

Evolution

Investigation Data Sheet



Dominant & Recessive Genes In Tongue Curling

The DNA in your body determines your physical traits, such as how tall you will grow, what your hair color will be, and even something as silly as whether you can curl your tongue or not. The DNA in your body is a combination of your ancestors' DNA. For any given trait, you receive a combination of two genes to control it — one from your mother, the other from your father. In addition, for any given trait, there are dominant and recessive genes. Dominant genes overpower recessive genes whenever they combine. If two dominant genes combine, the dominant trait will occur. If a dominant and recessive gene combine, a dominant trait will still occur. It takes two recessive genes to show a recessive trait.

Objective

Build a Punnett square to determine how a certain trait, like tongue curling, is passed down to you from your parents.

Materials

- a red pen
- a blue pen
- the cooperation of your parents

Safety Notice: All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

Procedure

1. A Punnett square is a chart that is used to calculate the probability of certain traits passing from parents to offspring. Let's say each parent has one dominant and one recessive gene for tongue curling (Tt). Two dominant genes (one from mom, one from dad) will result in a child who can also curl his or her tongue. A combination of a dominant and recessive gene will still result in a child who can curl his or her tongue. It's only when the child gets a recessive gene from both parents that the child will also have the recessive trait. So, there is only a one-in-four chance that these parents will produce a child unable to curl his or her tongue. This information is modeled in the Punnett square below.

		Mother	
		T	t
Father	T	TT	Tt
	t	Tt	tt

What is the chance that these parents will produce a child capable of curling his or her tongue?

2. Ask your parents to curl their tongues. You will record your results in the Punnett square below. If a parent is able to curl his or her tongue, let's assume, for the purpose of this investigation, that he or she has one dominant and one recessive gene. This would be represented as (Tt)—the dominant gene represented by a capital T and the recessive gene represented by a lower case t. If a parent cannot curl his or her tongue, it means that he or she has two recessive genes (tt). Label the Punnett square in red with your mother's genetic information and in blue with your father's genetic information. Then, fill in the boxes of the Punnett square accordingly, putting one letter from each parent in each of the four boxes. These are the different possible combinations of traits that you and any siblings could inherit.

		Mother	
Father			

What are the chances that you would be able to curl your tongue?

What are the chances that you would not be able to curl your tongue?

Conclusions

- Use information gathered during this investigation to explain how parents can produce children with many different genetic combinations.

Extension

Use a Punnett square to determine how other traits are passed down from your parents to you (i.e., hair color, eye color).