Taste and Smell Laboratory Experiments

Activity 1: Use a mirror to examine your tongue. Describe the location and structure of the three types of papillae.

<table>
<thead>
<tr>
<th>Papillae</th>
<th>Location</th>
<th>Observation of structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>circumvallate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>filiform</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fungiform</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activity 2: Stimulating your taste buds.
1. Dry the superior surface of your tongue with a paper towel.
2. Place a few sugar crystals on your dried tongue. Do not close your mouth.
3. Time how long it takes to taste the sugar. ____________ sec.
4. Why couldn’t you taste the sugar immediately?

Activity 3: Plotting taste bud distribution.
1. Prepare to make a taste sensation map of your lab partner’s tongue by obtaining the following: cotton-tipped swabs, salt solution, bitter solution, sweet solution and sour solution.
2. Before each test, the subject should rinse his or her mouth thoroughly with water and lightly dry his or her mouth with paper towel.
3. Generously moisten a swab with the sweet solution and touch it to the center, back, tip, and sides of the dorsal surface of the subject’s tongue.
4. Map, with O’s on the tongue outline below, the location of the sweet receptors.
5. Using a fresh swab in each case, repeat the procedure with the other solutions. Use a "B" to map location the bitter receptors, a "+" to map the salt receptors and a "-" to map the sour receptors.
6. What area of the tongue seems to lack receptors? ________________________________
Activity 4: Examining the combined effects of smell and texture on taste.

1. Ask the subject to sit with eyes closed and to pinch his or her nostrils shut.
2. Obtain samples of food items. At no time should the subject be allowed to see the foods being tested.
3. Place the food in the subject’s mouth and ask him or her to identify the food by using the following sequence of activities.
   a) First, move the food around in the mouth with the tongue.
   b) Second, chew the food.
   c) Third, if a positive identification is not made with the first two steps, ask the subject to release his or her pinched nostrils and to continue chewing with nostrils open to see if a positive identification can be made.
4. Record the results on the chart by checking the appropriate column.
5. Was sense of smell equally important in all cases?

6. Where did it seem to be important and why?

<table>
<thead>
<tr>
<th>Food</th>
<th>Texture only</th>
<th>Chewing with nostrils pinched</th>
<th>Chewing with nostrils open</th>
<th>Identification not made</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activity 5: Effect of temperature on taste

In addition to the effect that olfaction and food texture play in determining our taste sensations, the temperature of foods also helps determine if the food is appreciated or even tasted. To illustrate this, have your partner hold some chipped ice on the tongue for approximately a minute and then close his or her eyes. Immediately place any of the foods previously identified in his or her mouth and ask for identification. Explain your results?

Questions: Answer questions on a separate sheet on paper in complete sentences.

1. Describe why the sense of smell is so important to the sense of taste.
2. Describe how other senses (sight, feel, etc…) influence taste perception.
3. Draw & label the structures that make up a taste bud.
4. Describe the gustatory pathway from the taste pore to the cerebral cortex.
5. Describe the olfactory pathway from the olfactory epithelium to the cerebral cortex.