

A Question of Taste

Within The X-bacteria kit you may also have noticed some PTC taste test strips. These can be used to carry out another short exercise with your students, as detailed below.

Background information

People differ in their ability to taste phenylthiocarbamide (PTC). To people who can taste it, PTC is very bitter, however, to some people it is completely tasteless. The ability to taste PTC depends largely on differences in a gene called *TAS2R38*. This gene encodes a taste receptor protein which is found in the taste buds on the tongue. The ability to taste PTC can be influenced by other factors including: the density of taste buds, smoking, age, other genes that are involved in taste, and a person's perception of what they can taste.

This short practical involves tasting paper strips that have been soaked in PTC, to identify the participants' ability to taste this bitter chemical. It forms part of a larger practical workshop which uses molecular biology techniques to investigate differences in the *TAS2R38* gene of the student participants. For more information please see: www.survivalrivals.org

PTC strips – Instructions for use

This document provides instructions for tasting the control (normal paper) and PTC paper strips provided in your Survival Rivals kit.

Advance preparation

It is advisable to make one set of the strips distinguishable from the other. One easy way to do this is to cut the corners off of one set of strips using a **clean** pair of scissors. As the strips can be tricky to separate, it's a good idea to distribute one of each paper strip on a paper towel to the student's benches before the activity.

How to do the taste test

a) Preparing the students

It is beneficial if students are not made aware of the taste they are expecting, as perception of taste may be affected by prior expectations. If possible, ask the students to keep their reactions to themselves until all of the participants have recorded their results. This may be difficult as PTC tastes extremely unpleasant to tasters.

b) Tasting the strips

1. Ensure students have washed their hands.
2. Provide each student with one control strip and one PTC strip.

3. Ask students to taste the first paper strip (the control) which has the corner removed from the bottom. To do this, ask students to put the paper on the middle of the tongue and close their mouths. Students should note down any taste and its intensity from a scale of 0 - 2, (0 = no taste, 1 = weak taste, 2 = strong taste).

4. Repeat step 3 with the PTC strips.

c) Recording the results

It may be interesting to gather the class data to identify how many people are:

- Non-tasters – those who recorded 0 after tasting the PTC strip
- Weak tasters – those who recorded 1 after tasting the PTC strip
- Tasters – those who recorded 2 after tasting the PTC strip

These data can be entered onto the Survival Rivals website www.survivalrivals.org. We hope to build a national picture of bitter tasting ability to quantify the percentage of tasters and identify any regional differences that may exist.

Expected results

The ability to taste PTC is genetically dominant over the inability to taste. Therefore, the expected results should be approximately 25% tasters, 50% weak tasters, 25% non-tasters. However, as PTC tastes very unpleasant, the results might be skewed to show that students have reported themselves as 75% tasters and 25% non-tasters.

Health and Safety Information

CLEAPSS has advised that students should not taste more than two PTC strips within this activity. Teachers should ensure that students wash their hands before putting paper strips into their mouths. Paper strips should be disposed of immediately into a normal bin to avoid the spread of germs.

Ethical Information

It is strongly recommended that children and their parents do not participate together in this activity.

The ability to taste PTC is mainly due to differences at various locations within the *TAS2R38* gene. Therefore, it is a trait which is inherited from parents. Because of this, there are some combinations of results which could cause anxiety to parents and children who participate together in this activity. There are several explanations for unexpected results. These include the number of differences within the *TAS2R38* gene that can affect ability to taste

PTC, differences in other genes involved in taste, age, smoking, and the density of a person's taste buds. These complex factors that contribute to the ability to taste PTC suggest that the taste test cannot definitively reveal any sensitive information between family members. However, it is strongly advised that this situation is avoided by preventing parents and children participating in this activity together and by ensuring that students do not have access to PTC strips that they could take home.

This taste test protocol has been considered by a leading UK geneticist who has stated that differences in the ability to taste PTC are highly unlikely to be associated with any other health conditions for the participants.

