and related non-nervous cells

II. Glial Cells

- 5 to 10 times more glial cells than neurons; about 100 000 per cubic mm of brain.
- Electron microscopic work indicates that wherever neurons are not synapsed with another neuron, they are enveloped by processes or cells bodies of glial.
- Glial cell processes are connected in a vast syncytium, composed primarily of gap junctions that act as a potassium buffer within extracellular fluid.

A. Types

- Astroglia Protoplasmic and fibrous, interface between neuron and blood supply, may serve as antigen recognizing cells of CNS.
- Oligodendroglia Smaller than astroglia related to myelin formation. They show rhythmic pulsatile movements with periods of 2-5 min.
- Microglia Smaller, derived from mesoderm rather than exoderm. Function phagocytosis of deteriorating myelin.

B. Tumors

Glial cells are chief sources (60%) of all brain tumors, most common is derived from astroglia, the most malignant type is called glioblastoma.

- Common types: In children, 70% tumors are in the brain stem
- Metastatic sources; from lung, breast, adrenal and thyroid glands

III. Degeneration and Regeneration

A. Types

- Wallerian cut to axon produces changes distal to cut, degeneration within 12 hours
- Retrograde Changes proximal to cut as well as distal; dispersion of Nissl substance, if many neurons die in the same area, gliosis occurs.
- Transneural degeneration Due to transneural deafferentiation, the removal of information input to the cell.

B. Regeneration and Neuroplasticity

- Normal in PNS but very rare in CNS begins with sprouting towards previous connection.