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Strawberry DNA Extraction

The activity is designed mainly to introduce students to DNA. A discussion of how this DNA extraction procedure works might also touch on the plant cell wall, the cell membrane, proteins, and DNA's lack of solubility in ethanol.

- **TEKS HS**
  B.c.7.A: Identify components of DNA, explain how the nucleotide sequence specifies some traits of an organism, and examine scientific explanations for the origin of DNA.
- **TEKS MS**
  8.b.13.A: Identify the function of the cell membrane, cell wall, nucleus, ribosomes, cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells.

  8.b.13.B: Describe the function of genes within chromosomes in determining inherited traits of offspring.

Materials Required

Strawberry DNA Extraction Kit (211338)

Strawberries

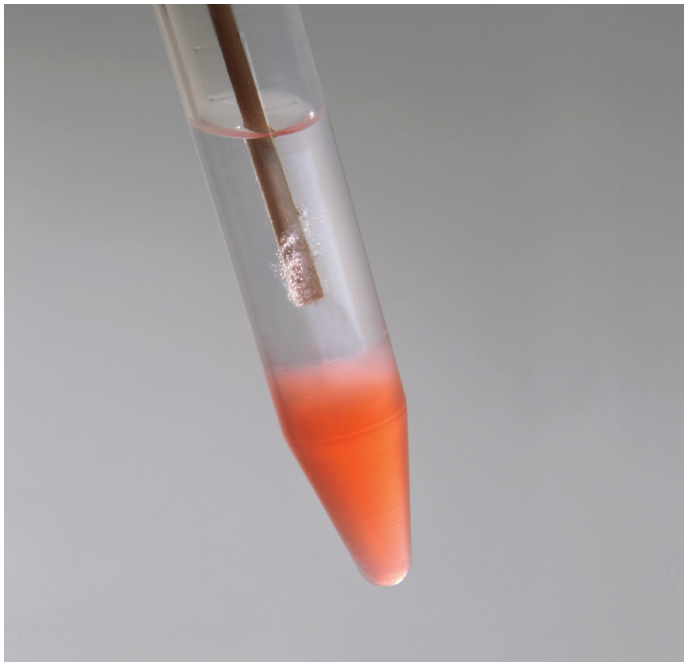
Ice

Activity Procedure

1. First, place the bottle of ethanol in a cup of ice to chill it.
2. Place half of a strawberry into a plastic bag, remove air from the bag, and seal it.
3. Smash the strawberry in the bag with your hands until it is pulverized.
4. Add 10 mL of DNA extraction buffer to the plastic bag.
5. Continue to smash the strawberry for 1 more minute.
6. Set up a filtration apparatus by placing the funnel into the cup and lining the funnel with 1 or 2 layers of cheesecloth.
7. Pour the strawberry/extraction buffer mixture into the funnel, and allow it to filter into the cup.
8. Discard the cheesecloth into the plastic bag, and pour 2 mL of the strawberry filtrate into a centrifuge tube.
9. Carefully layer 8 mL of ice-cold ethanol on top of the 2 mL of strawberry filtrate already in the tube.

Safety

Follow and model basic laboratory safety rules. Make sure that students do not drink the ethanol. (It has been denatured and, therefore, is doubly dangerous.)



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10. Carefully wind the wood applicator stick to spool the DNA as it precipitates out of the solution at the interface of the ethanol and filtrate.

Results/Summary

The DNA will precipitate out of the solution at the interface between the ethanol and lysate because DNA, in the presence of the salt that is in the lysis buffer, is not soluble in ethanol, especially cold ethanol. Physically smashing the strawberry destroys the more organized structures of the strawberry, allowing the detergent in the lysis buffer to gain access to the cell membrane. Since the cell membrane is composed mostly of lipids, the detergent very effectively disrupts the membrane, allowing the DNA to spill out of the cells.

Emphasize to students that even though DNA is a large molecule, the double helix cannot be viewed with a normal microscope, much less with the unaided eye. What they are observing is a conglomeration of many molecules of DNA.

Additional Information

View more information, content links, and products related to this activity at www.carolina.com/takeaways.

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