
Life Process 1

Grade 10

Important Definitions...

a. Nutrition

Answer

Nutrition: The process by which organisms take up nutrients and utilise these nutrients for various biological activities is called nutrition.

b. Nutrients

Answer

Nutrients: Nutrient is a substance available in food that helps us to stay healthy. The main nutrients available in food are carbohydrates, fats, proteins, vitamins, minerals and roughage.

c. Proteins

Answer

Proteins: Proteins are a type of biomolecules which are made up of amino acids. A protein is made up of several amino acids which are linked together by peptide bonds. They play various roles like help in body building, repairing worn out cells and keeping us healthy.

Important Definitions

d. Cellular respiration

Answer

Cellular respiration: Cellular respiration is a process in which respiratory substrates such as starch, glucose, fats and proteins are broken down to release energy. This energy is then trapped for the synthesis of ATP to release CO_2 .

e. Aerobic respiration

Answer

Aerobic respiration: Cellular respiration occurs by two processes i.e. aerobic and anaerobic respiration. The process by which the breakdown of carbohydrates occurs in the presence of oxygen resulting in the release of energy in the form of ATP is called aerobic respiration.

f. Glycolysis

Answer

Glycolysis is the first step in respiration. In this step, six-carbon glucose is broken down into a three-carbon molecule called pyruvate. This does not require oxygen. One glucose molecule produces 2 pyruvate molecules.

Krebs/ TCA cycle & Glycolysis

Krebs Cycle/TCA cycle	Glycolysis
It is a cyclic pathway.	It is a linear pathway.
Occurs in the matrix of mitochondria	Occurs in the cytoplasm
It does not consume ATP.	It consumes 2 ATP molecules.
Occurs only in eukaryotes	Occurs in eukaryotes as well as in prokaryotes
Substrate is acetyl-CoA.	Substrate is glucose.
It generates 2 GTP/ATP molecules from 2 acetyl-CoA molecules.	It generates 2 ATP molecules from 1 glucose molecule.

Motosis & Meiosis

It involves single division, resulting in the formation of two daughter cells.

It involves two successive divisions, namely meiosis I and II, resulting in the formation of four daughter cells.

It is also known as equational division as the daughter cell has the same number of chromosomes as the parent cell.

Meiosis I is known as reductional division where the chromosome number is reduced to half. Meiosis II is known as equational division where the sister chromatids separate while the chromosome number remains the same.

It plays a significant role in cell growth, repair, and healing of wounds.

It brings about variation and maintains constant chromosome number from one generation to another.

The prophase stage is short and does not comprise of synapsis, crossing over, and the formation of chiasmata.

Prophase I stage is very long.

It mainly takes place in the somatic cells.(v)It mainly takes place in the reproductive cells.

It mainly takes place in the reproductive cells.

Aerobic & Anaerobic Respiration

Anaerobic respiration	Aerobic Respiration
It involves the partial breakdown of glucose.	It involves the complete breakdown of glucose into CO_2 and H_2O .
A net gain of only 2 molecules of ATP occurs.	A net gain of 36 molecules of ATP occurs.
Here, oxidation of NADH to NAD^+ is a slow reaction.	Here, oxidation of NADH to NAD^+ is a vigorous reaction.

Some important Questions

Kreb's cycle is also known as citric acid cycle.

Answer

Krebs cycle is also known as citric acid cycle because the first product formed during the cycle is citric acid. Citric acid is formed by the condensation of an acetyl group with oxaloacetic acid and water.

b. Why Fibers are one of the important nutrients.

Answer

Fibers are one of the important nutrients because they help in the digestion of foods although they themselves are not digestible.

They help in the digestion of undigested substances which is also a reason why we are advised to have fiber rich food in case of constipation.

Fibers are naturally present in leafy vegetables, fruits, cereals, etc.

Use this mnemonics to remember the steps of Kreb's Cycle



Kreb's Cycle

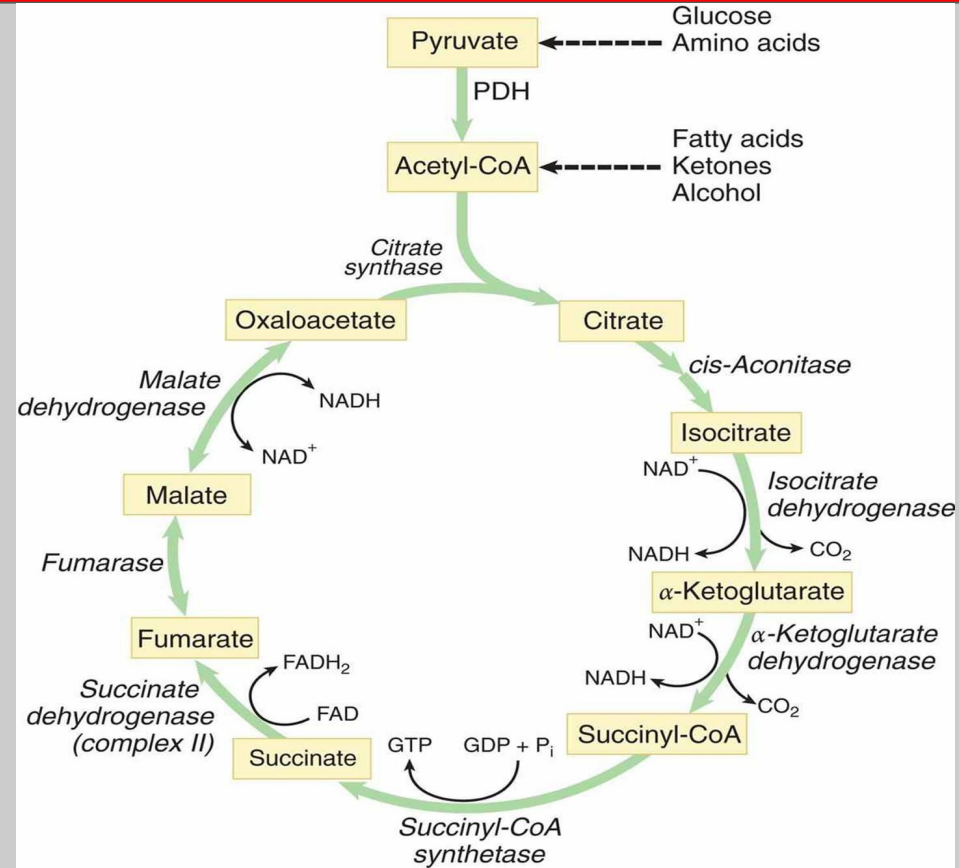
Krebs cycle is a cyclic process that occurs in the mitochondrial matrix, in the presence of oxygen.

Step 1: The cycle starts with the condensation of an acetyl group with oxaloacetic acid and water to form citric acid, with a release of CoA molecule. The enzyme involved in this conversion is citrate synthase.

Step 2: Citrate then isomerises to form isocitrate.

Step 3: The synthesis of citrate is followed by two successive steps of decarboxylation – first, the formation of α -ketoglutaric acid, and then, that of succinyl-CoA.

Step 4: This succinyl-CoA gets oxidised to form malic acid, which in turn gets converted into oxaloacetic acid, thereby allowing the cycle to continue.



Cellular Respiration.....Check when you are Online

Link/ Activity	Description
https://www.cellsalive.com/cells/cell_model.htm	Use Cells Alive site to show the parts of the cell where the stages of aerobic respiration takes place
https://www.ck12.org/biology/aerobic-vs-anaerobic-respiration/lecture/Aerobic-vs-Anaerobic-Difference/?referrer=concept_details	Teacher will explain the the two types of cellular respirations using CK-12 foundation site

Cell division...Check when you are online

<https://www.cellsalive.com/>

<https://www.ck12.org/biology/mitosis-vs.-meiosis/lecture/Mitosis-and-Meiosis-Simulation/>

