Notes for Wednesday September 25, 2002

Protection of S.C.

- Vertebral column
- Epidural space
- Meninges:
  - Dura mater
  - Subdural space (interstitial fluid)
  - Arachnoid
  - Subarachnoid space (cerebrospinal fluid)
  - Pia mater

Cerebrospinal Fluid (CSF)

- Provides cushioning & protection of CNS
- Delivers nutrients & removes wastes
- Used for diagnostic purposes

Meningitis

- Inflammation of the meninges
- Viral or bacterial
- Pressure on spinal cord

Spinal tap = Lumbar puncture

- Removal of CSF at 3-5 lumbar vertebra

Internal Anatomy

- White matter: myelinated axons
- Gray matter: un-myelinated fibers & nuclei (cell bodies)
- Central canal - CSF

Gray Matter

- Four regions:
Anterior horns: nuclei of MOTOR neurons
Posterior horns: interneurons and SENSORY axons

**White Matter**

- Anterior; posterior & lateral white columns:
  - Ascending TRACTS
  - Descending TRACTS

**Roots**

- Dorsal/posterior roots x 2 contain the SENESORY GANGLIA (cluster of sensory cell bodies)
- Ventral/anterior roots x 2 contain MOTOR axons
- Meet up laterally to form nerve

**Nerves x 31 pairs**

- Bundles of neurons
- Typically mixed (sensory & motor)
- Protective connective tissue coverings:
  - Endoneurium wraps each axon
  - Fascicles = bundles of axons
  - Perineurium wraps each fascicle
  - Epineurium wraps all the fascicles to form the nerve; continuous with Dura Mater

**Recap S.C. functions**

- Convey information from PNS to brain
- Integrate & respond to information = REFLEX

**Reflex**

- A fast response to a change in internal or external environment.
• Automatic & unconscious
• Maintain homeostasis

**Reflex Arc**
1. Sensory receptor
2. Sensory/afferent neuron
3. (Interneuron)
4. Motor/efferent neuron
5. Effector neuron
DOES NOT INVOLVE BRAIN

**Stretch Reflex**
• Two neurons
• One synapse
  (monosynaptic)
• E.g. knee jerk response

**Flexor/Withdrawal Reflex**
• Three neurons
• Two synapses
  (polysynaptic)

**Crossed Extensor Reflex**
• Sensory impulse enters on one side of S.C. and motor impulse exits on opposite side

**Spinal cord injuries**
• Paraplegia = paralysis of both lower limbs; transection below cervical region
• Quadriplegia = paralysis of all four limbs; transection in cervical region

**Nerve injuries**
• In PNS: regeneration only if cell body is intact and Schwann cells are functional

• In CNS: neurons cannot regenerate.

**Please note regarding Myelin:**

• In PNS formed by Schwann cells

• In CNS formed by Oligodendrocytes