

DNA Extraction Lab

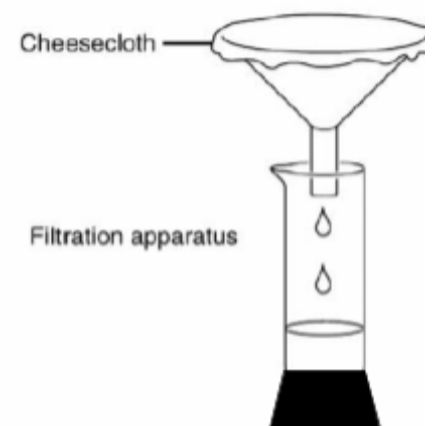
All organisms have genetic information in the form of DNA. Every cell in an organism houses their DNA in the nucleus. When cells need to grow and divide, the DNA coils up into multiple structures called chromosomes. The DNA is protected in the nucleus because it is surrounded by a nuclear membrane. In order to extract DNA from cells, we need to break open both the nuclear membrane and the cell membrane. Once these membranes are broken, we will be able to separate the DNA from the other biological molecules in the cell.

In this lab, the following components will be used to extract DNA from a strawberry.

- **Detergent** - Cell membranes and nuclear membranes consist primarily of lipids. Dishwashing detergent breaks up clumps of lipids. Adding detergent to your strawberry cells will break open both membranes and release DNA.
- **Salt** - The phosphate groups in DNA molecules have negative charges. Salt helps to neutralize this charge, which makes the DNA less soluble in water.
- **Meat Tenderizer** - Each chromosome contains a very long molecule of DNA. This DNA is wrapped tightly around proteins. The enzyme in meat tenderizer is a protease, which is an enzyme that cuts proteins into small pieces. As this enzyme cuts up the proteins, the DNA will separate from the proteins and unwind.
- **Alcohol** - Cold alcohol reduces the solubility of DNA. When cold alcohol is poured on top of the solution, the DNA will precipitate out into the alcohol layer.

Procedure:

1. Remove the leaves from the top of a strawberry.
2. Place the strawberry into a Ziploc bag and grind up the strawberry.
3. Add 10 mL of extraction buffer (salt and soap solution) to the bag.
4. Add a small pinch of meat tenderizer to the bag.
5. Knead/mush the strawberry and the solution together in the bag gently. Do not form bubbles.
6. Assemble your filtration apparatus based on the picture.
7. Pour the strawberry mixture into the filtration apparatus and let it drip into the graduated cylinder. Wait 10 minutes.
8. Slowly pour cold alcohol into the tube.
9. Dip the glass rod into the tube where the strawberry juice and alcohol layers come into contact with each other and swirl. The DNA will stick to the glass stirring rod.



Post Lab Questions:

All Answers must be in RED (-2)

1. What does DNA stand for?
2. DNA is a polymer. What is the monomer for DNA?
3. List the three parts of a nucleotide.
4. What is the shape of a DNA molecule?
5. What type of bond holds the sugars and phosphates together?
 - Are these bonds strong or weak?
6. What type of bond connects the bases to one another?
 - Are these bonds strong or weak?
7. 40% of a DNA molecule is cytosine.
 - What percent of this DNA molecule is guanine?
 - What percent of this DNA molecule is thymine?