Special Senses: The Eye

MMHS Advanced Biomed
Chitraroff
Normal vs. Special

• **Normal Sense**: receptors in the skin, muscles and joints.
  – Touch = tactition (tactile)
  – Temperature, pressure, pain receptors in skin.
  – Proprioceptors (stretch) in muscles and joints.

• **Special Senses**: smell, taste, sight, hearing, and equilibrium.
Special Senses

• **Sight** = Vision (Visual)
• **Hearing** = Audition (Auditory)
• **Taste** = Gustation (Gustatory)
• **Smell** = Olfaction (Olfactory)
Sensation vs. Projection

• A sensation is a feeling that occurs when the brain interprets sensory impulses.

• The cerebral cortex causes the sensation to seem to come from the stimulated receptors. This is called Projection, because the brain projects the sensation to its apparent source. This allows a person to pinpoint the region of stimulation.
Sensory Adaptation

Do you notice that you perceive certain sounds when entering a room but soon that same sound becomes faint background noise after time? 
→ This can happen with smells, and sight too.

This experience is known as...

• Sensory Adaptation is the ability to ignore unimportant stimuli.
  – Prevents nervous system from becoming overwhelmed.
5 Types of Sensory Receptors

- **Chemoreceptors**: Stimulated by changes in the chemical concentration of substances
- **Pain receptors**: Stimulated by tissue damage
- **Thermoreceptors**: Stimulated by changes in temperature
- **Mechanoreceptors**: Stimulated by changes in pressure or movement
- **Photoreceptors**: Stimulated by light energy.
Sensory Receptors
Eye Statistics

• 70% of all sensory receptors are in the eye.
• Optic tracts are massive nerve bundles with over a million nerve fibers.
• The Vision sense requires the highest learning curve.
• Microscopic creatures lurk in your eyelashes.
• At birth, your eyes are 70% of their maximum size. Ears and nose never stop growing.
• Average person blinks 12x per minute or 10,000x per day or 30 minutes each day.
• The older we are, the less tears we produce.
Somatic Afferent Perception

• **Special somatic afferent (SSA)** refers to **afferent nerves** that carry information from the **special senses** of **vision**, **hearing** and **balance**.

• The **cranial nerves** containing SSA fibers are the
  – **optic nerve**
  – **vestibulocochlear nerve**
Visceral Afferent Perception

• **Special visceral afferent (SVA)** refers to **afferent nerves** that develop in association with the **gastrointestinal tract**.\(^1\) They carry the **special senses** of smell (**olfaction**) and **taste** (**gustation**).

• The **cranial nerves** containing SVA fibers are the
  – **olfactory nerve**
  – **facial nerve**
  – **glossopharyngeal nerve**
  – **vagus nerve**