

LABORATORY EXERCISES FOR EYE

CVH178, Rabbit eye cross-section. The eye in this species of mammal is diurnal. Look at the three major layers of the eye (the sclera, the uvea and the retina) using the handout and your histology text as a guide. The cornea is a continuation of the sclera in the anterior portion of the eye. Examine the corneal layers to identify the epithelium (what type is it?), the stroma (major component?) and the endothelium (type?). The ciliary body is part of the uveal layer. Identify the ciliary muscle (what is the orientation of the muscle fibres?), and the iris (an extension of the ciliary body). Find the pigmented epithelial cell layer. Can you see any melanocytes within the stroma of the iris? Identify the dilator pupillae and sphincter pupillae muscles; what are the functions of these? Locate the lens epithelium on the anterior surface (adjacent to the cornea). In the lateral aspect of the lens, can you see any evidence of the long, thin crystalloid cells making up the bulk of the lens? What is the orientation of the long axes of these cells? Are any blood vessels evident within the lens? Is there any evidence of a suspensory ligament? Locate the choroid layer adjacent to the retina. How can you distinguish choroid tissue from the other layers of the eye? What are the major functions of this layer? In the retina, try to identify the photoreceptor layer; can you distinguish any of the other cell layers?

CVH162, Frog eye, cross-section of head. You can see in this slide the relationship between the eyeball and its orbit. Try to do the same histological analysis on the eye in this slide as you did for the rabbit eye. This comparison illustrates some of the differences between water- and air-adapted vertebrate eyes; the amphibian eye is very similar to those of fishes. If the section on the slide in your box was cut so that it includes the body of the lens, you will be able to determine the overall lens shape. If your slide does not include any lens material, try looking at slides with the same number from other boxes in the laboratory. In the amphibian lens, accommodation is accomplished by muscles which move the whole lens toward or away from the retina; these muscles are attached between the ciliary body and the lens periphery. Can you see any muscle in this area? Compare the shape of the amphibian lens with that of the lens in the rabbit eye, and try to estimate the relative distance from the lens to the retina in each type of eye.

Retina demonstration. Look at the demonstration slide of two frog retinas. Exposure to light reduces the optical density of the photosensitive pigment (makes it lighter in appearance) in retinal rod cells. Given this fact, can you tell which retina was exposed to light ("light-adapted") and which was kept dark ("dark-adapted") before fixation? You should be able to easily identify the retinal cellular layer containing the photosensitive parts of the rods.

CVH61, dogfish head. In some slides there are portions of the eyeball; identify what you can of the eye on your slide and exchange slides with others in the lab to see more details. The elasmobranch eye has cartilage associated with the sclera; can you find any evidence of this? What is its purpose?