**Ch 15 Special Senses- Part 1 The Eye and Vision Notes**

The special senses of the body include: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. All of these senses use distinct receptor cells localized in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ region.

**The Eye and Vision**

\_\_\_\_\_\_% of the body’s sensory receptors are in the \_\_\_\_\_\_\_\_\_\_\_\_. Half of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cortex is involved in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ processing.

The eye is sphere shaped with only \_\_\_\_\_\_\_\_ of its surface visible. Most of the eye is enclosed by the bony orbit and protected by a cushion of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Accessory Structures of the Eye**

Accessory structures \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the eye and aid in eye \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These structures include: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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| **Accessory Structure** | **Function** |
| Eyebrows |  |
| Eyelids |  |
| Conjunctiva |  |
| Lacrimal apparatus |  |
| Extrinsic eye muscles |  |

Eye muscle movement:

|  |  |  |
| --- | --- | --- |
| **Muscle** | **Action** | **Controlling Cranial Nerve** |
| Lateral rectus |  |  |
| Medial rectus |  |  |
| Superior rectus |  |  |
| Inferior rectus |  |  |
| Inferior oblique |  |  |
| Superior oblique |  |  |

Diseases/Disorders:

* An inflammation of a small sebaceous gland around the eye is called a \_\_\_\_\_\_\_\_\_\_\_.
* Inflammation of the conjunctiva covering the eye is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. An infection of the conjunctiva caused by bacteria or viruses is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Double vision, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs when the movements of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ muscles of 2 eyes are not coordinated.
* Cross-eye or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a weakness of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ muscles.

Eye Structure

The wall of the eyeball contains 3 layers:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

The internal cavity is separated into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ segments by the lens and is filled with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (fluids).

1. **Fibrous Layer**= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Sclera- opaque posterior region; functions to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Cornea- transparent anterior 1/6 of fibrous layer; forms\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. **Vascular Layer**= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Choroid region- supplies\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Ciliary Body- surrounds \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; controls shape of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Iris- colored part of the eye
* Pupil- central opening that controls amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ entering eye.

3. **Inner Layer (retina)=** contains millions of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ cells that transduce light energy as well as neurons & glial cells. It is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ layered membrane.

* Pigmented layer of retina- absorbs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, stores \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Neural layer of retina- transparent layer composed of neurons.
  + Optic disc- site where \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ nerve leaves eye; “blind spot”
  + Rods- sensitive to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vision receptors
  + Cones- vision receptors for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light & color vision
    - Fovea centralis- area in center of macula lutea that contains all the cones; region w/ best visual acuity.

The inner layer of the retina has 2 sources of blood supply:

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- supplies the outer 1/3 (photoreceptors)
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- supplies the inner 2/3

Retinal detachment- condition where the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ layers separate allowing the jellylike \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ humor to seep between them. Can lead to permanent blindness. It is usually caused by a blow to the head. The retina can be reattached with laser surgery.

Internal Chambers & Fluids

The eyeball is separated into 2 segments, 1) the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ segment and 2) the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ segment by the lens & ciliary zonule.

1. Posterior segment- contains the gel-like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ humor which contributes to the internal pressure of the eyeball. It is formed in the embryo and lasts throughout the whole lifetime.
2. Anterior segment- contains the watery plasma- like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ humor which supplies nutrients & oxygen to the lens, cornea, and retina. It is continuously formed throughout life by capillaries of ciliary processes.

Diseases/ Disorder:

* Glaucoma- condition in which drainage of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ humor is blocked causing fluid to back up and increase \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in eye.

The Lens

The lens is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (shape), transparent, flexible, and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (without blood supply). Its function is to change \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to precisely focus light on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Lenses become more dense and less \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with age.

Cataracts- The lens can become cloudy as a consequence of aging, diabetes, heavy smoking, and frequent exposure to intense sunlight.

Light and Optics

Of all the energy waves, visible light only occupies a small portion in the middle of the spectrum. Eyes only respond to this \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light. When visible light passes through the spectrum, it is broken up into the colors of the rainbow (ROY G BIV). The color \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has the longest wavelength & lowest energy. The color \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ has the shortest wavelength & highest energy.

The color your eye perceives is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of that wavelength (all colors are absorbed except the color you see). White \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ all colors; Black \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ all colors.

Light bends (or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) due to the change in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of light passing from 1 transparent medium to another. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the eye also refract light because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| Lens | Shape |
| Convex |  |
| Concave |  |

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_lens bends light so rays converge at a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (image is upside down and reversed)

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lens disperses light that prevents light from being focused.

Disorders related to eyeball shape:

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| Disorder | Common Name | Shape of Eyeball | How Corrected |
| Myopia |  |  |  |
| Hyperopia |  |  |  |
| Disorder | ~ | Issue With Eyeball | How Corrected |
| Astigmatism |  |  |  |

Rods vs. Cones

Rods- very sensitive to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; best suited for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vision and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ vision. Contain a single pigment so vision is in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ tones.

Cones- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sensitivity to light; require \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for activation; react quickly; have 1 of \_\_\_\_\_\_ pigments for vividly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sight; high-resolution vision.

Colorblindness- lack of 1 or more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; inherited as \_\_\_\_\_\_\_\_-linked condition (more common in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_); most common type is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When moving from bright light to darkness, we see blackness because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

We see objects in 3D because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_