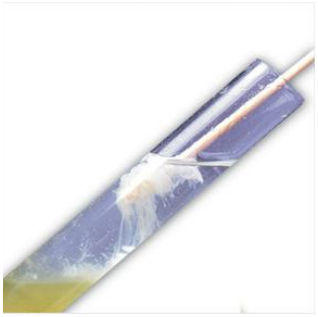
Classroom Chemistry – Extracting DNA



You hear about DNA but did you know you could extract DNA.

Materials:

- 100 ml Green split peas
- 250 ml Water
- Small jars/glasses
- Strainer
- Blender
- Strainer
- Rubbing Alcohol
- Bamboo skewer
- Measuring cup
- 1 ml Salt
- 30 ml Liquid dish detergent
- Meat tenderizer
- Measuring spoons

Procedure: (Remember to have your parent's permission and have them watch and help you.)

- Blend peas, salt and water on high for 15 seconds.
- Pour the solution through the strainer into the measuring cup.
- Add the liquid dish detergent and swirl the mixture.
- Let it stand for 5 to 10 minutes.
- Pour the mixture into the jars about 1/3 full.
- Add a pinch of meat tenderizer and stir gently.
- Tilt your jar/glass and slowly add rubbing alcohol down the inside so that it floats on top of the pea mixture. Stop when you have the same amount of alcohol and mixture.
- Observe where the alcohol and pea mixture layers meet.
- Use the skewer to remove the whitish material (DNA).

What's Happening:

Blending separates the pea cells from each other but each cell is surrounded by a sack (cell membrane). DNA is found inside the second sack (nucleus) inside each cell. We have to break open these two sacks. Cell's membranes have two layers of lipid (fat) molecules and proteins. When detergent comes in contact with the cell, it captures the lipids and proteins breaking open the cell membrane.

The meat tenderizer is an enzyme. DNA is folded and protected by proteins and the enzyme cuts the proteins away from the DNA. DNA is a long, stringy molecule and the salt helps it stick together. DNA normally stays dissolved in water, but when salty DNA comes in contact with alcohol it becomes "undissolved" (precipitates). The DNA clumping together pulls more DNA strands out of the mixture as it rises into the alcohol.

Extension:

Turn this activity into an experiment by trying other sources of DNA like spinach, strawberries, and broccoli. If you try things like chicken livers you have to make sure everything is cleaned up properly. You don't want to get salmonella poisoning. A video on extracting your own DNA is available at: http://www.youtube.com/watch?feature=player_embedded&v=DaaRrR-ZHP4. Try different detergents, soaps, shampoos and body scrubs. Leave out a step or mix the steps or change the amount you use in a step. Do only living things have DNA? This is how science discoveries are made.

This activity is based on our Classroom Chemistry and Evidence & Investigation kits. The source for this lab was: http://learn.genetics.utah.edu/content/labs/extraction/howto/. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom guest speaker or allow your business as a field trip location.

Lorne Cooper, Regional Executive Director

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