

## Human Senses

The sense organs connect the nervous system to the external environment. They are the sources of stimuli that cause a response in the nervous system, and they are the sources of all information to the human body.

### Eye

In the human eye, the nerve cells are located in a single layer called the **retina**, located along the back wall of the eye. Light rays enter the eye through a curved, transparent structure called the **cornea**, and then pass through the **pupil**, an opening in the eyeball. The **iris** regulates the size of the pupil. Next, the **lens** focuses the light on the retina, which contains two types of light-sensitive cells, **rod cells** and **cone cells**, which detect light. Cone cells, which detect color, are concentrated in the central portion of the retina, while rod cells, which permit vision in dim light, are concentrated at the edge of the retina. A light-sensitive pigment called **rhodopsin** functions in the detection of light.

From the eye, a series of impulses is generated for transmission to the brain. The **optic nerve** carries these impulses. The region of keenest vision, the **fovea**, is located at the center of the retina. When vision is poor, light is not focusing on the fovea, and corrective lenses are prescribed.

### Ear

The ear is the organ of hearing in humans. The **outer ear** funnels vibrations to the **eardrum**, or tympanic membrane, which transmits the vibrations to three inner ear bones: the **malleus** (hammer), the **incus** (anvil), and the **stapes** (stirrup). These bones transmit the vibrations to the **inner ear** where the receptor of hearing, the cochlea, is located.

The **cochlea** is a snail-like series of coiled tubes within the skull. As the ear bones vibrate, they push and pull a membrane at one end of the cochlea, causing fluid within the tubules to vibrate. The vibrations are detected by sensitive hair cells, and nerve impulses are generated. The **auditory nerve** carries the impulses to the brain for interpretation.

### Taste and smell

Specialized receptor cells called chemoreceptors transmit taste and smell. **Chemoreceptors** of the human tongue distinguish four different tastes: sweet, sour, salty, and bitter. In the human nose, chemoreceptors detect a variety of scents, including minty, floral, musky, putrid, and pungent.

In both taste and smell, chemoreceptors are stimulated by molecules and ions that reach the tongue and nose. Liquid materials affect the chemoreceptors in the taste buds of the tongue, while gaseous molecules affect the chemoreceptors in the upper reaches of the nose.

The **olfactory nerve** carries nerve impulses from the nose to the brain for interpretation.

### **Other senses**

The other senses of the body include receptors for touch, pain, temperature, and balance. Touch and pain receptors, called **Pacinian corpuscles**, are located in the skin, muscles, and tendons. The sense of balance is centered in the semicircular canals of the inner ear. Visceral senses include stretch receptors in the muscles, as well as carbon dioxide receptors in the arteries.

Upravený text.

<http://www.cliffsnotes.com/sciences/biology/biology/nervous-coordination/human-senses>

### **Task**

Read the text and translate the highlighted words.