Internal Eye Structures

1. 3 layers of the eye.
2. Clear layers of the eye.
3. Purpose of iris:
4. Which cranial nerve controls the ciliary body?
5. What occurs when the ciliary body is stimulated?
6. Chambers and what they contain.
7. Structures of retina: blindspot, fovea centralis, macula.
8. Compare rods and cones.
9. Macular degeneration.
10. Glaucoma.
11. Compare near-sighted and far-sighted.
12. Astigmatism.
13. Lasik surgery.
14. Effects of sympathetic stimulation of the eye.
15. Effects of parasympathetic stimulation of the eye.
16. Purpose of dark pigmentation of choroid.
17. Other purpose of choroid.
18. Detached retina—causes and effects.
19. What is a cataract?
20. Why do an albino animals' eyes appear red?

Answers:

Internal Eye Structures

1. Sclera, choroid and retina
2. Cornea and lens
3. Purpose of iris: to control the amount of light that reaches the retina
4. Which cranial nerve controls the ciliary body? Oculomotor
5. What occurs when the ciliary body is stimulated? Lens bends and iris constricts
6. Chambers and what they contain. Anterior chamber contains aqueous humor (which is watery); and the posterior chamber contains vitreous humor (which is gel-like)
7. Structures of retina: blindspot, fovea centralis, macula. The blindspot is the area of the retina where the neuronal axons are exiting to form the optic nerve. At this spot there are no neuronal receptors. The macula is a yellowish area of the retina that includes the fovea centralis, a particularly receptor-rich part of the retina that gives us our greatest visual acuity.
8. Compare rods and cones. Rods are neuronal receptors that fire action potentials in response to light and dark; cones fire action potentials specifically in response to colors. Red-green color-blindness occurs when someone lacks a particular type of cone. Generally, women have higher ratio of cones to rods than men. Thus, women see greater details in color; men see better at night and at far distances.
9. Macular degeneration. This is when the part of the retina that contains the fovea centralis suffers damage. Wet macular degeneration is when there is a tumor-like overgrowth of blood vessels protruding from the underlying choroid. Wet macular degeneration can even lead to a detached retina; dry macular degeneration is when there is debris built-up (from old proteins and other cellular wastes).
10. Glaucoma. Build-up of the pressure in the posterior chamber, usually because fluid cannot flow from the posterior chamber to the anterior chamber. The increased pressure can damage the optic nerve and cause vision loss.
11. Compare near-sighted and far-sighted. In near-sightedness (myopia), the light is bent too much and comes to a point before it reaches the fovea centralis. They will be able to see up-close well but distance vision will be blurry. In far-sightedness, the light is not bent enough and has not yet come to a point when it reaches the fovea centralis. This is common as we age and our lens stiffens and doesn't bend enough for light rays to meet on the fovea centralis of the macula.
12. Astigmatism. Myopia caused by an overly curved cornea or lens. This is common in childhood, but as the child grows, the eye may correct its shape.
13. Surgery that reshapes the cornea, most typically by lessening its curvature. This can correct myopia.
14. Effects of sympathetic stimulation of the eye. Lens flattens and iris dilates for far vision. These sympathetic nerves come from the thoracolumbar region of the spinal cord.
15. Lens bends and iris constricts for close vision. This occurs via the Oculomotor nerve, Cranial Nerve III.
16. Purpose of dark pigmentation of choroid. Prevents light scattering so that vision is more clear.
17. Other purpose of choroid. Contains blood vessels that nourish the retina.
18. Usually caused by trauma or decreased humor pressure. It can lead to blindness because the retinal cells die when separated from the nourishment of the choroid.
19. Most common cause of blindness. As we age, the proteins of the lens break down and cause an opacity of the lens. Surgical treatment is a removal of the lens and a replacement with a plastic lens.
20. The red is the blood vessels of the choroid. Since the choroid and the iris lack pigment in an albino, the red of the blood is sees as the eye color. Albinos usually have poor vision because they cannot prevent light-scattering in the posterior chamber and they suffer light damage of the retina since the iris cannot protect it by constricting in bright light.