

Name:

DNA Extraction from Wheat Germ

Introduction:

DNA is the genetic code found in all cells that tells your body what to do and what it is. Each DNA strand is very long and there is a strand in every cell. In this lab we will use wheat germ to extract and observe the DNA strands. Wheat germ is the embryo of wheat seeds. It is in the wheat germ that the nucleus of a wheat cell can be found. The DNA is found in the nucleus of the wheat germ. In this lab, we will use heat and detergent to extract the DNA from the wheat germ.

The cell membrane and nuclear envelope that surround the DNA are made of thin layers of fat. We use heat in our experiment to soften the membranes of the cell. As you know, fats get softer when they are warm. Also, the heat will destroy chemicals called enzymes that will destroy DNA. If we don't use the right amount of heat in this experiment, then these enzymes will cut up the DNA.

We will also use detergent to help extract the DNA. Detergents, such as dish soap, are used by us to clean fat and proteins off dishes and clothes. This same detergent can be used to break apart the fats in the cell membrane and nuclear envelope. When both membranes are broken up, the DNA can float out of the cell and sit in the solution.

After the cell has broken up, you will still not be able to see the DNA. You can add alcohol to the mixture to see the DNA. DNA strands will naturally be attracted to the alcohol and will collect on the border between the alcohol and the water/soap mixture.

Pre-Lab Questions:

You must answer these and show the teacher before you continue.

1. Where is DNA found in cells?
2. What are the two reasons you will need to use heat in the experiment?
3. How will using dish soap allow you to see DNA from the wheat germ?
4. Why do you use alcohol in this lab?

Question:

What does the DNA in the cell look like?

Hypothesis:

Write your hypothesis here.

Materials:

1 gram of wheat germ
1 ml of liquid dish detergent
14 ml of alcohol
20 ml of 50-60°C water
50 ml test tube
Graduated cylinder
Paper clip hook
Pipette

Procedure:

1. Place 1 gram or 1 teaspoon of raw wheat germ in a 50 ml test tube.
2. Add 20 ml of hot water and mix (shake) for 3 minutes.
3. Add 1 ml of detergent and mix gently every minute for 5 minutes. Try not to create foam
4. After you are done mixing, use a piece of paper towel to remove foam from top of solution. **FOAM = BAD**
5. Tilt the test tube at an angle. **SLOWLY** pour 14 ml of alcohol down the side so that it forms a layer on top of the mixture in the test tube. **DO NOT** mix the two layers together. There should be two layers, an alcohol layer on top, and a soap/water layer below. If the layers mix, you screwed up.
6. Let the test tube sit for a few minutes. White, stringy, filmy DNA will begin to appear where the water and alcohol meet. You will usually see the DNA begin to appear almost immediately after you pour in the alcohol. If you let it sit longer, the DNA will float all the way to the top.
7. Use a bent up paper clip to take out the DNA strands and set them on a paper towel to dry. You now have DNA of your own!

Observations:

Did you get DNA? What did it look like? How long did it take you to do parts of experiment?

Conclusion:

On a separate sheet of paper, write a conclusion. Parts of conclusion: Was hypothesis correct? Overview of how YOU did experiment, 3 reasons for possible errors or ways to improve lab, possible future lab ideas, did you learn anything? Was it interesting?