Présentation du document / description of the document

The document is called « Interview with a Potato" and was written by Rupert Morgan, in "I Love English World" magazine, from December 2022.

We can see the picture of a potato that is modified to make it look like a king (lying on a sofa?).

Under the picture, there are 4 columns. Each column contains a question asked by ILEW, and the answer from the potato.

In the upper left corner, there is a QR code that leads to a YouTube page. This page contains the oral version of the interview.

At the bottom of the document, we can find help with vocabulary.

4 subjects are dealt with, 1 per question:

The first question is about the history of the potato. The second is related to the belonging of the potato either to the group of vegetables or to the group of starch. The third one deals with its nutritive value. And finally, the last one is about ways to cook it.

What is the tone of the speaking potato?

The potato appears to be a little annoyed, angry, even frustrated. It seems self-centered and proud of itself. Sometimes, it uses familiar vocabulary (spud = patate), but never slang.

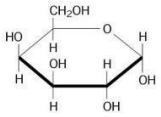
What are the biological concepts that could be developed?

- Carbohydrates
- Starch
- Vitamins
- Healthy diet

What are carbohydrates ???

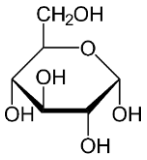
At first sight, “carbo” stands for carbon, “hydrates” stands for water (H2O)

Examples of carbohydrates :



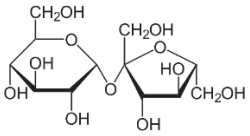
Galactose

C6H1206



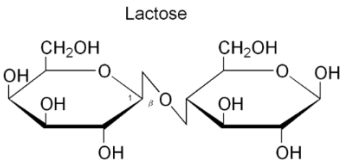
Glucose :

C6H12O6



sucrose :

C12H22O11



lactose

C12H22O11

First observation : no water H2O is found in these molecules. ! But these molecules are only made of carbon, oxygen and hydrogen.

Glucose : the main source of energy for the body. The brain can only use glucose. Transported in the blood. An excess of glucose in the blood can lead to diabetes.

Sucrose : real “sugar”, with the taste of “sugar”. Found in fruits, beet (betterave), sugar cane (cane à sucre)

Lactose : found in milk. It is the only source of carbohydrates that a baby can find in the maternal milk. All mammals drink milk at the very beginning of their lives. Except for human beings, mammals are not supposed to drink milk after weaning (sevrage) because they are not able to digest it anymore.

Galactose : monomer found in lactose. Can be obtained after the digestion of lactose. And can be then converted into glucose.

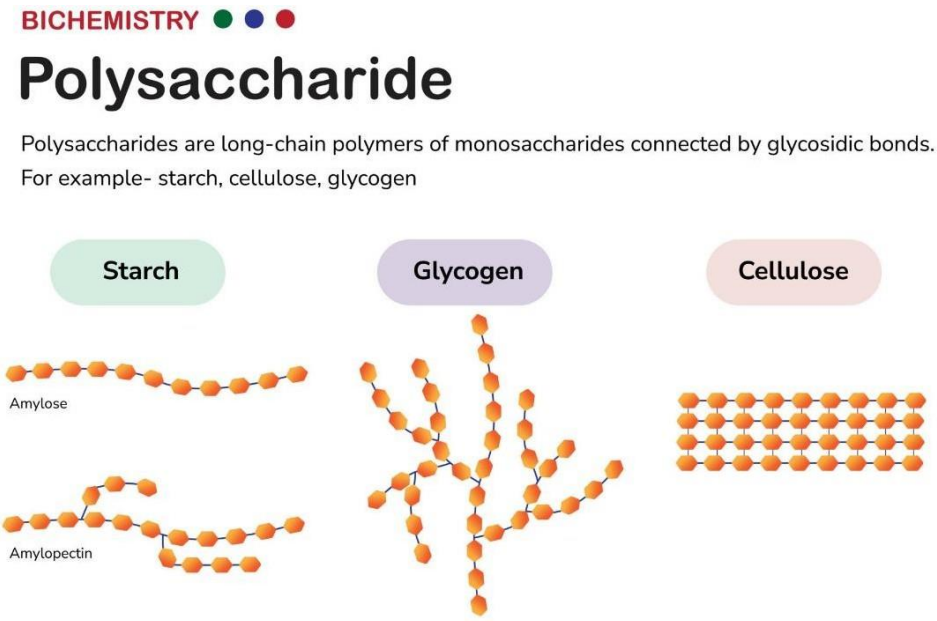
Second observation : galactose and glucose have the same chemical formula C6H12O6. But -OH groups are not organized the same way. They are isomers.

Third observation : sucrose and lactose are dimers or disaccharides, glucose is a monomer or monosaccharide.

Lactose is made of 1 glucose covalently linked to 1 galactose. (glycosidic bond)

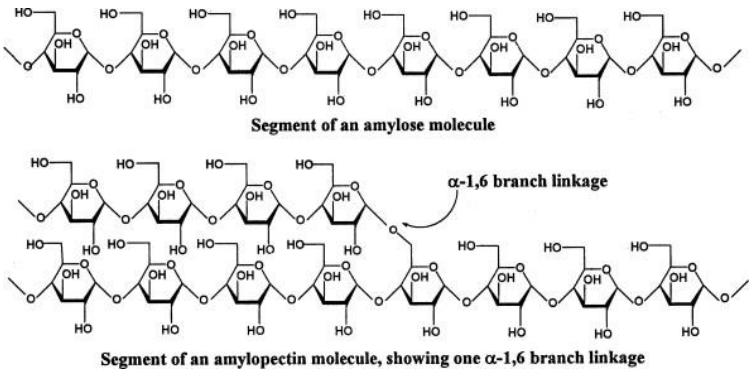
By comparing the different chemical formulas, one molecule of water is needed to separate the lactose or the sucrose into monomers. These reactions are called hydrolysis. They occur during digestion. These reactions require enzymes.

Bigger molecules also exist, such as starch (amidon) , glycogen.and cellulose. They belong to a group called polysaccharides.

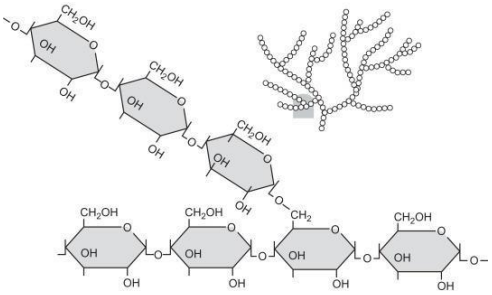


<u>Lets' have a closer look !</u>

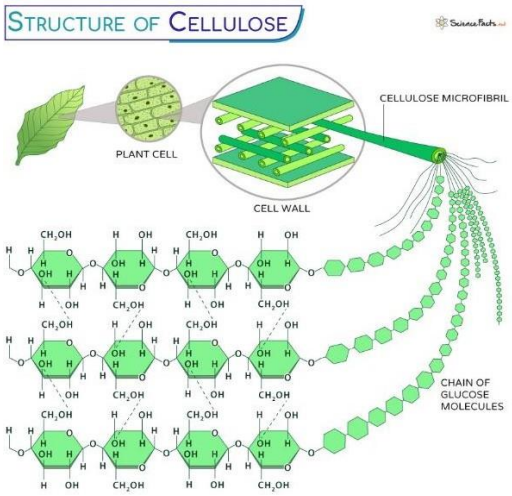
Structure of starch



structure of glycogen.



Structure of cellulose



https://www.sciencefacts.net/cellulose.html

> *Each glucose molecule is flipped 180 degrees during joining, compared to its adjacent glucose molecule in the chain. This alternating orientation of glucose units results in a straight, linear chain.*

Common points and differences.

Both are big molecules (polymers) made of glucose. The different molecules of glucose are linked with covalent bonds. Both molecules are a storage of glucose. Glucose can be freed from either starch or glycogen.

Starch is found in plants as glycogen is found only in animals (in the liver and in the skeleton muscles).

After eating a potato, starch is digested to obtain glucose, and then glucose can be stored in the liver as glycogen. When the body needs energy, glucose can be released from the liver to feed all the organs.

Another big molecule is made of glucose : cellulose found in paper and vegetables. In vegetables, it is known as fibers. But the way molecules of glucose are linked makes it impossible for us to digest it. Humans cannot digest fibers, but bacteria, living in the gut can!!

Summary

Starch	Glycogen	Cellulose
Polymer	Polymer	polymer
Made of glucose	Made of glucose	Made of glucose
Linear chains (amylose) and branches (amylopectine)	Branches	Linear chains
αβ1-4 bounds in the linear chain and α1-6 bounds at branching points	α1-4 bounds in the linear chain and α1-6 bounds at branching points	β1-4 bounds H bounds
Storage of glucose	Storage of glucose	
Energetic function	Energetic function	Structural function : shape and strength
Found in starch: potatoes, rice, wheat (flour), …	Found in liver and skeletal muscles	Found in plants and trees
Can be digested by humans	Can be digested by humans	Can not be digested by humans, but by some insects and bacteria

Vitamin

Article Talk

From Wikipedia, the free encyclopedia

For other uses, see Vitamin (disambiguation).

Vitamins are organic molecules (or a set of closely related molecules called vitamers) that are essential to an organism in small quantities for proper metabolic function. Essential nutrients cannot be synthesized in the organism in sufficient quantities for survival, and therefore must be obtained through the diet. For example, Vitamin C can be synthesized by some species but not by others; it is not considered a vitamin in the first instance but is in the second. Most vitamins are not single molecules, but groups of related molecules called vitamers. For example, there are eight vitamers of vitamin E: four tocopherols and four tocotrienols.

Vitamins

Vitamins (*vita* = life) are organic compounds needed in minute amounts for growth and good health. Unlike other organic nutrients, vitamins do not serve as an energy source nor as building blocks, but they are crucial in helping the body use those nutrients that do. Without vitamins, all the carbohydrates, proteins, and fats we eat would be useless.

Most vitamins function as **coenzymes** (or parts of coenzymes), which act with an enzyme to accomplish a particular chemical task. For example, the B vitamins act as coenzymes when glucose is oxidized for energy.

Most vitamins are not made in the body, so we must ingest them in foods or vitamin supplements. The exceptions are vitamin D made in the skin, and small amounts of B vitamins and vitamin K synthesized by intestinal bacteria. In addition, the body can convert *beta-carotene* (kar′o-tēn), the orange pigment in carrots and other foods, to vitamin A. (For this reason, beta-carotene and substances like it are called *provitamins*.)

Vitamins are found in all major food groups, but no one food contains all the required vitamins. A balanced diet is the best way to ensure a full vitamin complement.

Initially vitamins were given letter designations that indicated the order of their discovery. Although more chemically descriptive names have been assigned to them, this earlier terminology is still commonly used.

Source : Human Anatomy and Physiology – Elain Marieb

Using the documents related to vitamins, choose the correct answer to each item.

1. Vitamins :
    a. Serve as an energy source.
    b. Serve as building blocks.
    c. Help metabolic functions.

2. Essential nutrients :
    a. Can be synthesized by the organism.
    b. Must be obtained by the diet.
    c. Are the same for all living organisms.

3. Vitamin K :
    a. Is made in the skin.
    b. Can be converted into vitamin A.
    c. Is a major factor involved in blood coagulation.

4. Vitamin D :
    a. Is synthesized by intestinal bacteria
    b. Is involved in bone rigidity.
    c. Gives their orange color to carrots.