The Nervous System

EQ: Compare and contrast the functions of the different support cells in the nervous system.

I. Three Basic Functions of the Nervous system
   a. Sensory - gathers info
   b. Integration - information is brought together
   c. Motor - responds to signals, homeostasis

II. Interesting Facts about the Neuron
   a. Longevity – can live and function for a lifetime
   b. Do not divide – fetal neurons lose their ability to undergo mitosis; neural stem cells are an exception
   c. High metabolic rate – require abundant oxygen and glucose

III. Organization of the Nervous System

IV. Nervous Tissue is Just two cells
   i. The Neruon - The Functional Unit of the NS
   ii. Anatomy of a Neuron
      1. Cell body: enlarged part of the neuron – contains the nucleus & other organelles.
      2. Dendrites: They receive impulses and pass them to the cell body.
      3. Axon: move impulses down the neuron (can be very long, from < 1mm to > 1 meter.)
      4. Axon terminals: the end of the axon and neuron.
      5. Myelin Sheaths
         a. Many axons are covered with a white, fatty material called myelin
         b. Outside the CNS the myelin sheath is created by Schwann cells
         c. Inside the CNS the MS is created by oligodendrocytes
         d. Note the Nodes of Ranvier or the gaps between the Schwann cells
         e. Multiple Sclerosis (MS)
            i. In MS the myelin sheath is destroyed
            ii. This slows nerve impulses down and causes…
               1. Visual/speech disturbance
               2. No muscle control leading to paralysis
            iii. Is an autoimmune disease
   iii. 3 Types of Neurons
      1. Sensory neurons: (afferent) move impulses from sensory receptors (like your ears) to the CNS
      2. Motor neurons: (efferent) move impulses from the CNS to effector organs like your muscles or glands.
      3. Interneuron or Association Neuron: processing
   b. The Neuroglia - Supporting Cells
      i. 5 Main Types
         1. Schwann cells: forms the myelin sheath of PNS
         2. Oligodendrocytes: myelin sheath of CNS
         3. Microglia: attack foreign material in the CNS
         4. Astrocytes: connect blood vessels to neurons
         5. Ependymal cells: forms membranes over brain structures

V. White vs Grey Matter
   a. Myelinated (white matter) – myelinated axons
   b. Unmyelinated (grey matter) - unmyelinated