Find Out if You're a Supertaster!

Young Scientist Program
Anatomy & Physiology Teaching Team
Adapted from sciencebuddies.org
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Abstract

Are you really picky about food? Or do you know someone who is? It might be because he or she is a *supertaster!* To supertasters, the flavors of foods are much stronger than to average tasters. Are you a supertaster? Find out with this tongue-based science fair project!

Objective

Determine what percentage of the population are supertasters, average tasters, and non-tasters.

Terms and Concepts

- Taste bud
- Receptor
- Supertaster
- Non-taster
- Average taster
- Papillae

Introduction

Do you hate the taste of broccoli? Or think that grapefruit is extremely bitter? If so, you may be able to blame it on your taste buds! **Taste buds** are sensory organs on your tongue that help you sense different flavors. Each taste bud is made up of about 150 cells, called **receptors.** Each receptor is best at sensing a single flavor: sweet, salty, bitter, or sour. The sum total of these sensations is the "taste" of the food.
The number of taste buds varies from person to person. People who have more taste buds are called **supertasters.** To supertasters, foods have much stronger flavors, which often leads to supertasters having very strong likes and dislikes for different foods. Supertasters often report that foods like broccoli, cabbage, spinach, grapefruit, and coffee taste very bitter.

The opposite of supertasters are **non-tasters.** Non-tasters have very few taste buds and to them, most food seems bland and unexciting. The people in the middle are **average tasters.** Which kind of taster do you think you are? You can find out in this science fair project by putting some blue food coloring on the tip of your tongue and counting the number of papillae there. **Papillae** are structures that house the taste buds. By testing a group of people (30 or more), you can determine what percentage of the population are non-tasters, supertasters, and average tasters. Which type of taster do you think is most common? Ready to find out? Then stick out your tongue and start counting!

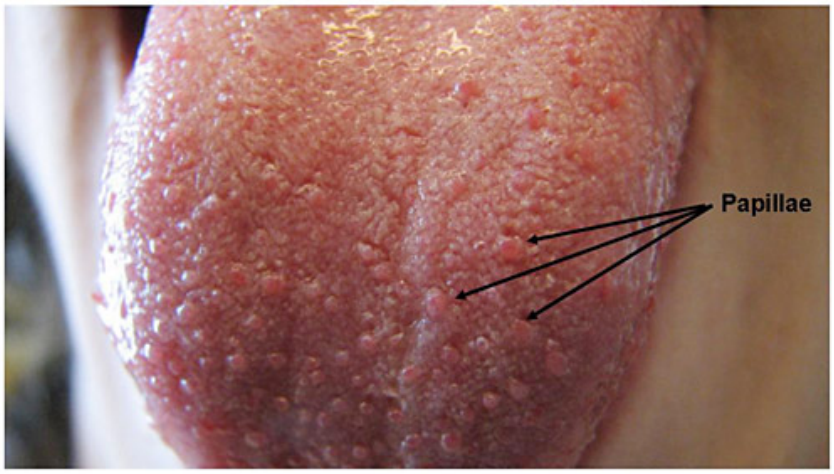

Figure 1. In this close-up of a tongue you can see the papillae (bumps) that house the taste buds (Bladebot, 2006).

Materials and Equipment

- Disposable gloves
- Blue food coloring
- Small disposable cups, one for each volunteer
- Water
- Paper-hole reinforcer, one for each volunteer; available at office supply stores
- Flashlight
- Magnifying glass; available at most drugstores
- Lab notebook
- Compass and protractor, *or* polar graph paper, *or* a computer with Internet access

Experimental Procedure

1. Put on a pair of disposable gloves. Use a new pair for each volunteer. Have the first volunteer open his or her mouth. Place a drop of blue food coloring on the tip of his or her tongue. Do not let the food coloring tip touch the volunteer's tongue.
2. Have the volunteer take a mouthful of water, swish it around in his or her mouth, and then spit it out. Use a new cup and fresh water for each volunteer.
3. Ask the volunteer to make his or her tongue as dry as possible by swallowing a couple of times, and then ask the volunteer to stick out his or her tongue.
4. Place a paper-hole reinforcer on the tip of the volunteer's tongue, as shown in Figure 2.
5. The blue dye will stain all of the tongue, except the papillae. The papillae will look like lighter blue or pink bumps in a sea of dark blue.
6. Using a flashlight and a magnifying glass, count the number of papillae within the paper-hole reinforcer. Your volunteer is finished and can remove the paper-hole reinforcer from his or her tongue.
7. Record the data in your lab notebook in a data table like the one below.
8. Repeat steps 1-7 for at least 30 people, including yourself.
9. Classify each person as a non-taster, an average taster, or a supertaster, based on how many papillae you counted for them. Record the classification in your data table.
10. Fewer than 15 papillae is a non-taster.

11. Between 15 and 30 papillae is an average taster.
12. More than 30 papillae is a supertaster.
13. Calculate the percentage of people who belong in each category of taster.
14. For example, if you tested 30 people and 15 of them were average tasters, then you would divide the number of average tasters (15) by the total number of people tested (30) and multiply by 100 to get the percentage (50 percent).
15. If you need help calculating percentages, ask an adult for assistance.
16. Make a pie chart showing your results.
17. You can use a compass and a protractor to draw the pie chart circle and divide it into the appropriate-sized pieces.
18. Or you can use polar graph paper to make your pie chart. Polar graph paper is already divided into wedges, so you can just count out how many wedges you need for each category. You can buy polar graph paper at an office supply store or print it out for free from Incompetech.com.
19. If you prefer to make your pie chart on the computer you can use the Create a Graph website to make your chart and then print it out.
20. Which type of taster is most common? Which is least common? What type of taster are you?

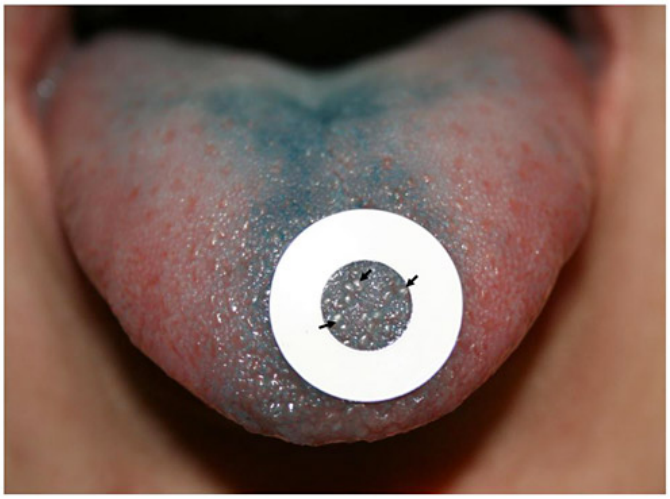

Figure 2. In this photo of a dyed tongue, the lighter-colored bumps are papillae. Black arrows point to three of the papillae. By counting the number of papillae inside the paper-hole reinforce, you can determine if a person is a non-taster, average taster, or supertaster.

Questions

- What are the different flavors that the receptor cells in the taste buds can sense?
- What are foods that taste especially strong or unpleasant for supertasters?

Credits

Sandra Slutz, PhD, Science Buddies
This science project idea was adapted from the following resource: Murray, J. (2004). *Taste intensity & fungiform papillae.* Retrieved July 16, 2008, from http://faculty.uca.edu/~jmurray/baw2004/taste.pdf
Science Buddies. "Do You Love the Taste of Food? Find Out if You're a Supertaster". http://www.sciencebuddies.org/science-fair-projects/project_ideas/HumBio_p017.shtml#summary

Bibliography

These websites have more information about taste, taste buds, and tongues:

Chudler, E. (2008). *That's Tasty.* Retrieved July 16, 2008, from http://faculty.washington.edu/chudler/tasty.html

Gavin, M. (2007). *What Are Taste Buds?* Retrieved July 16, 2008, from http://kidshealth.org/kid/talk/qa/taste_buds.html

Murray, J. (2004). *Taste intensity & fungiform papillae.* Retrieved July 16, 2008, from http://faculty.uca.edu/~jmurray/baw2004/taste.pdf

BBC Science & Nature. (n.d.). *Science of supertasters.* Retrieved July 16, 2008, from http://www.bbc.co.uk/science/humanbody/body/articles/senses/supertaster.shtml