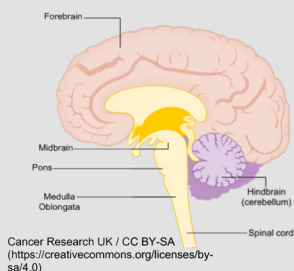


# Brain & Neurons



## Organization of Brain



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### MNEMONIC

Functions of **Hypothalamus**:

**Four F's:**

Feeding  
Fighting  
Fighting  
Functioning

### Parts of the Forebrain

- **Thalamus**: relay station for sensory information
- **Hypothalamus**: homeostasis, drive behaviors, contributes to endocrine system through **hypophyseal portal system** (connects to the **anterior pituitary**).
- **Basal ganglia**: posture, smooth movements
- **Limbic System**: emotion and memory; **septal nuclei** (pleasure-seeking), **amygdala** (fear + aggression), **hippocampus** (memory), and **fornix** (output tract).

### Parts of the Midbrain

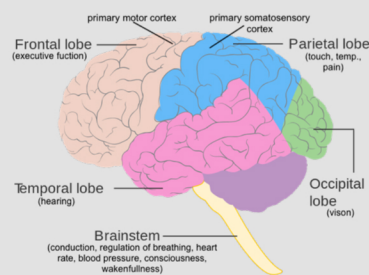
- **Superior and Inferior colliculi**: sensorimotor reflexes

### Parts of the Hindbrain

- **Cerebellum**: refined motor movements
- **Medulla Oblongata**: vital functions
- **Reticular Formation**: arousal, alertness

### Four lobes of Cerebral Cortex:

2. **Frontal**: impulse control
  - ⇒ **prefrontal cortex**: long-term planning
  - ⇒ **primary motor cortex**: motor functions
  - ⇒ **Broca's Area**: speech production
3. **Parietal**: touch, pressure, temperature, and pain; spatial orientation
3. **Occipital**: visual processing
4. **Temporal**:
  - ⇒ **auditory cortex**: sound processing
  - ⇒ **Wernicke's area**: speech perception
  - ⇒ **limbic system**: memory and emotion



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Modified to include brain regions and functions.

## Neurons

- Functional unit of nervous system
- Sensory input: **afferent**
  - ⇒ impulses to CNS
- Motor output: **efferent**
  - ⇒ impulses to effector organ

### Myelin

- insulates axon, conductance (increases speed of signal transmission), white matter
- produced by **oligodendrocytes** in CNS and **Schwann cells** in PNS

### Resting Potential

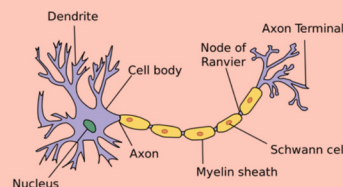
- 3 Na<sup>+</sup> out for every 2 K<sup>+</sup> pumped in.
- Maintains **-70 mV** membrane potential

### Synapse

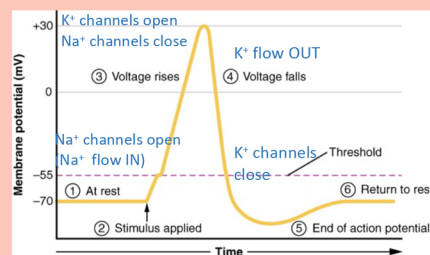
- connection between two neurons
- Voltage gated Ca<sup>2+</sup> channels
- Neurotransmitters travel across **synaptic cleft**.
- Neurotransmitters bind to receptors on **postsynaptic membrane**.

### Action Potential

- Stimulus causes depolarization of neuron cell membrane.
- Impulse propagates down axon: **depolarization** (Na<sup>+</sup> into axon) then **repolarization** (K<sup>+</sup> out) at nodes of ranvier → saltatory conduction



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