**Chapter 10: Senses**

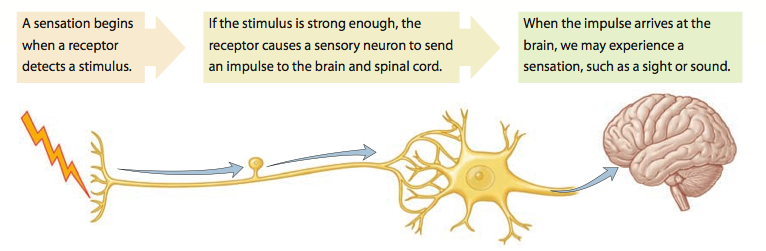
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ receptors associated with a sense of \_\_\_\_\_\_\_\_\_\_\_\_\_\_,   
    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ receptors that provide the special senses of \_\_\_\_\_\_\_\_\_,  
    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Sensory Receptors**

* Most are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Some receptors combine with muscle and tissue to form sense organs
* Transmit information about the \_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of each sensation



**Sensations**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + A feeling that occurs when the brain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Process in which the brain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Allows a person to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Types of Sensory Receptors**

|  |  |
| --- | --- |
| **Type of Receptor:** | **Respond to:** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

**Sensory Adaptation**

* Sensory Adaptation – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* + *Example: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
  + Once receptors have adapted, impulses can be triggered only if the stimulus strength \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Somatic Senses**

* Senses associated with \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Types
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (type of receptor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (type of receptor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (type of receptor: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)

**Pain**

* Stimulated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Signals a person to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Adapt \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - may continue to send impulses to the CNS
  + Pain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

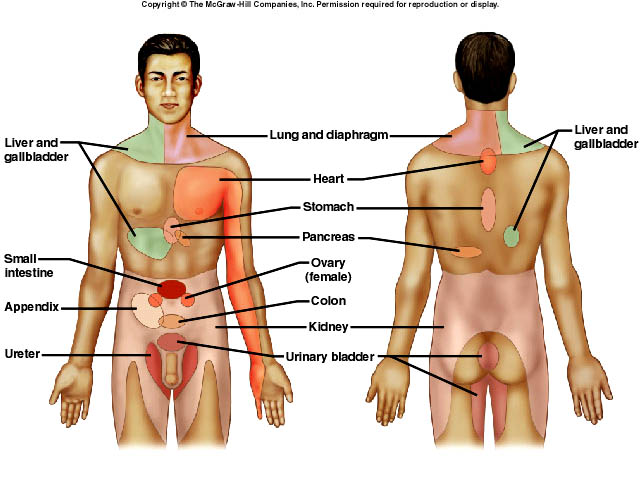
**Visceral Pain**

* Pain receptors are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_\_ whose stimulation produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Not well \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_ feeling of pain)
* May feel as if coming from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_ pain

**Referred Pain**

* Occurs due to sensory fibers from an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and those from an area of

\_\_\_\_\_\_\_\_\_\_\_\_\_\_ share a common nerve pathway to brain



**Pain Nerve Fibers**

* **\_\_\_\_\_\_\_\_\_\_\_ pain fibers**
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nerve fibers- sends \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Associated with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Typically more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + *Example:* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **\_\_\_\_\_\_\_\_\_\_ pain fibers**
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nerve fibers- sends \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Associated with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + More \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, but may be difficult to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + *Example:* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Regulation of Pain**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ determines \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_  
  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ response to pain.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- NT’s that \_\_\_\_\_\_\_\_\_\_\_\_ pain impulses
  + **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
    - Suppress \_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Acts like morphine which \_\_\_\_\_\_\_\_\_\_\_ receptors on neuron membranes
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Stimulates other \_\_\_\_\_\_\_\_\_\_\_\_ to release \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Touch and Pressure**

**Types of Mechanoreceptors**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Abundant in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Detect fine \_\_\_\_\_\_\_\_\_\_\_; distinguish between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the skin
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Common in \_\_\_\_\_\_\_\_\_\_\_\_\_ tissue, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Detect heavy \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Temperature**

* \_\_\_\_\_\_\_\_\_\_\_ receptors
  + Located in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Activated at temperatures \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_ receptors
  + Located deep in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Activated at temperatures between \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Temperatures above \_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Temperatures below \_\_\_\_\_\_\_\_\_\_\_ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Special Senses**

* Include \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + cheeks and walls of pharynx
  + Each taste bud has ~\_\_\_\_\_\_\_\_\_\_\_\_\_ taste receptors

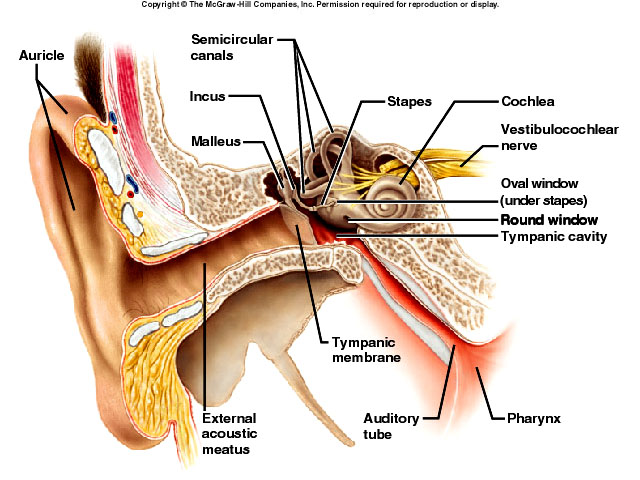
**Hearing**

Results when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ creates \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the air (sound waves) that stimulate the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to send nerve impulses to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the cerebrum

* Ear – organ of hearing
* Three Sections
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**External Ear**

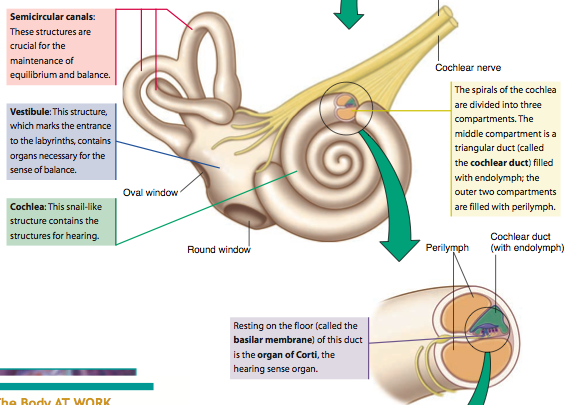
* \_\_\_\_\_\_\_\_\_ (pinna) - collects sounds waves
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - carries sound to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- opening to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Lined with gland that produce secretions that mix with dead skin cells to form cerumen ( \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ )



**Middle Ear**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ membrane
  + Vibrates in response to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + 3 smallest bones - \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Vibrate in response to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Opening in wall of tympanic cavity
  + Stapes vibrates against it to move fluids in inner ear, which stimulates the hearing receptors
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Passageway for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Helps maintain equal pressure on both sides of tympanic membrane
    - “Popping of the ears”
  + Can also allow infection to spread from middle ear to your throat

**Inner Ear**

* Complex system of communicating chambers and tubes within the temporal bone
* Three Parts
  + ****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Contains structures for \_\_\_\_\_\_\_\_\_\_\_\_\_
    - Organ of Corti
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Contains structures for \_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

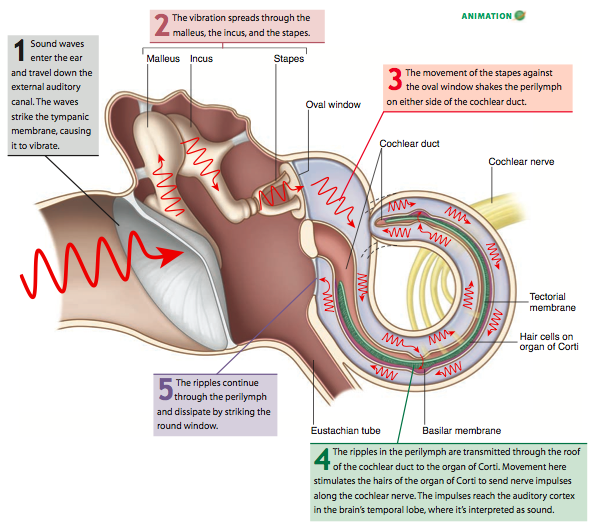
* + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Contains organs necessary for \_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Organ of Corti**

* Contains the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (hair cells)
* Nerve fibers extend from the base of the hair and eventually from the cochlear nerve (aka vestibulocochlear nerve)
* Particular sound frequencies cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Generates a nerve impulse

**How We Hear Sound**



**Balance and Equilibrium**

**Static Equilibrium**

* Organ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Sense \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when body is not moving
* Sense of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ when moving in a straight line
* When the head bends forward, backward, or to one side, the receptors are stimulated
  + Initiates a nerve impulse
  + Brain initiates a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to muscles to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **How it works**
  + Patch of hair cells
  + Tips of hair cells are covered by a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + In the gelatin-like material are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (otoliths)
  + When the head tilts, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, stimulating the hair cells and consequently the vetibulocochlear nerve (CN VIII)

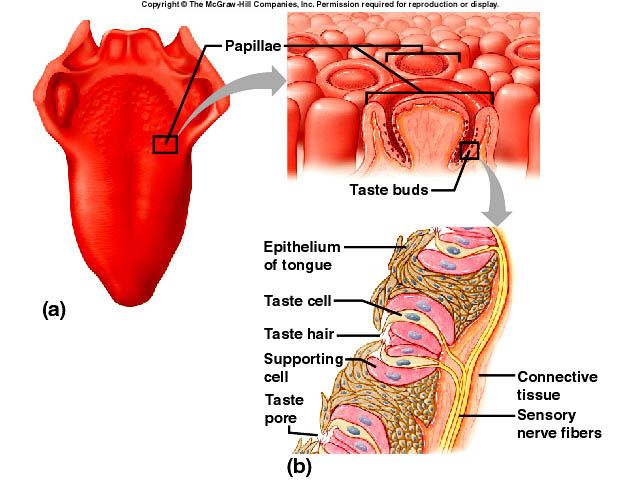
**Dynamic Equilibrium**

* Organ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Sense rotation and movement of head and body
* Rapid turns of the head or body stimulate the receptors
  + Initiates a nerve impulse
  + Brain initiates a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to muscles to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **How it works**
  + Canals are filled with \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + At the end of each canal is a bulb-like structure (ampulla)
  + When the head \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the fluid in the ampulla lags behind
  + When the movement \_\_\_\_\_\_\_\_\_\_\_\_\_, the fluid swirls past the cone and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it in the process
  + This stimulates the hair cells and consequently the vestibulocochlear nerve

**Taste**

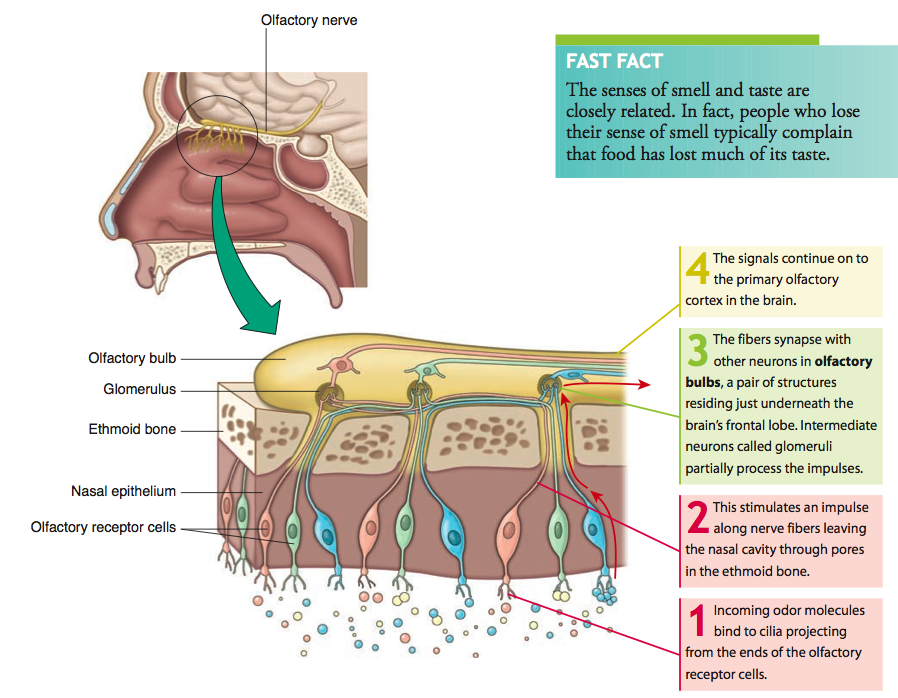
Results when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ come in contact with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (chemoreceptors) in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (taste buds)

* **Taste Buds**
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Located in papillae of tongue, roof of mouth, linings of cheeks and walls of pharynx
  + Each taste bud has ~\_\_\_\_\_\_\_\_\_\_\_\_\_ taste receptors
* **Taste Sensations**
  + Four Primary Taste Sensations
    - \_\_\_\_\_\_\_\_\_ – stimulated by carbohydrates (sugar)
    - \_\_\_\_\_\_\_\_\_ – stimulated by acids (lemon)
    - \_\_\_\_\_\_\_\_\_ – stimulated by salts
    - \_\_\_\_\_\_\_\_\_ – stimulated by many organic compounds (caffeine)
  + Possible 5th - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - meaty
  + Spicy foods activate pain receptors



**Smell**

Results when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ come in contact with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (chemoreceptors) in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (olfactory bulbs)

****

**Olfactory Nerve Pathways**

* Once olfactory receptors are stimulated, nerve impulses travel along the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Nerve (CN I).
* Once the stimulus reaches the olfactory cortex in the cerebrum, it may continue on to other locations in the cerebrum and brainstem, including the limbic system
  + Explains why certain odors can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, or even a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Olfactory Stimulation**

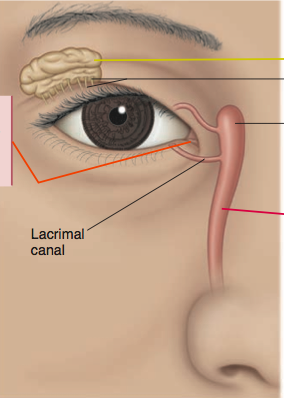
* Olfactory organs located high in the nasal cavity above the usual pathway of inhaled air
  + Person may have to sniff and force air up to the receptor areas to smell a faint odor
* Olfactory receptors undergo sensory adaptation rapidly
  + Sense of smell drops by \_\_\_\_\_\_ within a \_\_\_\_\_\_\_\_\_\_ after stimulation (sensory adaptation)

**Sight/Vision**

Results when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ comes in contact with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (photoreceptors) in the eye

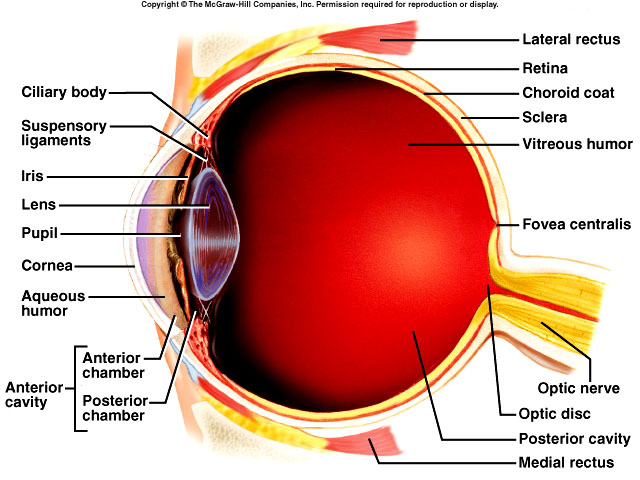
* Eye – organ containing visual receptors  
  + Provides vision with the assistance of accessory organs

**Accessory Structures**

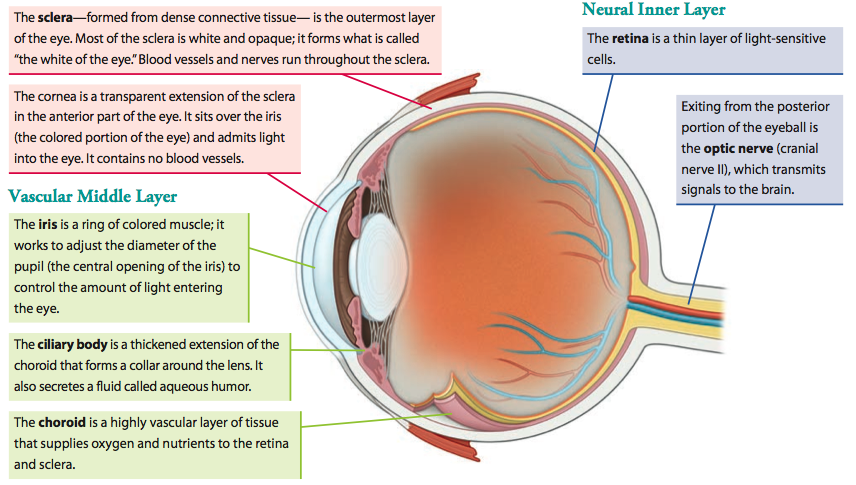
* Eyebrow – keeps out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Eyelid and Eyelashes – keeps out \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Conjunctiva – secretes a mucous that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Very vascular – when blood vessels are dilated = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 6 Extrinsic Muscles - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* ****\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Lacrimal gland, which secretes \_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Series of ducts that carry tears into the nasal cavity.

**Structure of the Eye**

* Mostly Hollow
* Spherical
* Wall has 3 layers
  + Outer layer - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Middle layer - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Inner layer - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

****

**Outer Layer - Fibrous**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Dense connective tissue
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Extension of sclera
  + Anterior part of the eye
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Sits over the Iris
  + Admits \_\_\_\_\_\_\_\_\_\_\_\_ into the eye

**Middle Layer - Vascular**

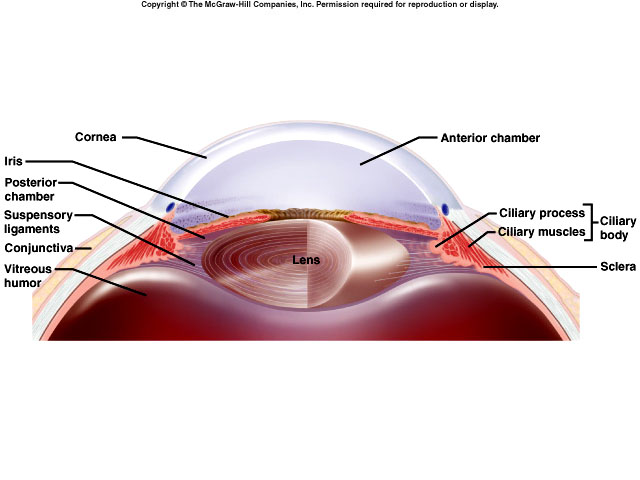
* Iris
  + Ring of colored \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Adjust the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (hole in the iris) to control amount of light
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Highly vascular
  + Supplies \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ciliary body
  + Thickened extension of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Holds \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Secretes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Lens
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Behind the iris
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_for near and far vision

**Accommodation** - Changing of lens shape to view objects

**Inner Layer - Nervous**

* Retina
  + Lines posterior 2/3 of the eye
  + Contains \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (photoreceptors)
    - \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Continuous with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – produces sharpest vision
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – blind spot; contains no visual receptors

**Chambers and Fluids**

* 2 main chambers
  + Anterior
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the lens
    - Filled with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (water-like)
      * Provide nutrients
  + Posterior
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the lens
    - Filled with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (jelly-like)
      * ****Maintains the shape of the eyeball and keeps it from collapsing

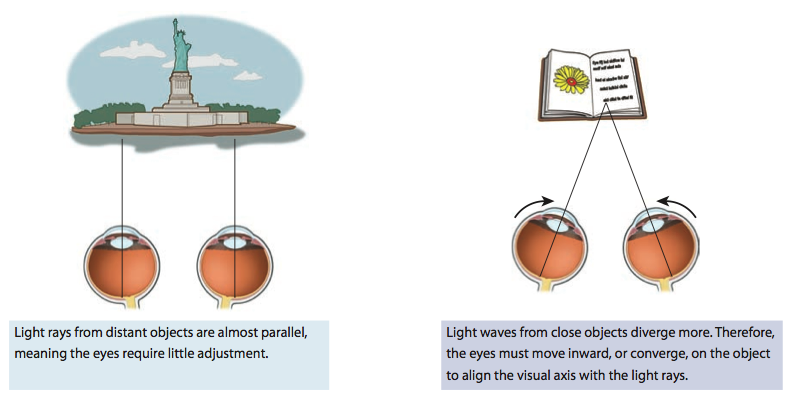
**The Process of Vision**

* In order for vision to occur:

1. Light must enter the eye and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the retina to produce a tiny, upside-down image of the object being viewed
2. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the retina must convert that image to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. The impulses must be transmitted to the \_\_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Light Refraction**

* Refraction
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Occurs when light waves hit the curved surfaces of the cornea and the lens
  + Proper vision requires light rays from an object to fall on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
    - Convergence - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**Clinical Application**

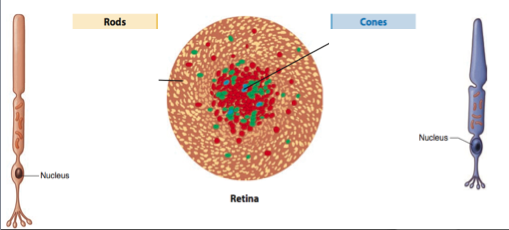
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lenses correct nearsightedness
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lenses correct farsightedness

**Action of Photoreceptors**

* Photoreceptors ( \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_) in the retina \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and trigger the nerve impulse down the optic nerve to the brain

**Visual Receptors**

* \_\_\_\_\_\_\_\_\_
  + Located in the \_\_\_\_\_\_\_\_\_\_\_\_\_ of the retina
  + Active in \_\_\_\_\_\_\_ light
  + Responsible for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Cannot distinguish \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_
  + Located in the \_\_\_\_\_\_\_\_\_\_\_\_\_ of the retina
  + Active in \_\_\_\_\_\_\_ light
  + Responsible for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Responsible for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

****