

How to Extract DNA from Anything Living



First, you need to find something that contains DNA. Since DNA is the blueprint for life, everything living contains DNA. For this experiment, we like to use green split peas. But there are lots of other DNA sources too, such as:

- Spinach
- Chicken liver
- Strawberries
- Broccoli

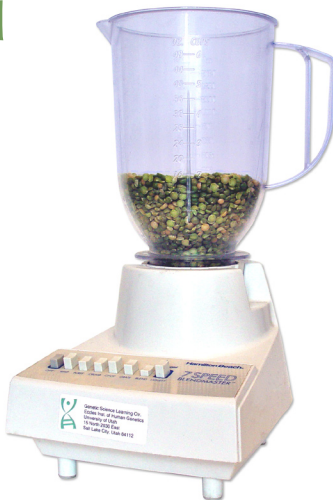
Certain sources of DNA should not be used, such as:

- Your family pet, Fido the dog
- Your little sister's big toe
- Bugs you caught in the yard

Start



Step 1



Blender Insanity!

Put in a blender:

- 1/2 cup of split peas (100ml)
- 1/8 teaspoon table salt (less than 1ml)
- 1 cup cold water (200ml)

Blend on high for 15 seconds. The blender separates the pea cells from each other, so you now have a really thin pea-cell soup.

How to Extract DNA from Anything Living

Soapy Peas

Pour your thin pea-cell soup through a strainer into another container (like a measuring cup).

Add 2 tablespoons liquid detergent (about 30ml) and swirl to mix.

Let the mixture sit for 5-10 minutes.

Pour the mixture into test tubes or other small glass containers, each about 1/3 full.

Step 2



Step 3



Enzyme Power

Add a pinch of enzymes to each test tube and stir gently. Be careful! If you stir too hard, you'll break up the DNA, making it harder to see.

Use meat tenderizer for enzymes. If you can't find tenderizer, try using pineapple juice or contact lens cleaning solution.

How to Extract DNA from Anything Living

Alcohol Separation

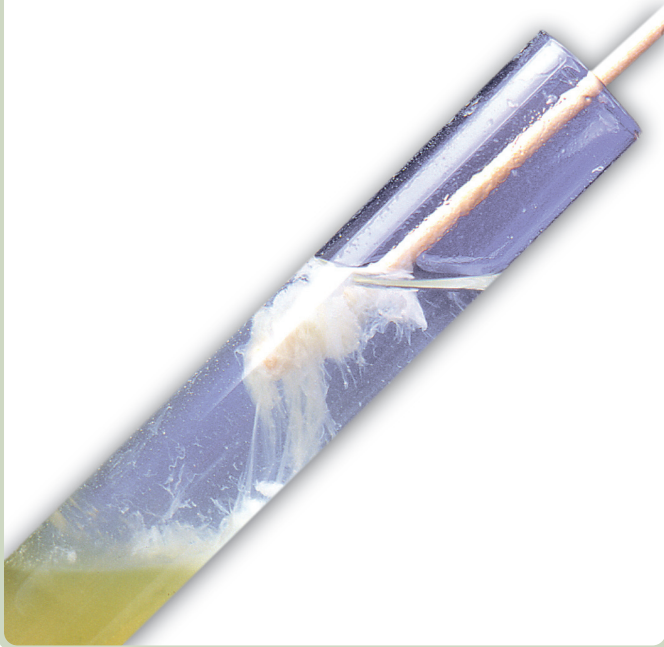
Tilt your test tube and slowly pour rubbing alcohol (70-95% isopropyl or ethyl alcohol) into the tube down the side so that it forms a layer on top of the pea mixture. Pour until you have about the same amount of alcohol in the tube as pea mixture.

Alcohol is less dense than water, so it floats on top. Look for clumps of white stringy stuff where the water and alcohol layers meet.

Step 4



Finish



What is that Stringy Stuff?

DNA is a long, stringy molecule. The salt that you added in step one helps it stick together. So what you see are clumps of tangled DNA molecules!

DNA normally stays dissolved in water, but when salty DNA comes in contact with alcohol it becomes undissolved. This is called precipitation. The physical force of the DNA clumping together as it precipitates pulls more strands along with it as it rises into the alcohol.

You can use a wooden stick or a straw to collect the DNA. If you want to save your DNA, you can transfer it to a small container filled with alcohol.

How to Extract DNA from Anything Living

You Have Just Completed DNA Extraction!

Now that you've successfully extracted DNA from one source, you're ready to experiment further. Try these ideas or some of your own:

Experiment with other DNA sources. Which source gives you the most DNA? How can you compare them?

Experiment with different soaps and detergents. Do powdered soaps work as well as liquid detergents? How about shampoo or body scrub?

Experiment with leaving out or changing steps. We've told you that you need each step, but is this true? Find out for yourself. Try leaving out a step or changing how much of each ingredient you use.

Do only living organisms contain DNA? Try extracting DNA from things that you think might not have DNA.



Want to conduct more DNA extraction experiments? Try out different soaps and detergents. Do powdered soaps work as well as liquid detergents?



Supported by a Science Education Partnership Award (SEPA) [No. 1 R25 RR16291-01] from the National Center for Research Resources, a component of the National Institutes of Health, Department of Health and Human Services. The contents provided here are solely the responsibility of the authors and do not necessarily represent the official views of NCRR or NIH.