Neurons and Brain

What are the building blocks of nervous system?
1. Neurons
2. Glia: supports neurons

Neuron: Structure
Three basic parts:
1. Cell body
2. Axon
3. Dendrites

Neuron: Function
specialized in
- Receiving
- Transmitting
- Processing information

One way transmission: from dendrites to axon
How Neurons Communicate

One way transmission: from dendrites to axon.

1. Electrical
2. Chemical

1. Electrical signals

- Resting Potential
  - electrical system in equilibrium (polarization of ions)

1 (b) Action potential
- sudden change in the electrical charge across the neuron’s membrane
- all-or-none response (threshold)

How Neurons Communicate?

2. Chemical Transmission

Synapse

Neurotransmitters
2 effects:

1. Excitatory
   generate action potential in the next neuron
2. Inhibitory
   more difficult for the second neuron to fire
**Brain**

3 Main Parts

1. Hindbrain
2. Midbrain
3. Forebrain

**Damage**

1-2. Medulla & Pons

- control heart rate & breathing
- carry visual & auditory information
- respiration
- movement
- facial expression
- sleep

Damage to Pons:
Locked-in syndrome

**3. Reticular formation**

a) Filters sensory information
b) Regulate overall arousal in the brain

- If damaged - sleepy or aroused;
  - coma

**I. Hindbrain**

4. Cerebellum

“little brain”

Coordinated motor activity

*Damage: poorly coordinated muscle functioning*
II. Midbrain
Involve in
- Vision
- Hearing
- Pain-relieving function
- Some motor movements

III. Forebrain
1. Thalamus
- Receive
- Filter
- Organize
- Transmit
information from our senses (except smell) to other parts of the brain

2. Hypothalamus
Regulates:
Sexual behavior

- Eating & drinking (amount of nutrition stored in cells)
- Aggression

3. Limbic system
a) Hippocampus:
memory functioning
damage - inability to store new information

b) Amygdala
organizes emotions
- stimulation – elicit aggression & rage
- damage – reduces aggression
4. Cerebral Cortex
   2 hemispheres

Corpus Callosum
   A set of axons connecting the two hemispheres

Split-Brain Phenomenon

4 regions or lobes

1. Occipital Lobe
   Vision
   Damage:
   • “Blindness”
   • Face-blindness
   • Inability to recognize colors
   • Motion-blindness

2. Parietal Lobe
   a) spatial awareness
      “neglect” phenomenon
2. Parietal Lobe

Sensory Cortex
- Processes information about pain, touch, temperature

3. Frontal lobe

a) Primary Motor Cortex

b) “executive system”
- Planing
- Decision making
- Forming concepts
- Processing & storing information
- Self-regulation

4. Temporal Lobe

- Hearing
- Some aspects of vision

Damage to the L hemisphere
- Inability to understand spoken words

Damage to the R hemisphere
- Recognize speech, but not organizations of sound (melody, tune)