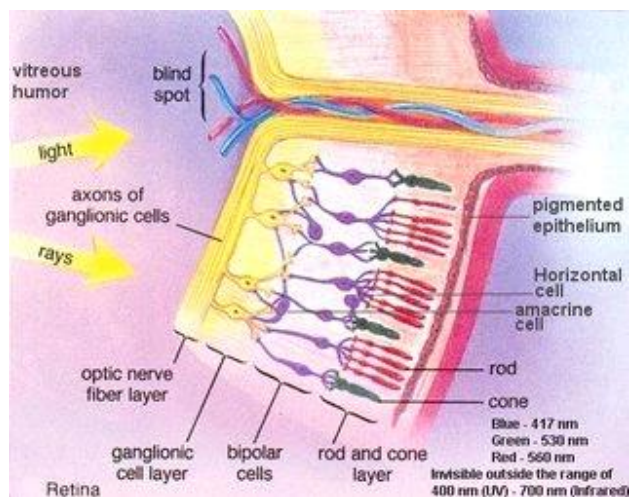


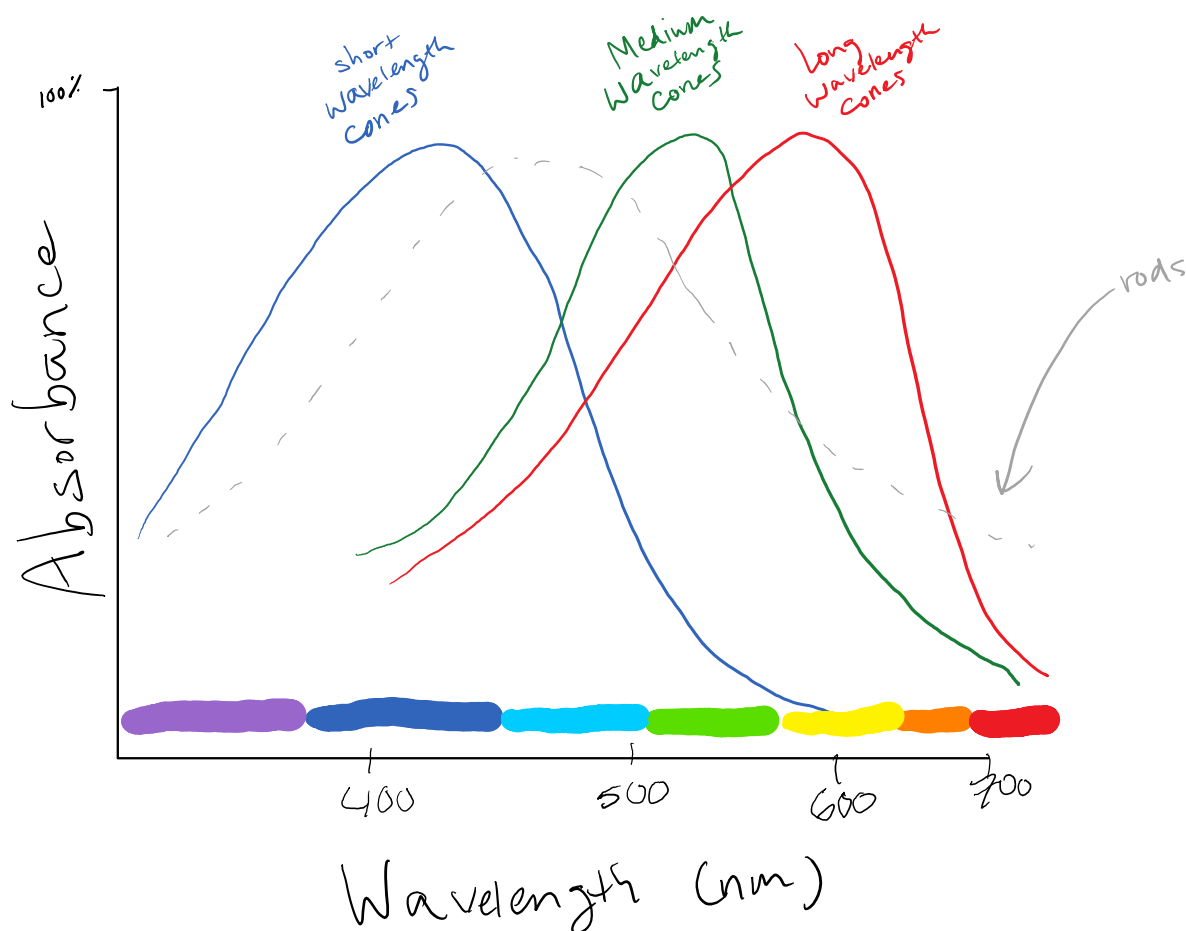
How do animals adapt their eyesight in the midnight zone?

Friday, September 1, 2017 10:30

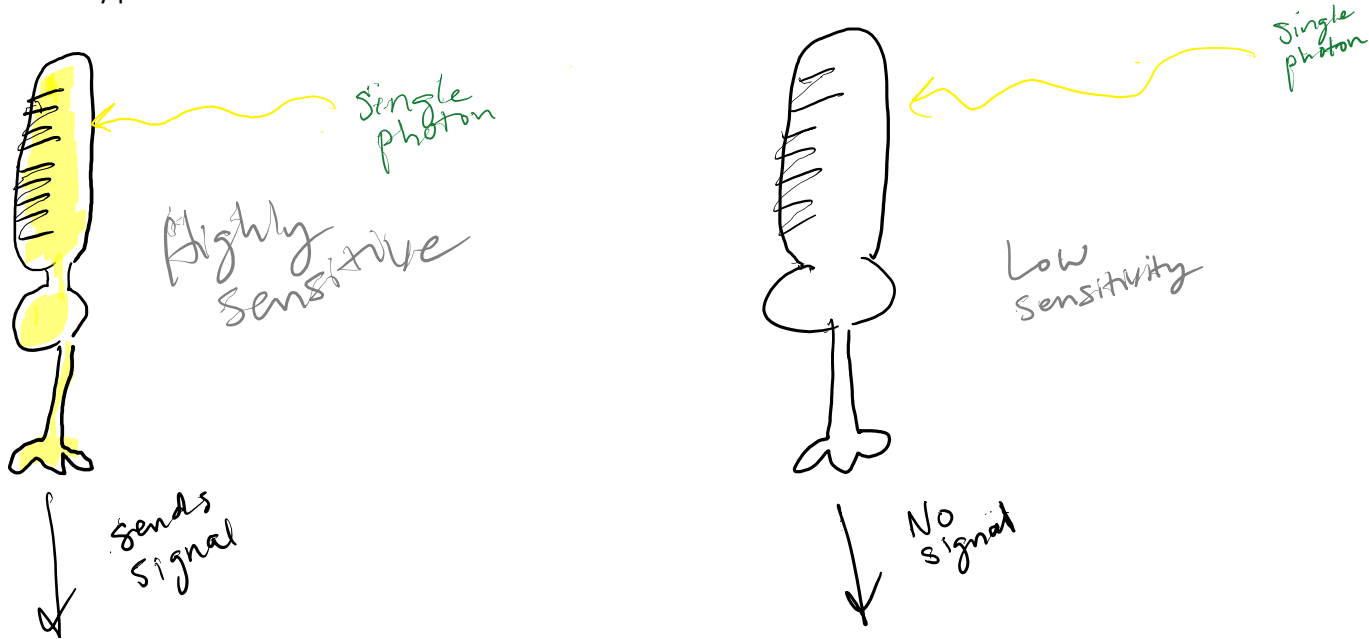
As you may know, light is sensed by a thin layer of cells in the back of the eye called the **retina**. In the retina, there are specialized cells which perform different tasks:



Rods and cones, two types of **photoreceptor cells**, are primarily responsible for sensing light and passing this information on. Each photoreceptor contains **photopigments** that are sensitive to a particular wavelength of light: "short wavelength" cones detect waves of light on the blue end of the spectrum, for example, which enables us to distinguish blue from red or green:

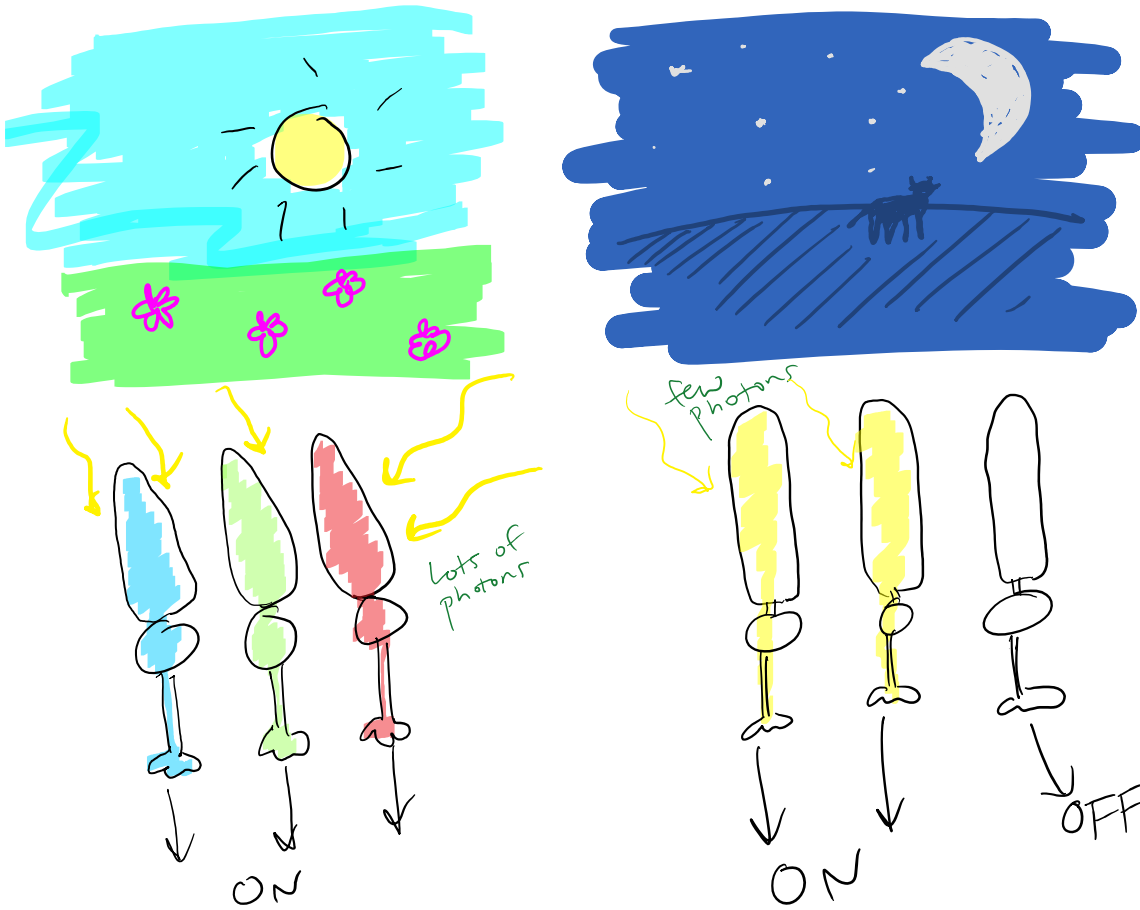


In addition to color sensitivity, rods and cones have different **intensity** sensitivities. Intensity refers to the amount of light - literally, how many photons reach the photoreceptor. Sensitivity is determined by how easily the photoreceptor responds to various numbers of photons - photoreceptors with HIGH sensitivity will activate in response to a single photon, while photoreceptors with LOW sensitivity won't be activated until they are bombarded by photons:



You only need to detect colors during the day - colors are really just reflected light, so without light, there isn't any color to see! For this reason, cones have very LOW sensitivity. They only turn on when there is lots of light present, such as in bright daylight.

Meanwhile, even though there aren't many colors to see at night, our eyes have evolved to detect shades and textures, which are produced by varying amounts of low light. Our rods have very HIGH sensitivity, and so can distinguish even tiny differences in light.



Because our rods are so sensitive, they are all activated, or **bleached**, during the day. This is why we need two different kinds of photoreceptors with different sensitivities - one set of color-sensing cones for the day, and another set of intensity-sensing rods for the night!