Lab 11:
Activity 10
Fundoscopic Examination

The term **fundus** refers to inner lining of the eyeball, including the retina, optic disc, blood vessels, and the macula. This examination is routinely performed by doctors and ophthalmologists. In most cases, this exam is aided through the administration of parasympatholytic drugs which dilate the iris. Unfortunately, we do not have access to these drugs. Therefore, we will not be able to have an optimal image during our exams. This exam can be used to help determine if the eye is affected by viral inflammation, diabetes mellitus, glaucoma, macular degeneration, optic nerve degeneration, or retinal tears.

The tool used to perform this examination is called an **ophthalmoscope** (Fig 11.11). The ophthalmoscope has a lamp controlled by a switch that can also be used to adjust the light intensity, several lenses selectable with a dial, an indicator to show which lens is selected, and a viewing window.

**Procedure**

*WARNING: Do not examine the macula for more than 1 second at a time!*

Move to a dim portion of the room. Remove the examiner’s and subject’s glasses, but you may leave contact lenses in place. Have the patient focus on an object in front of them.

Hold the ophthalmoscope in your right hand. Steady yourself by placing your left hand on the subject’s shoulder, or by placing it on their forehead with the thumb along the eyebrow. View the fundus at eye level 15 inches away from the right eye at an angle of 15° from the midline. Select a lens that allows the eye to be in focus. You should see a red color reflected back at you. This is the **red reflex**. The lack of a red reflection or the presence of spots in the reflection suggests light opacities, or cataracts. Look for the red reflex in both of the patients eyes.

Slowly move the ophthalmoscope towards the eye. You may need to pick a different lens to keep the eye in focus during this procedure. As you move, you will be able to see the cornea, lens, and then the retina. The ophthalmoscope should be about 2 inches away from the eye when the retina is visible. If you are at eye level and 15° from the centerline, you should be able to see the optic disc once the image is in focus. Figure 11.12 illustrates what you should see when the back of the eye is in focus.
After identifying a blood vessel, follow it to the optic disc. This should be in the nasal, or medial direction. Look for three properties of the disc: cup, color, and contour. You should find the macula in the temporal direction (from the optic disc). You may see lesions, atrophy, laser scars, or hemorrhages in the area. You may also see very convoluted blood vessels. You may even see blood pulsing in the vessels.

To examine the left eye, hold the ophthalmoscope in your left hand and view through your left eye.

Please note that fundoscopy is one of the most difficult routine exams. It takes practice to do it well!

There are several good references and demonstrations for this lab.

https://www.youtube.com/watch?v=7lhvhKvK_iM
http://www.ncbi.nlm.nih.gov/books/NBK221/

Activity 11
Identifying Structures of the Ear

Activity 12
Otoscopy

An otoscope (Fig 11.X) is used to examine the ears. It allows clinicians to be able to visualize the tympanic membrane and several structures deep to the membrane, namely, the malleus, and incus. Of course, clinicians can also observe the tympanic membrane for signs of middle ear infections and can inspect tubes and look for scarring of the tympanic membrane.

Fig. 11.X

WARNING: Be careful not to damage the tympanic membrane by inserting the otoscope too far into the ear or by jerking the otoscope!
Attach the largest speculum possible to the otoscope and turn on the otoscope light. Examine the right ear of a lab partner by holding the otoscope like a pencil in your right hand. Pull the auricle gently in the posterior and superior direction. This will help you to see the tympanic membrane. Insert the speculum into the ear canal and rest the back of your right hand on the subject’s face to help hold the otoscope steady.

Look at the auditory canal. You may see hair and cerumen (earwax) that should appear yellow or brown.

Examine the tympanic membrane. Pay particular attention to the color, clearness, and shape of it. The membrane should be slightly pink, clear, and neither bulging inward or outward (a neutral position). You should be able to see the malleus behind the tympanic membrane. Deviations from these traits are indicative of pathological processes.