BERRY FULL OF DNA

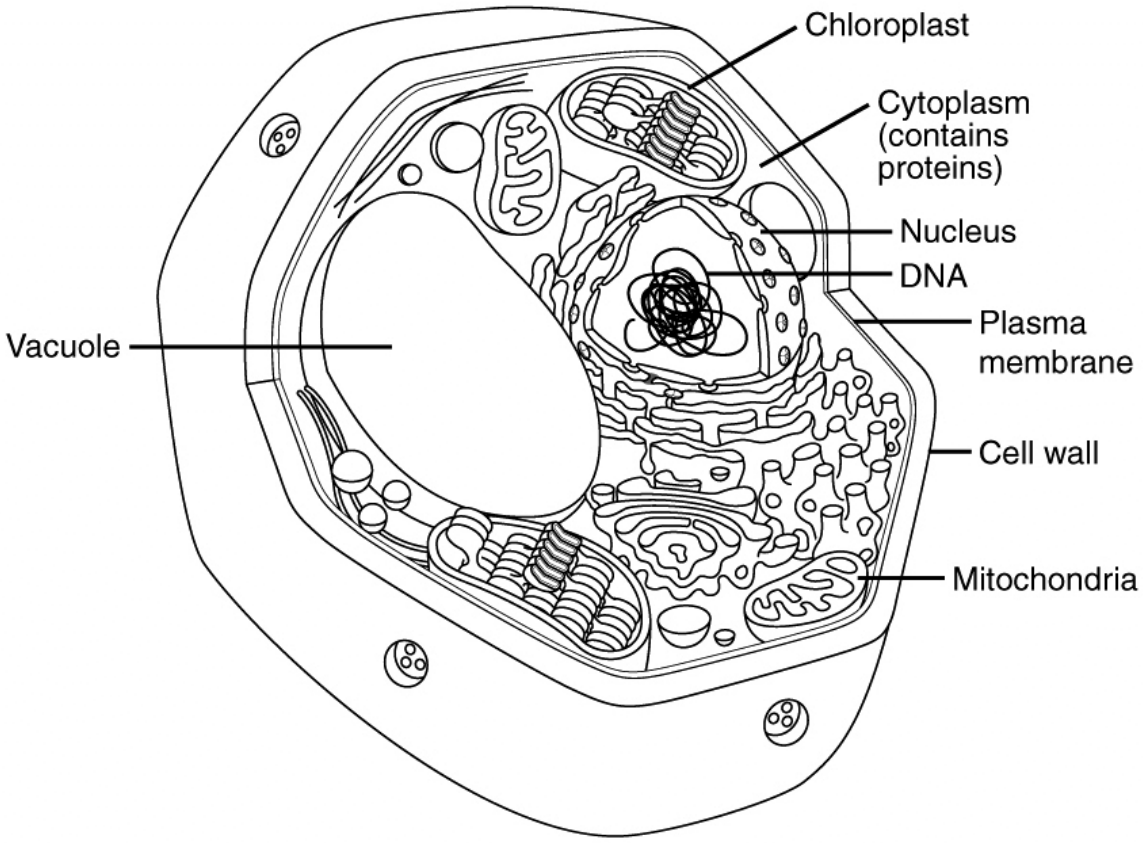
THE QUESTION: What can we tell about the molecular structure of DNA by studying the characteristics of DNA we purify from strawberries?

BACKGROUND : We will break open the cells of strawberries and separate the DNA from the rest of the parts of the cell. Strawberries are a good source of DNA because they have 8 copies of each type of chromosome. You will never be able to eat a strawberry again without thinking of how much DNA is in it! You will be able to take home pure strawberry DNA.

PRELAB

HOW DO WE ISOLATE DNA?

Take a look at the sketch of the plant cell below. The chromosomes (which are made of DNA) are in the nucleus. This is the only place where DNA is located



Match the procedure with what it is doing to help isolate the DNA from the other materials in the cell

_____ Break open the cell — A. SQUISH THE FRUIT TO A SLUSH

_____ Dissolve cell membranes — B. FILTER YOUR STRAWBERRY EXTRACT THROUGH CHEESECLOTH

_____ Precipitate the DNA (clump DNA together) — C. MIX IN A DETERGENT SOLUTION

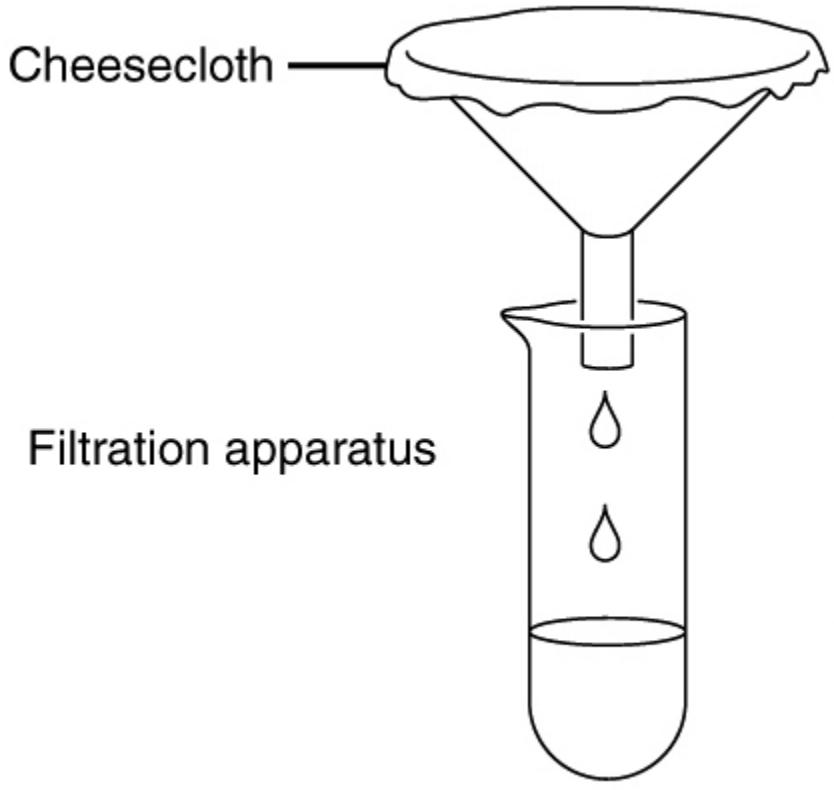
_____ Separate organelles, broken cell wall and membranes from proteins, carbohydrates and DNA — D. LAYER COLD ETHANOL OVER FILTERED EXTRACT

MATERIALS (per student)

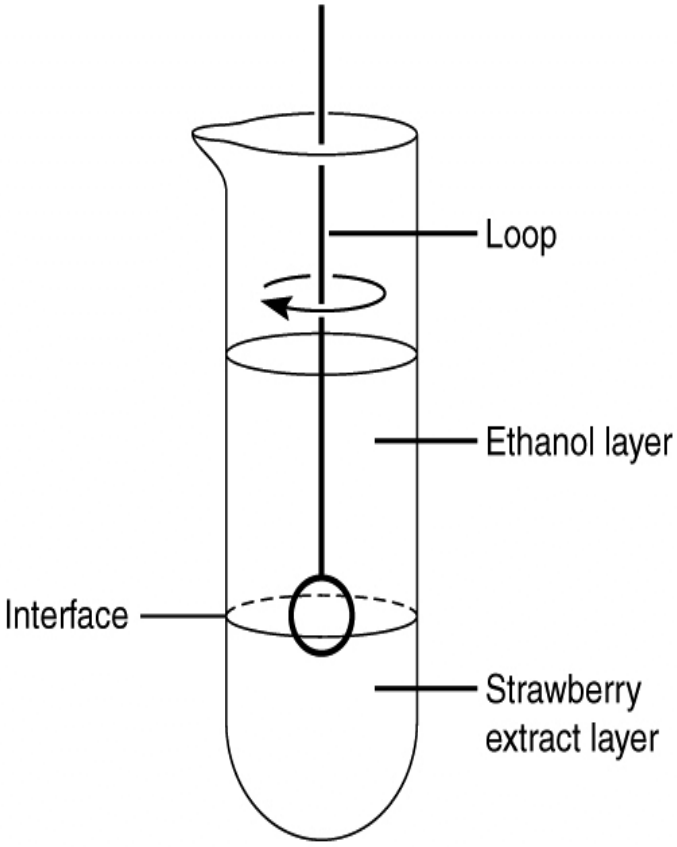
1. zip lock baggie
2. 1 strawberry
3. 10 ml DNA extraction buffer (soapy, salty water)
4. Filtering Apparatus: cheesecloth, funnel and small beaker
5. Ice cold ethanol in a wash bottle
6. Test tubes
7. Glass rod or innoculating loop

PROCEDURES

1. PLACE ONE STRAWBERRY IN A ZIP LOCK BAGGIE
2. SMASH UP THE STRAWBERY WITH YOUR FIST FOR 2 MINUTES
3. ADD THE EXTRACTION BUFFER TO THE BAG
4. MUSH AGAIN FOR 1 MINUTE
5. POUR THE EXTRACT INTO THE FILTERING APPARATUS AND LET IT DRIP DIRECTLY INTO THE TEST TUBE.
6. ONLY FILL THE TEST TUBE SO THAT IT IS 1/8 FULL!



7. SLOWLY POUR COLD ETHANOL (FROM SQUIRT BOTTLE) INTO THE TUBE SO THAT THE TEST TUBE IS HALF FULL WITH LIQUID
8. DIP THE LOOP OR ROD INTO THE TUBE RIGHT WHERE THE ALCOHOL AND EXTRACT LAYERS ARE IN CONTACT WITH EACH OTHER. KEEP THE TUBE AT EYE LEVEL SO YOU CAN SEE WHAT IS HAPPENING



OBSERVATIONS AND ANALYSIS

1. What did the DNA look like? Relate its chemical structure to how it looks when lots of it is clumped together.

2. DNA is soluble in water, but not in ethanol. What does this fact have to do with our method of extraction? Explain what happened when the ethanol came in contact with the strawberry extract.

3. A person cannot see a single cotton thread 100 feet away, but if you wound thousands of threads together into a rope, it would be visible at some distance. How is this statement an analogy to our DNA extraction?

4. In order to study our genes, scientists must first extract the DNA from human tissue. Would you expect the method of DNA extraction to be the same for Human DNA? Why or why not?

5. Would the DNA be the same in any cell in the human body? Hint: Remember that we started out as one fertilized cell.

6. If you wanted to extract DNA from a living person, what cells would you use and why?

7. List two reasons why a scientist might want to study the DNA of strawberries.