**Hearing, Balance, Smell and Taste**

**Study Guide**

1. The Ear: Hearing and Balance
   1. Anatomy
      1. See handout
      2. Outer, middle, and inner ear. Auditory canal, eardrum, ossicles, Eustachian tube, vestibule, semicircular canals, cochlea, and vestibulocochlear nerve.
   2. Function
      1. See handout
      2. Cochlea = hearing (pitch/frequency and volume)
      3. Vestibule = “What direction is gravity?”
      4. Semicircular canals = “What direction is my head moving?”
      5. Note: hair cells in the inner ear are *mechanoreceptors*; i.e. they send a signal when they are bent.
2. The Nose: Smell (Olfaction)
   1. Anatomy
      1. See handout
      2. Nostril, nasal cavity, olfactory hairs, olfactory cells, olfactory bulb, and olfactory nerve.
   2. Function
      1. Thousands of different olfactory receptors that can bind different odor chemicals. So we can experience thousands of different smells.
      2. Note: olfactory hair cells are *chemoreceptors*; i.e. they respond to different chemicals in the air.
      3. Smell is a huge component of a food’s flavor.
      4. The olfactory nerve makes significant connections with parts of the brain in the temporal lobe that are responsible for emotions and memory.
      5. Olfactory adaptation = we “get used to” an odor rather quickly and after a short period of time our brain will ignore it.
3. The Tongue: Taste (Gustation)
   1. Anatomy
      1. See handout
      2. Tongue, taste hairs, taste cells, taste buds
   2. Function – We have 5 different tastes
      1. Sweet = sugars = carbohydrate intake
      2. Sour = acidic substances = vitamin C intake
      3. Salty = minerals = salt and mineral intake
      4. Umami (meats/savory) = amino acids = protein intake
      5. Bitter = a taste we don’t like = avoid natural poisons and spoiled foods
      6. Note: taste cells are also *chemoreceptors*; i.e. they respond to different chemicals that we put in our mouth.