Neuroscience BIO-311 Ramdya
Exercise questions for **Audition**

1) Explain what a "tone" with a pure sound frequency is. In which range can the human ear perceive sound frequencies, and sound intensities?

2) Explain the primary sensory transduction process in hearing. In which cells does this take place?

3) Which neurons transmit the auditory signal from the cochlea to the brain? Explain the anatomy of these neurons, which cells they contact, and which neuronal processes of these neurons (dendrites/axons), are involved where.

4) How is sound frequency decoded by the cochlea? Describe how different sound frequencies are coded by i) an array of inner hair cells ii) by an array of spiral ganglion neurons (which make "auditory nerve fibers"), iii) by an array of neurons in the cochlear nucleus.

5) What is the function of the outer hair cells? What can you say about the innervation of the outer hair cells (afferent or efferent)?

6) Explain what is meant by the term "phase locking”. Is phase locking a frequency-dependent phenomenon?

7) Name three auditory nuclei that are positioned in between the cochlear nucleus and the primary auditory cortex (A1), and their "ascending" order.

8) Explain how the localization of a sound is calculated by auditory brain nuclei. i) which two main "cues" are used for this computation? ii) Name the auditory nuclei concerned with each cue. Roughly describe the mechanisms used by each circuit to compute sound localization.

9) Speculate how otosclerosis, a condition affecting the ossicles, particularly the stapes, may lead to conductive hearing loss. Discuss the changes in the auditory pathway and the implications for sound transmission