LEGEND

- direction
- research topic
- conclusion and discussion
- experiments
- safety
- additional information

Teaduskeskus AHHAA
www.ahhaa.ee

START

Is there DNA in our saliva?

Hey, nature friends!

Have you ever wondered, **why our cells are not empty?**

What **do they consist of** and **how can we make the invisible visible?**

There are approximately **50-100 trillion cells** in a human body

NB! Safety precautions

Do not drink the denatured alcohol!

Pure DNA is an **acidic substance, solid** at room temperature, rather **soft and colourless,** or with a violet hue

HUMUS is a brown or black amorphous, **complex substance that is made up of organic compounds.** It makes up a large part of the soil organic matter in soil and is closely connected to the mineral soil. **Humus makes the soil fertile.**

EXTRACTING DNA FROM THE SALIVA

1. **Spit** in a cup, as much as you can. Try to bite your cheek lightly, to get **as many cells in the cup as possible**.
2. **Add a little water,** up to the 0,2 ml marking. **Stir thouroughly** with a toothpick.
3. Add 2-3 drops of **dish soap** and **stir thouroughly.** This will dissolve the cell membrane.
4. Add **1 teaspoon of saline solution** and **stir some more**.
5. Last, add some **water** (~1 cm layer). **Pour it carefully** down the side of the cup.

DO NOT STIR ANY MORE!

EXTRACTING DNA FROM THE KIWIFRUIT

1. Cut the kiwi into pieces, put them in a ziploc bag and **smash until there are no large chunks remaining.** Pour the squished kiwi into a cup.
2. Follow steps 2-5 of the instructions on how to extract DNA from the saliva.
5. Last, add some **denatured alcohol** (~1 cm layer). **Pour it carefully** down the side of the cup.

DO NOT STIR ANY MORE!

FINISH

Do animate and inanimate nature have something in common?

What are the differences between **animal** and **plant cells?**

What are the similarities?

Is there DNA in a **plant cell**?

What about **sand** or **soil**?

EXTRACTING DNA FROM THE SAND

1. Put **one teaspoon of sand** into a ziploc bag and add a **teaspoon of water.**
2. Stir thouroughly!
3. Follow steps 2-5 of the instructions on how to extract DNA from the saliva.

EXTRACTING DNA FROM THE SOIL

1. Put **one teaspoon of soil** into a ziploc bag and add a **teaspoon of water.**
2. Stir thouroughly!
3. Follow steps 2-5 of the instructions on how to extract DNA from the saliva.

Where do the **cells in the soil** come from?

Would we get different results if we used a **different type of soil?**

Which makes DNA visible - water or denatured alcohol?

What happens if you end the experiment with **water?**

What happens if you end the experiment with **denatured alcohol?**

DNA is short for **D**esoxyribo-**N**ucleic **A**cid

The structure of DNA was identified in 1953 by **James Watson** and **Francis Crick**

DNA EXTRACTION

Have you ever wondered, why our cells are not empty?
what do they consist of and how can we make the invisible visible?

Is there DNA in our saliva? Is there DNA in plants? What about sand or soil?

.....

.....

How can we find answers to those questions?

.....

.....

DNA EXTRACTION

SALIVA

1. Spit in a cup, as much as you can. Try to bite your cheek lightly, to get as many cells in the cup as possible.

KIWIFRUIT

1. Cut the kiwi into pieces, put them in a ziploc bag and smash until there are no large chunks remaining. Pour the squished kiwi into a cup.

SOIL

1. Put one teaspoon of soil into a ziploc bag and add a teaspoon of water.

SAND

1. Put one teaspoon of sand into a ziploc bag and add a teaspoon of water.

2. Add a little water, up to the 0,2 ml marking. Stir thouroughly with a toothpick.

3. Add 2-3 drops of dish soap and stir thouroughly. This will dissolve the cell membrane.

4. Add 1 teaspoon of saline solution and stir some more.

5. Last, add some water (~1 cm layer).

   Pour it carefully down the side of the cup.

   DO NOT STIR ANY MORE!

5. Last, add some denatured alcohol (~1 cm layer).

   Pour it carefully down the side of the cup.

   DO NOT STIR ANY MORE!

Which of these made the DNA visible? ○ water ○ denatured alcohol

DNA was found in ○ saliva ○ plants ○ soil ○ sand

Would we get different results if we used a different type of soil? Why?

.....

Where do the cells in the soil come from?

.....

What are the differences between animal and plant cells?

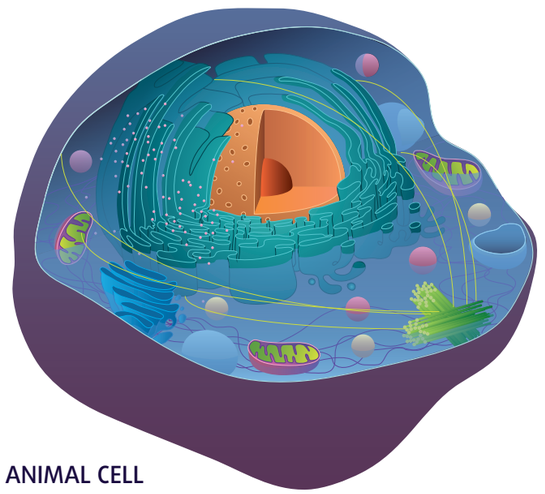
.....

What are the similarities?

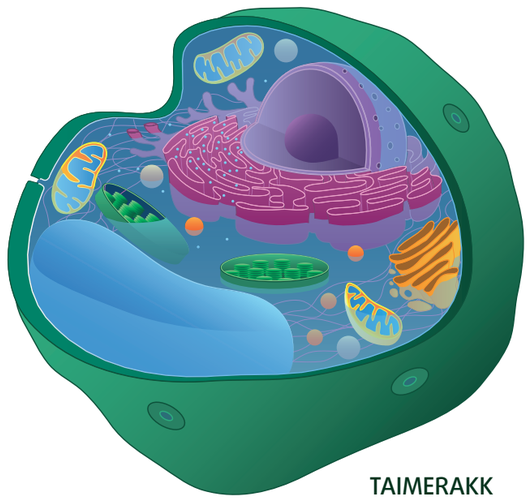
.....

Do animate and inanimate nature have something in common?

.....



ANIMAL CELL



TAIMERAKK

ADDITIONAL INFORMATION: