

# NERVOUS SYSTEM EMBRYOLOGY AND HISTOLOGY

1/5/82, 1/7/97, 3 Jan 01, 5 Jan 04, 7 Jan 08, 4Jan09, 03Jan11, 4Jan12  
S & MI:263, Martini'S 5th: 380-421, 6th: 385-398, 7th: 380-389, 9th: 374-

Means of rapid communication within body.

## FUNCTION OF NERVOUS SYSTEM FOLLOWS FUNCTIONAL CLASSES OF NEURONS

- sensory** environmental stimulus triggers a nervous impulse = **transduction** (internal & external environment monitored)
- association** interpret, evaluate incoming sensory data, forms reaction
- motor** directs muscle activity carries out according to directions from association neurons

**NERVOUS SYSTEM** divided into two major components, CNS and PNS:

- Central Nervous System (CNS):** Brain, Spinal cord
- Peripheral Nervous System (PNS):** Sensory branch, Motor branch:

- Somatic** controls skeletal muscle action
- Autonomic** controls smooth, cardiac muscle & glands (Autonomic NS controlled by centers in CNS)
  - Sympathetic** fight or flight (action)
  - Parasympathetic** feed or breed (visceral)

**NEURON ANATOMY:** (p 376, 378):

- dendrites axon Nissl bodies
- nucleus large nucleolus neurolemma
- Schwann cell myelin sheath synaptic buttons

**NEUROGLIA:** (p 38, 382) Nervous system cell types which support, insulate, remove waste, transfer nutrients:

- astrocytes** Most numerous, support CNS constitute **blood brain barrier**
- oligodendrocytes** myelinate CNS neurons
- microglia** phagocytic, part of Reticuloendothelial system (RES) in CNS
- ependymal** line ventricles of brain, ciliated, synthesize and move CSF

**EMBRYONIC DEVELOPMENT:** (p 451)

Ectodermal in origin, neural plate forms, produces nerves and neuroglia (glue)

- neurulation:** neural groove, neural folds yield hollow neural tube = CNS (p 1089)  
<http://www.youtube.com/watch?v=00xr4kzYZn4>  
<http://www.youtube.com/watch?v=ddg2IznSuYE>

- neural crest cells: FATES:** makes connections between CNS and Peripheral, sensory cells, sympathetic motor nerve cells, Schwann cells, pigment cells.  
<http://www.youtube.com/watch?v=dFaLTkr5w6o>

4th week gestation, brain three fluid filled vesicles

**DEVELOPMENT OF BRAIN** (p 451)

| primitive       | intermediate   | adult                                       |
|-----------------|----------------|---|
| prosencephalon  | telencephalon  | forebrain, cerebrum, basal ganglia          |
|                 | diencephalon   | eye develops out: thalamus and hypothalamus |
| mesencephalon   | mesencephalon  | corpora quadrigemina, cerebral peduncles    |
| rhombencephalon | metencephalon  | cerebellum and pons                         |
|                 | myelencephalon | medulla oblongata                           |

