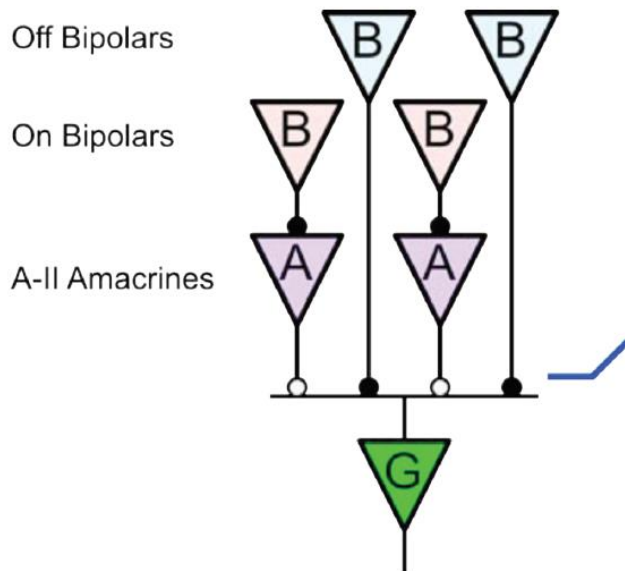


## Assignment 2

- Please show your work. I am more interested in how you are thinking rather than the final answer. Don't just write the answer. Explain, Explain, Explain.
- Submit before class on May 12th.

1. The following refers to a Ganglion cell (G) that we discussed in class. The connections marked with filled circles are excitatory synapses and connections marked with open circles are inhibitory. Answer the following question:

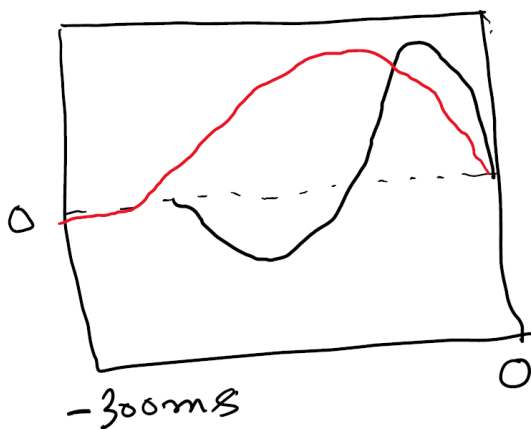


A. Please describe the response of each of the cell-type when the photoreceptor is stimulated by a brief pulse of light that is large enough to affect all the bipolar cells. Your response should include a sketch as if you are performing whole-cell patch clamp recording from these neurons, and a short description why you expect a particular response.

B. Same as A except that the light is turned off. Essentially, a steady light is turned off and then on to the same level.

- C. What is the optimal stimulus for this ganglion cell?
- D. In class, we discussed two kinds of ganglion cells: “pixel detectors” and “feature detectors”. Which class of ganglion cell does this neuron belong to? Explain, please.

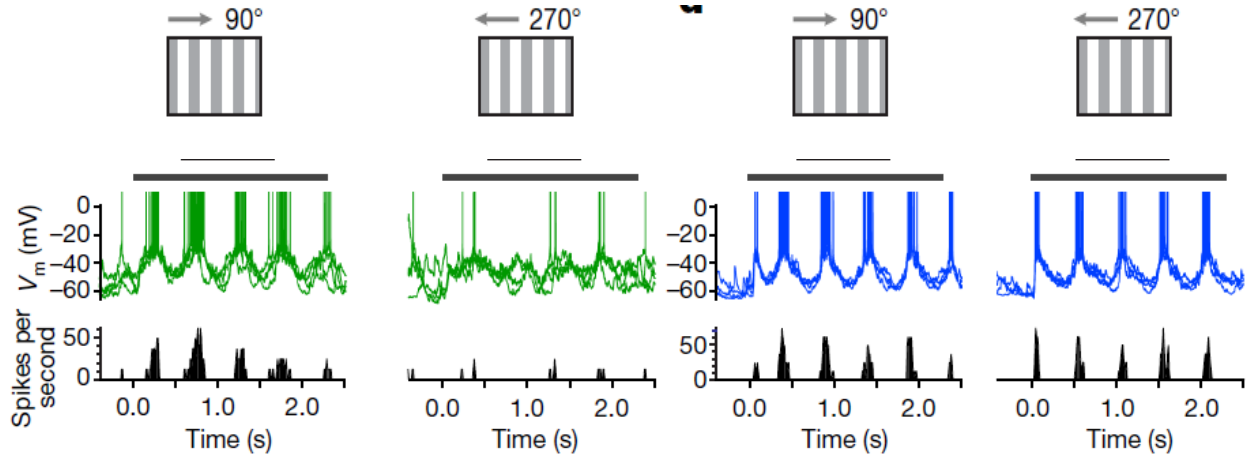
2. The figure below shows two linear filters belonging to two different retinal neurons. Answer the following: A. What kind of neurons would have such a linear filter? Explain
- B. If everything else remains the same, draw the responses of these neurons to a 100 ms (millisecond) pulse of light?



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3. Responses to two neurons to two drifting grating stimuli is shown above. These neurons are from the same brain region. Answer the following questions:

- What kind of recording is being performed here? Explain your response.
- What is the key difference between these neurons. Explain your response.
- What kind of cells (i.e. which brain region and cell-type) are being recording from here? Explain your response.



4. This is a correlation or Reichardt motion detector. In class notes, you will find a detailed account of how each stage of the one-half of the motion detector will respond to a moving bar. Based on the notes, answer the following:

- Draw the response at each stage of the “complete” motion detector to a moving bar.
- How would the response change if you replace the moving bar with a moving grating.

