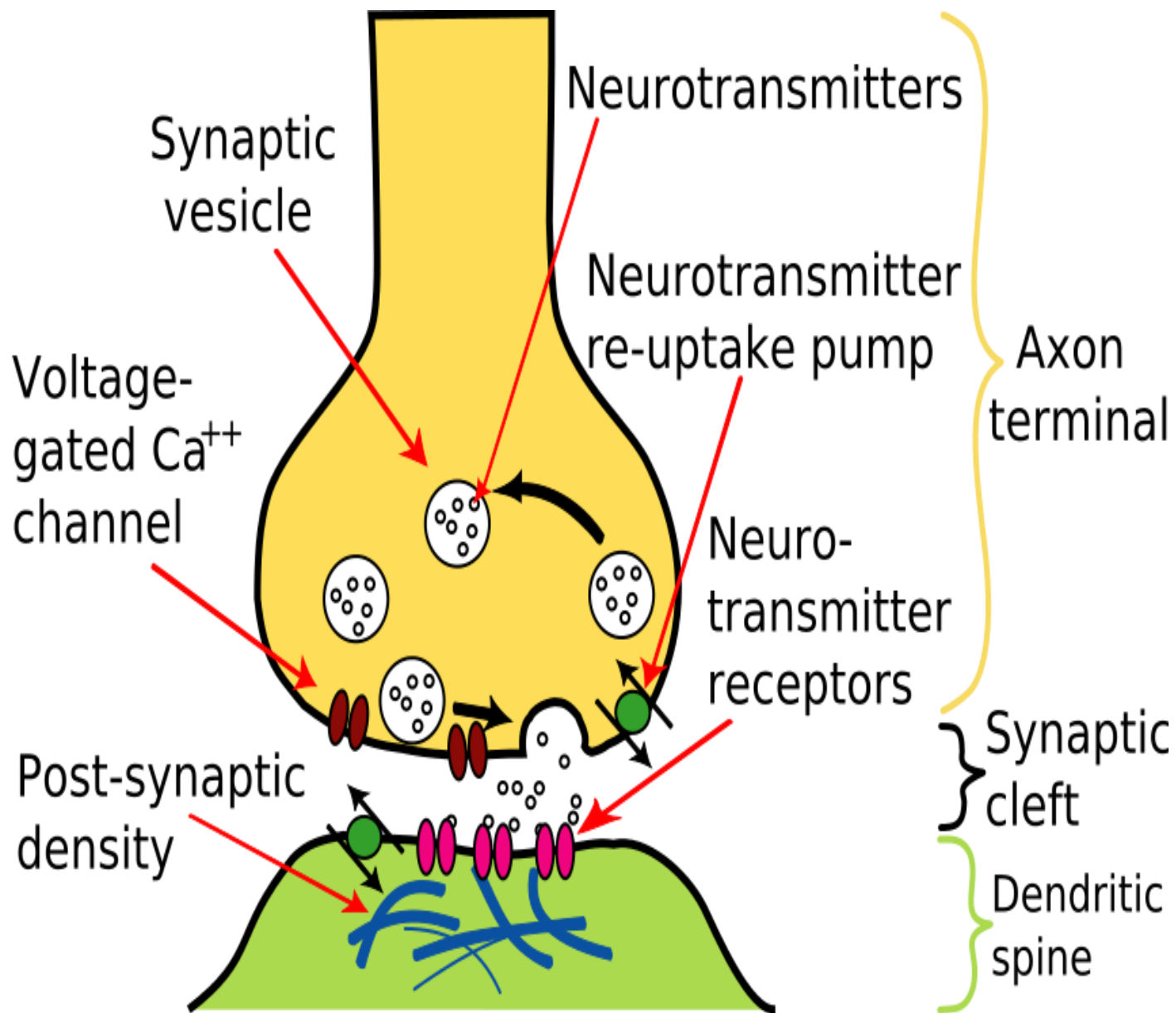
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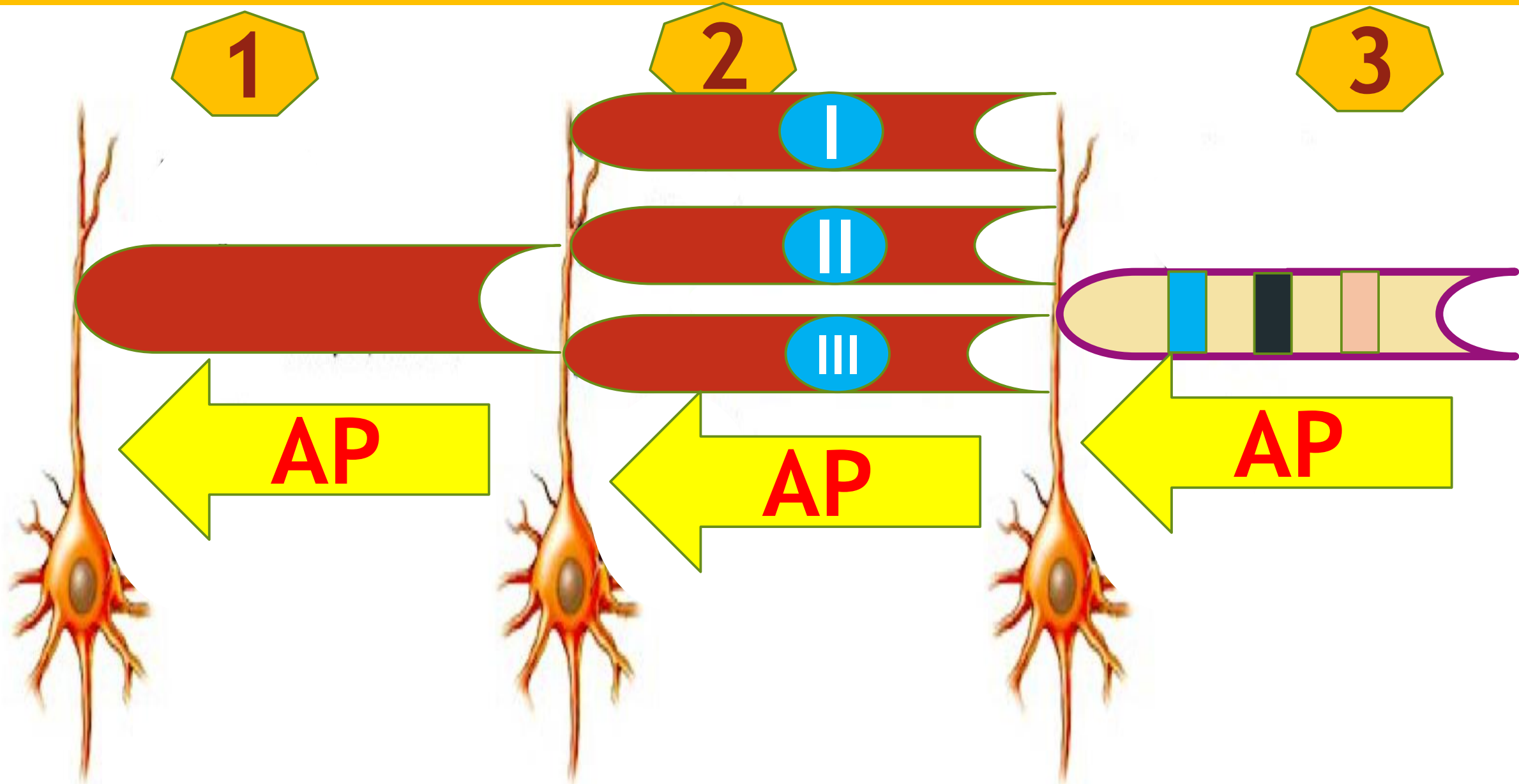
NEURON -



SYNAPSES TYPES & NEUROTRANSMITTERS



SPATIAL VS TEMPORAL SUMMATION



SPATIAL VS TEMPORAL SUMMATION

▶ **W**
▶ **S**
S
E

Can **CHANGE IN**
BLOOD pH, Tea ,
coffee effect
neuronal
excitability?

TYPES OF SENSES

SENSES

```
graph TD; A[SENSES] --> B[SOMATIC]; A --> C[SPECIAL];
```

The diagram is a simple tree structure. At the top is a light green rounded rectangle containing the word 'SENSES' in red. A blue line descends from the bottom center of this box, then splits into two horizontal lines that connect to the top centers of two more light green rounded rectangles below. The left box contains the word 'SOMATIC' in black, and the right box contains the word 'SPECIAL' in blue.

SOMATIC

SPECIAL

SENSORY RECEPTORS

- **Mechanoreceptors**
- **Thermoreceptors**
- **Chemoreceptors**
- **Photoreceptors**
- **Nociceptors**

Nerve Fiber Classification

```
graph TD; A[Nerve Fiber Classification] --> B[Histology]; A --> C[Function]; A --> D["Diameter & Conduction Velocity"]
```

Histology

Function

Diameter & Conduction Velocity

SENSORY RECEPTORS

- **Mechanoreceptors**
- **Thermoreceptors**
- **Chemoreceptors**
- **Photoreceptors**
- **Nociceptors**

Sensory Code

```
graph TD; A[Sensory Code] --- B[Modality]; A --- C[Location]; A --- D[Intensity & Duration];
```

Modality

Location

**Intensity
&
Duration**

Spinal Tracts

```
graph TD; A[Spinal Tracts] --> B[Descending]; A --> C[Ascending]; B --> D[Pyramidal]; B --> E[Extra-Pyramidal]; C --> F[Dorsal Column Tract]; C --> G[SpinoThalamic Tract];
```

Descending

Ascending

Dorsal Column Tract

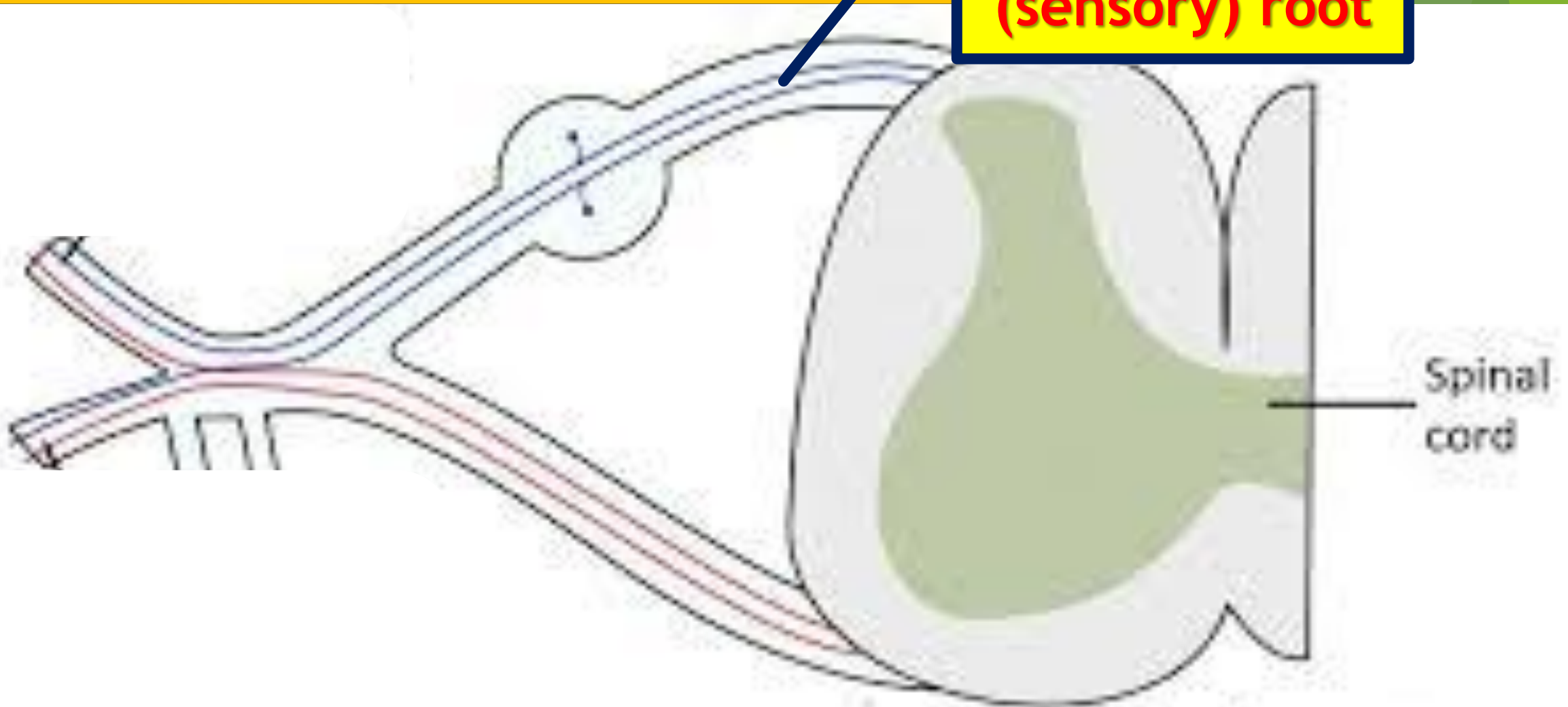
SpinoThalamic Tract

Pyramidal

Extra-Pyramidal

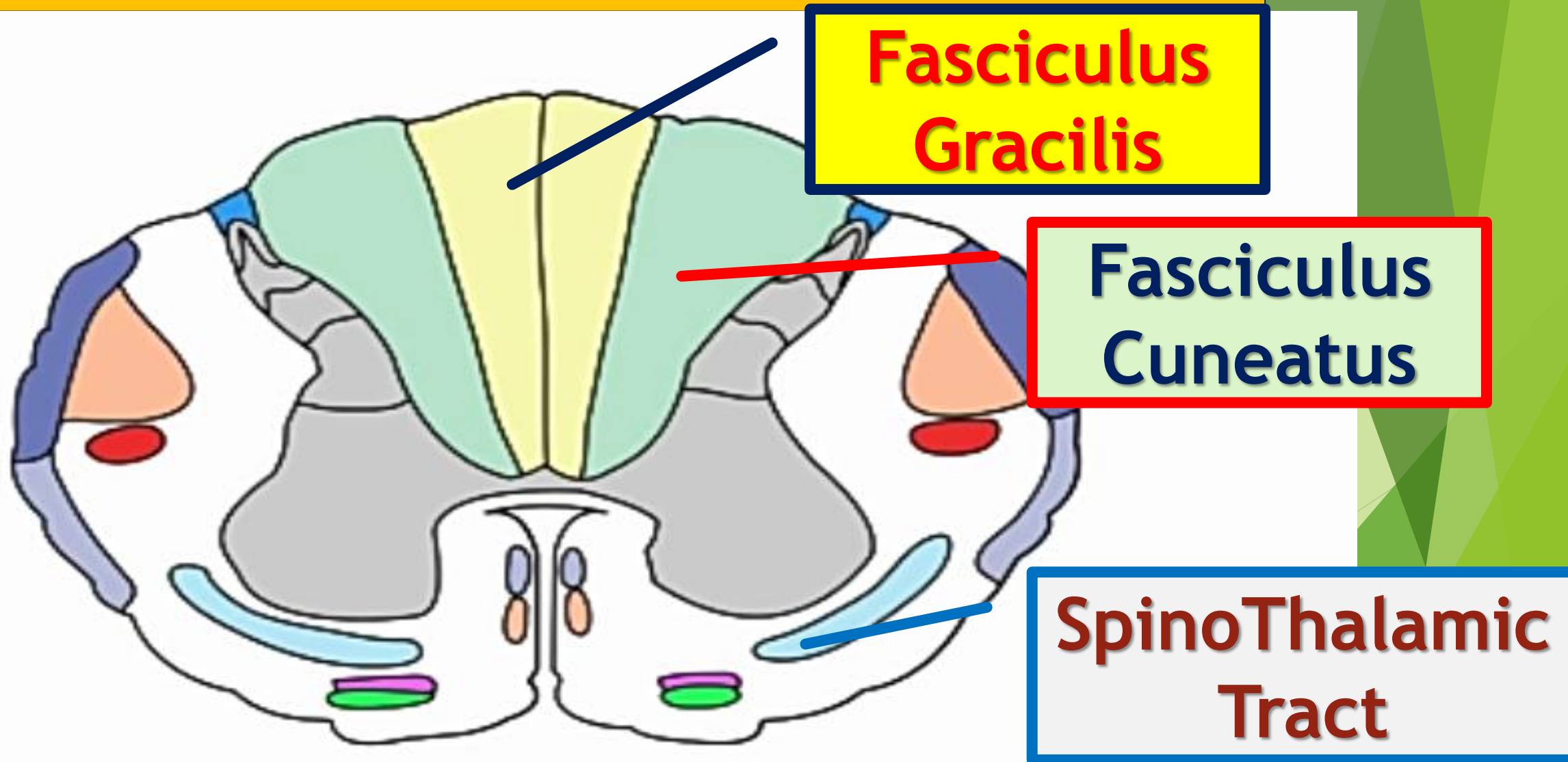
C/S Spinal Cord

Dorsal
(sensory) root

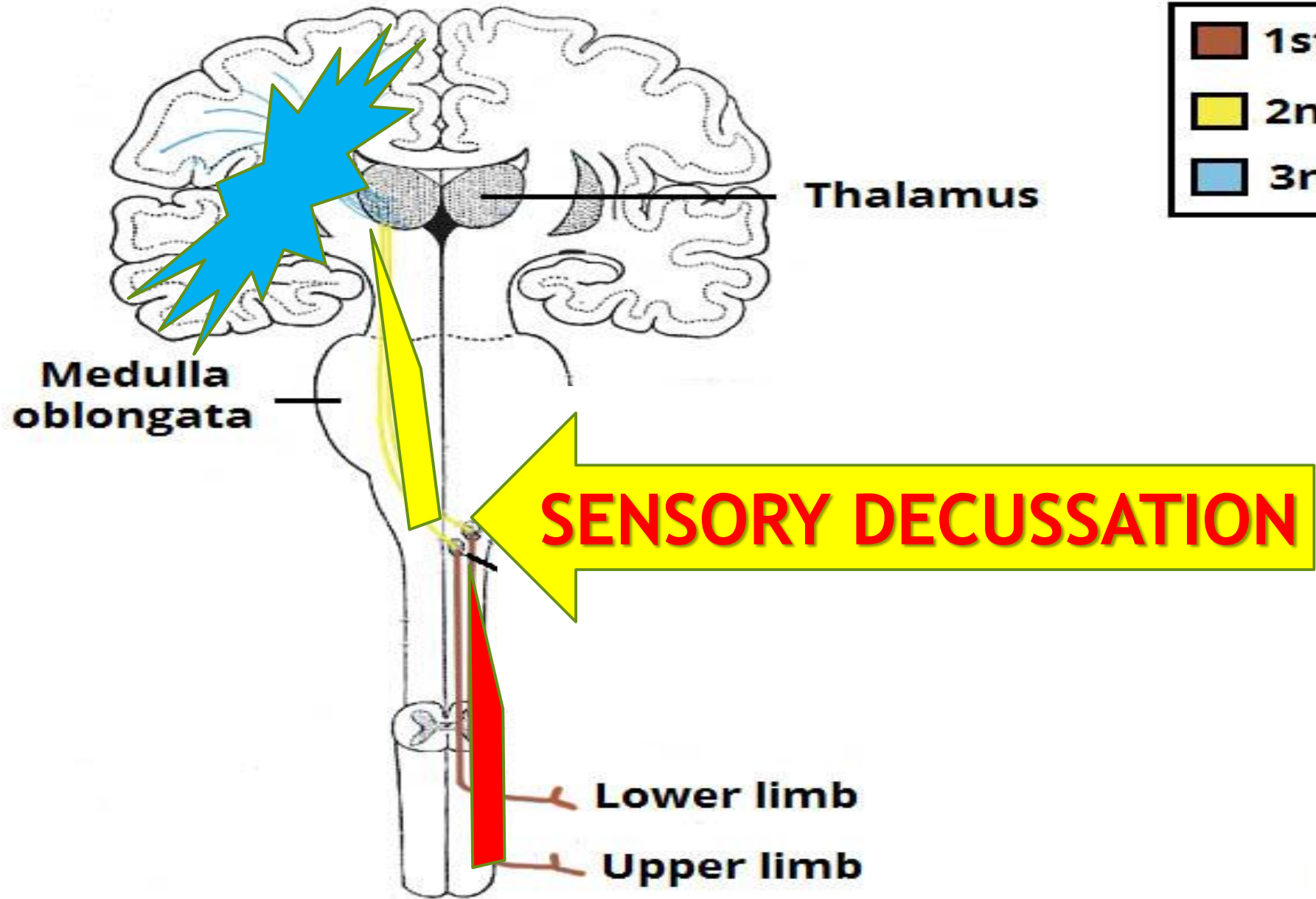


Spinal
cord

Ascending Pathways

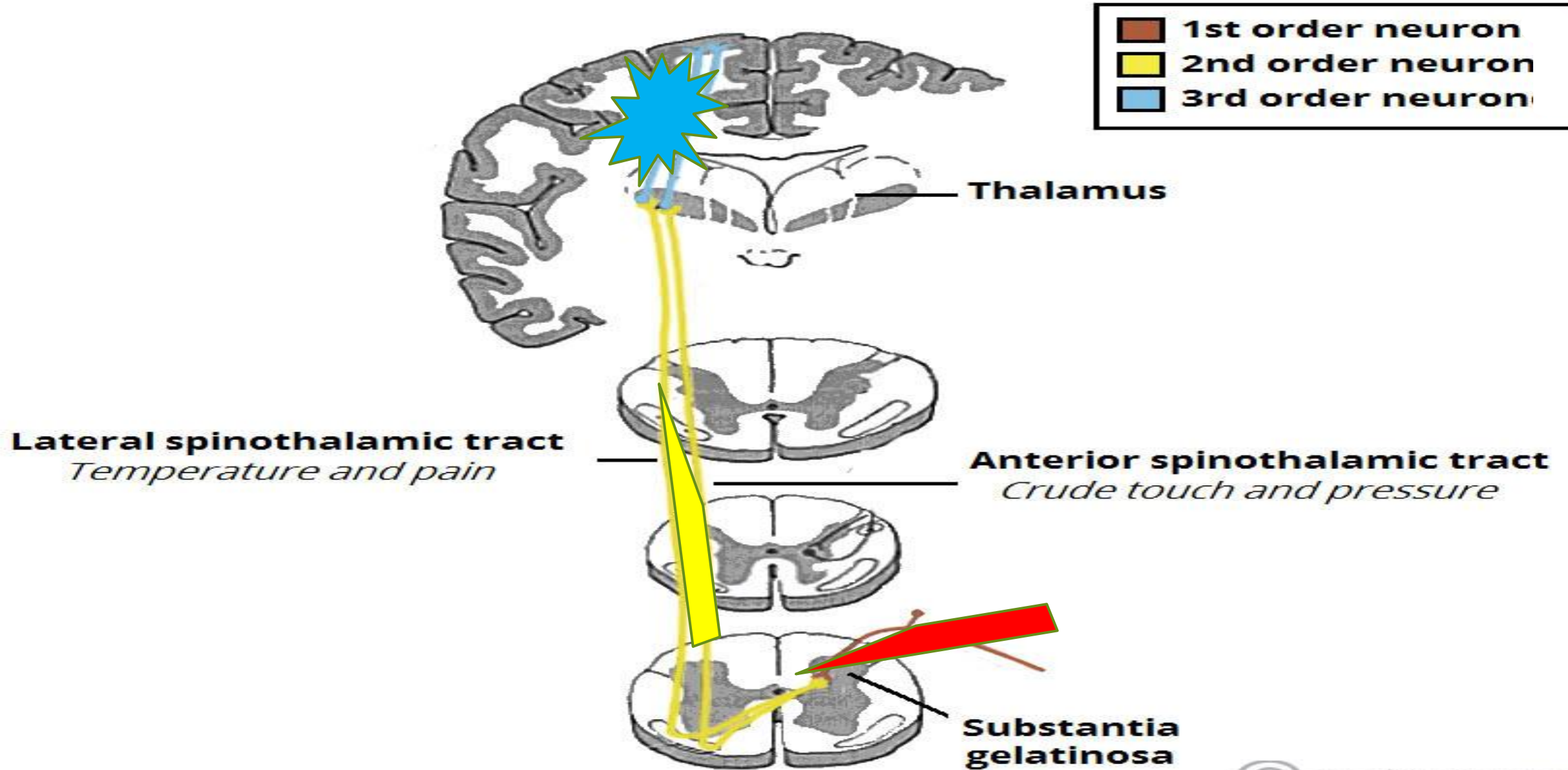


DORSAL COLUMN TRACT



- 1st order neuron
- 2nd order neuron
- 3rd order neuron

SPINOTHALAMIC TRACT

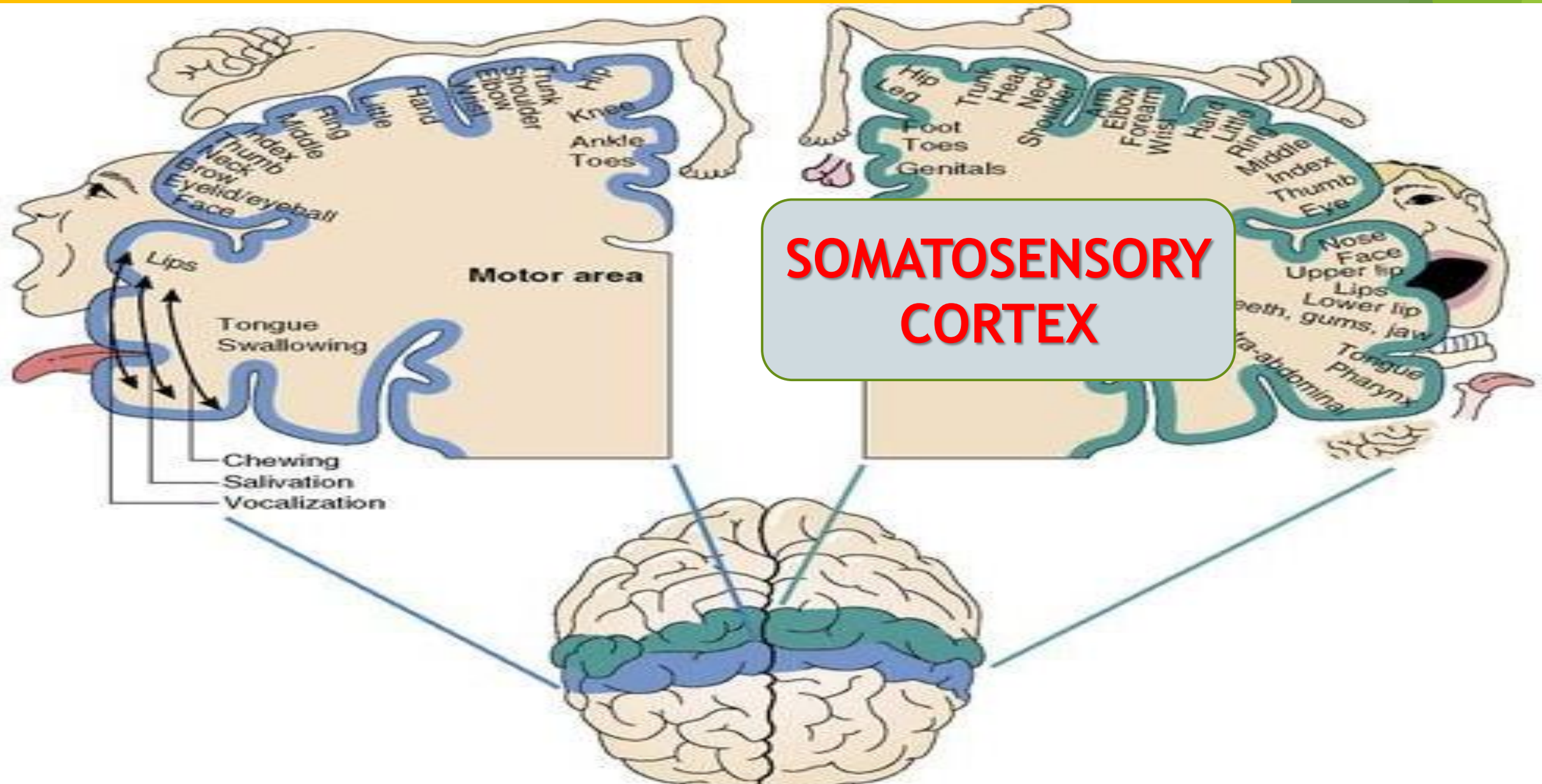


SPINOTHALAMIC TRACT

**Neospinothalamic
Tract
(Lateral Tract)
Fast Fiber
Pain & Temperature**

**Palaeospinothalamic
Tract
(Anterior)
Slow fiber
Crude Touch & Pressure**

SOMATOSENSORY CORTEX



➤ **Spinothalamic neurons send collateral branches to:**

1. medullary reticular formation

2. Tectal area - mesencephalon

3. Periaqueductal gray matter

➤ Suppose a woman has been injured on the left side of her spinal cord, at the 10th thoracic vertebra.

Comment on sense of pain and touch below the level of injury.

➤ **Injury to the dorsal columns on one side results in loss of which sensations?**

➤ **Ipsilateral OR Contralateral?**