Section B: Introduction To Sensory Reception

1. Sensory receptors transduce stimulus energy and transmit signals to the nervous system
2. Sensory receptors are categorized by the type of energy they transduce
• **Sensations** are action potentials that reach the brain via sensory neurons.

• **Perception** is the awareness and interpretation of the sensation.
1. Sensory receptors transduce stimulus energy and transmit signals to the nervous system.

Fig. 49.2

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• **Sensory reception** begins with the detection of stimulus energy by **sensory receptors**.

  • **Exteroreceptors** detect stimuli originating outside the body.

  • **Interoreceptors** detect stimuli originating inside the body.

  • Sensory receptors convey the energy of stimuli into membrane potentials and the transmit signals to the nervous system.

    • This involves: sensory transduction, amplification, transmission, and integration.
• **Sensory Transduction.**
  
  • The conversion of stimulus energy into a change in membrane potential.
  
  • **Receptor potential**: a sensory receptor’s version of a graded potential.
• Amplification.
  • The strengthening of stimulus energy that is can be detected by the nervous system.
    • May be a part of, or occur apart from, sensory transduction.
• **Transmission.**
  
  • The conduction of sensory impulses to the CNS.
  
  • Some sensory receptors must transmit chemical signals to sensory neurons.
    
    • The strength of the stimulus and receptor potential affects the amount of neurotransmitter released by the sensory receptor.
  
  • Some sensory receptors are sensory neurons.
    
    • The intensity of the receptor potential affects the frequency of action potentials.
• Integration.

• The processing of sensory information.

• Begins at the sensory receptor.

  • For example, sensory adaptation is a decrease in responsiveness to continued stimulation.

  • For example, the sensitivity of a receptor to a stimulus will vary with environmental conditions.
2. Sensory receptors are categorized by the type of energy they transduce.
• **Mechanoreceptors** respond to mechanical energy.
  
  • For example, **muscle spindles** is an interoreceptor that responds to the stretching of skeletal muscle.
  
  • For example, **hair cells** detect motion.
• Pain receptors = nocioceptors.

• Different types of pain receptors respond to different types of pain.

• Prostaglandins increase pain by decreasing a pain receptors threshold.
  
• Anti-inflammatories work by inhibiting prostaglandin synthesis.
• **Thermoreceptors** respond to heat or cold.
  • Respond to both surface and body core temperature.
• **Chemoreceptors** respond to chemical stimuli.
  • General chemoreceptors transmit information about total solute concentration.
  • Specific chemoreceptors respond to specific types of molecules.
  • Internal chemoreceptors respond to glucose, O$_2$, CO$_2$, amino acids, etc.
  • External chemoreceptors are **gustatory receptors** and **olfactory receptors**.
Electromagnetic receptors respond to electromagnetic energy.

- Photoreceptors respond to the radiation we know as visible light.
- Electroreceptors: some fish use electric currents to locate objects.