BHARATHIDASAN UNIVERSITY

Program: M.Sc., Biomedical Science

Course Title : Neurobiology

The Somatosensory Neurotransmission

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Classification of Sensory Receptors

- **General senses**: somatic and visceral.

  Somatic- tactile, thermal, pain, pressure and proprioceptive sensations.

  Visceral- provide information about conditions within internal organs.

  - example: pH. Osmolarity, O_2 and CO_2 levels

- **Special senses**- smell, taste, vision, hearing and equilibrium or balance.

- Alternate Classifications of Sensory Receptors
  - Structural classification
  - Type of response to a stimulus
  - Location of receptors & origin of stimuli
  - Type of stimuli they detect

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Structural Classification of Receptors

- **Free nerve endings**
  - bare dendrites
    - pain, temperature, tickle, itch & light touch
- **Encapsulated nerve endings**
  - dendrites enclosed in connective tissue capsule
    - pressure, vibration & deep touch
- **Separate sensory cells**
  - specialized cells that respond to stimuli
    - vision, taste, hearing, balance

- Structural Classification of Receptors

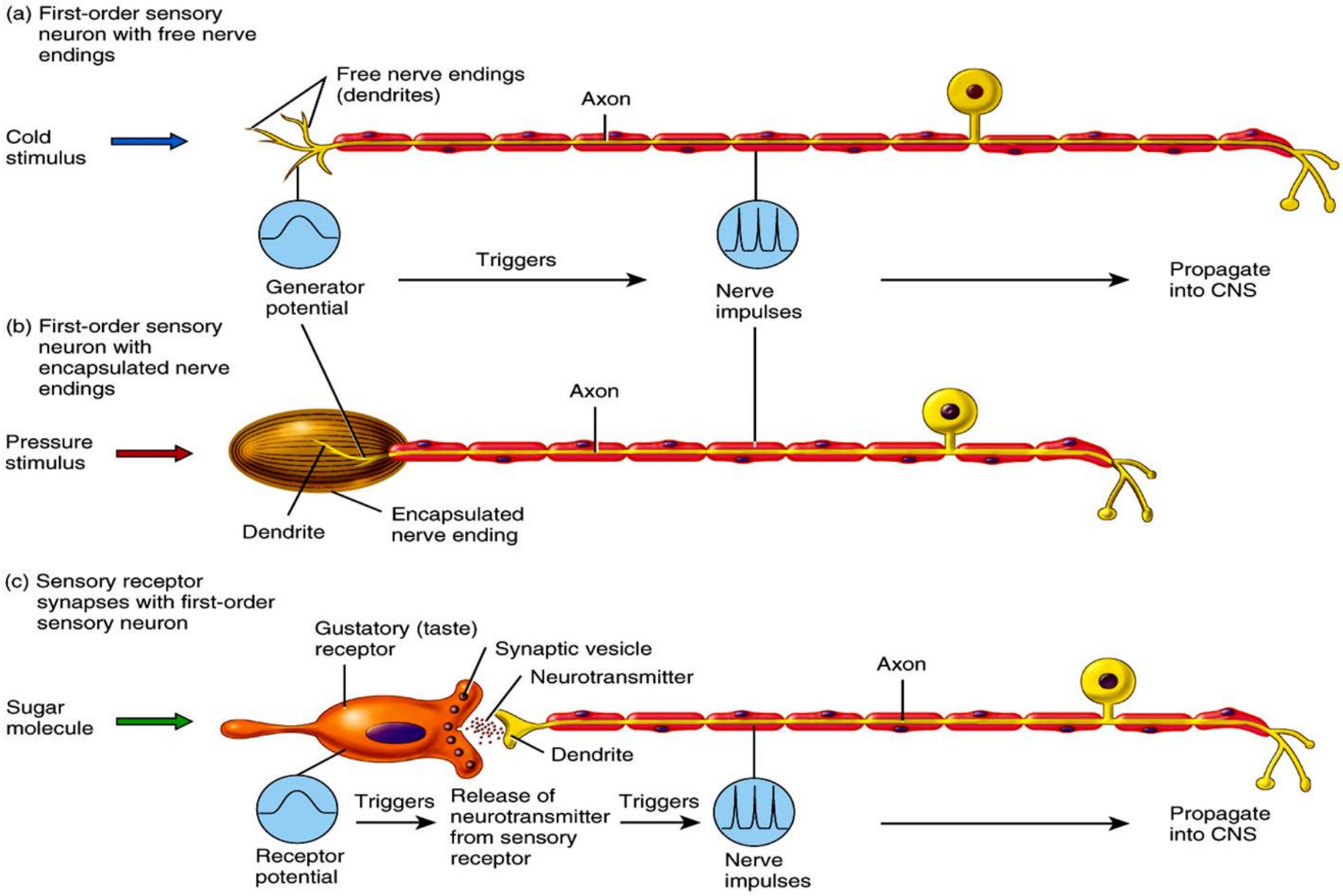


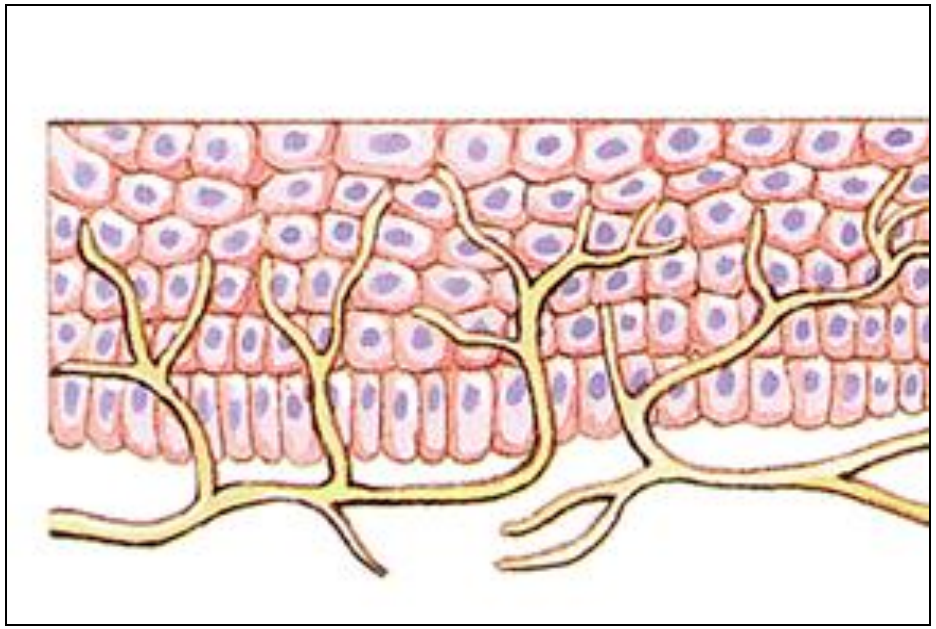
Figure 16.01 Tortora - PAP 12/e

Unencapsulated Nerve Endings

vs

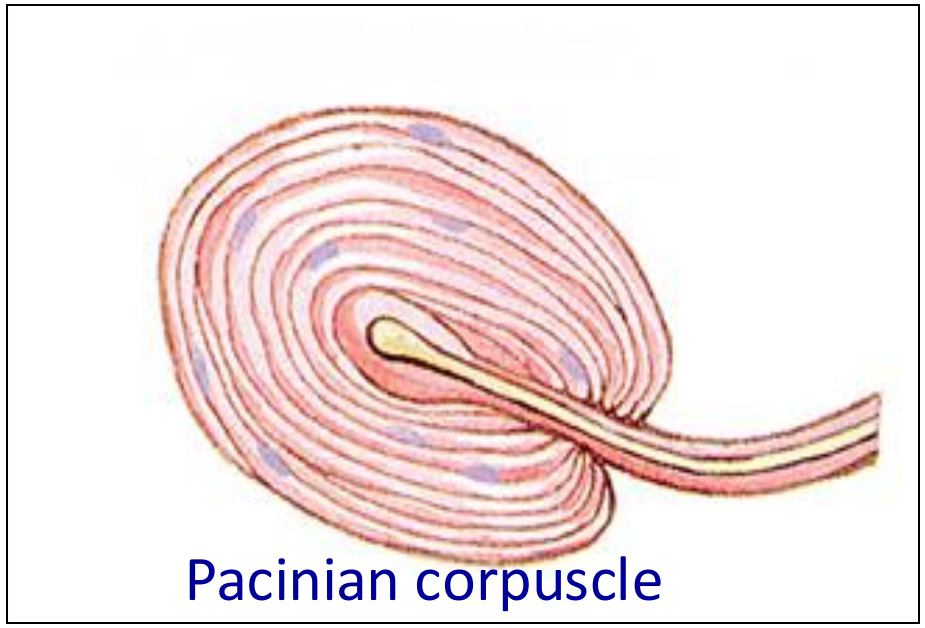
Encapsulated Nerve Endings

Free nerve endings



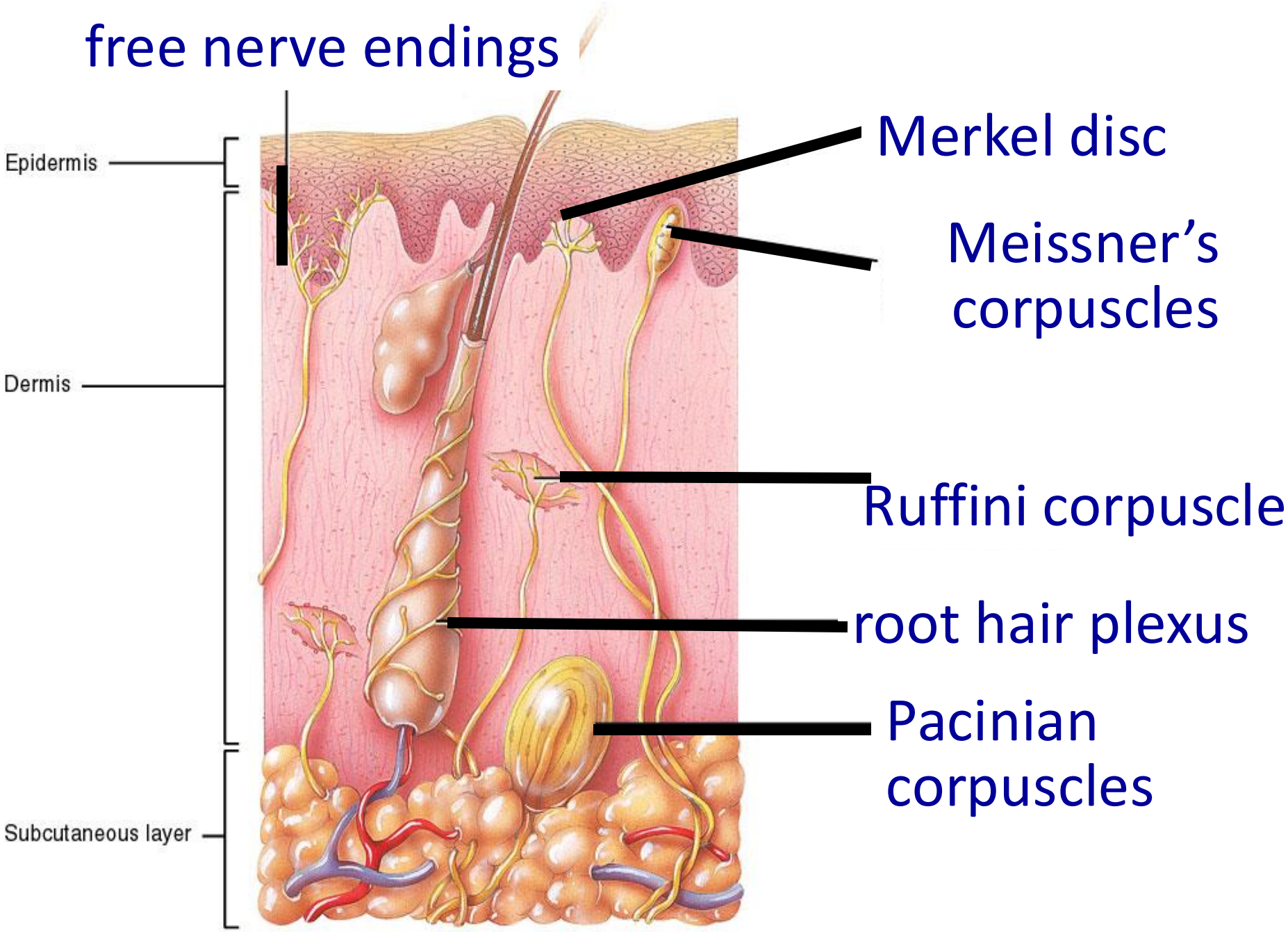
skin, bones, internal organs, joints

Naked nerve endings surrounded by one or more layers



Pacinian corpuscle

Deeper tissue, muscles


free nerve endings
Epidermis
Dermis
Subcutaneous layer
Merkel disc
Meissner's corpuscles
Ruffini corpuscle
root hair plexus
Pacinian corpuscles

Classification by Stimuli Detected

- **Mechanoreceptors**
  - detect pressure or stretch
  - touch, pressure, vibration, hearing, proprioception, equilibrium & blood pressure
- **Thermoreceptors** detect temperature
- **Nociceptors** detect damage to tissues (pain)
- **Photoreceptors** detect light
- **Chemoreceptors** detect molecules
  - taste, smell & changes in body fluid chemistry