Histology of Autonomic Nervous System

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ANATOMICAL ORGANIZATION OF THE NERVOUS SYSTEM

Nervous System

CNS
- BRAIN
- SPINAL CORD

PNS
- CRANIAL NERVES
- SPINAL NERVES

ANS
- SYMPATHETIC
- PARA-SYMPATHETIC
Central Nervous System (CNS)

• Definition:
  Unpaired, bilaterally symmetrical structures extending along the longitudinal axis of the midsagittal plane of the body. Structures arising directly from the neural tube.

• Includes:
  Brain
  Spinal cord
Cerebral Cortex

[Diagram with labeled layers: Plexiform layer, External granular layer, External pyramidal layer, Internal granular layer, Internal pyramidal layer, Polymorphic cells layer, White matter, Blood vessels]
Cerebellar Cortex

- Fissure
- Folium
- Molecular layer
- Granular
- Grey matter
- Purkinje cell layer
- White matter

- Stellate cells
- Molecular layer
- Purkinje cells layer
- Granular cells layer
Spinal cord

- Dorsal horn
- Ventral horn
- White matter
- Grey matter
- Central canal
- Multipolar neurons
Peripheral Nervous System (PNS)

• Definition:
  Made up of transmission pathways carrying information between the CNS and external/internal environments.

• Afferent (sensory) pathways:
  Carry information to the CNS.

• Efferent (motor) pathways:
  Carry information from the CNS.
Peripheral Nervous System (PNS)

• Includes:
  
  Cranial nerves (12 pairs).
  Spinal nerves (31 pairs).
Peripheral Nerve

- Epineurium
- Perineurium
- Endoneurium
- Nerve fibers (axons)
- Blood vessels
Nerve

Schwann cell nuclei

Myelin sheath
Autonomic Nervous System (ANS)

• May be considered a subdivision of the PNS.

• Entirely motor.

• Innervates smooth muscle and glands (viscera).
Subdivisions of ANS

• Sympathetic system (fight or flight): Also called thoracolumbar.

• Parasympathetic system (feed or breed): Also called craniosacral.
Dorsal Root Ganglion

- Bundle of nerve fibers
- Satellite cells

- Neurons
- Nucleolus
- Euchromatic nucleus
- Pseudounipolar neurons
- Bundle of nerve fibers
- Satellite cells
Sympathetic Ganglion

- Blood vessel
- Satellite cells
- Nerve fibers
- Multipolar nerve cells

- Blood vessels
- Nerve fibers
- Eccentric nuclei
- Satellite cells
- Multipolar neurons (as evident by their irregular shape)
Sensory ganglion

Autonomic ganglion
Optic nerve
Optic nerve
References


MCQ

• The cerebellar cortex consists of following layers:
  1. Plexiform, granular, pyramidal
  2. Plexiform, granular, polymorphic
  3. Granular, molecular, purkinje
  4. Molecular, purkinje, granular
MCQ

• The central canal of spinal cord is lined by:
  1. Simple columnar epithelium
  2. Simple cuboidal epithelium
  3. Simple columnar ciliated epithelium
  4. Simple cuboidal ciliated epithelium
MCQ

• Bundle of nerve fibres is surrounded by:

1. Epineurium
2. Perineurium
3. Endoneurium
4. None of the above
MCQ

• All are features of dorsal root ganglion except:

1. Large spherical nerve cells
2. Centrally placed nucleus
3. Satellite cells form a complete capsule
4. Neurons are dispersed between nerve fibres
MCQ

• All are features of sympathetic ganglion except:

1. Small irregular neurons
2. Centrally placed nucleus
3. Postsynaptic sympathetic neurons
4. Neurons are dispersed between nerve fibres