جامعة الانبار قسم التقنيات الاحيائية

كلية العلوم المادة: الاحياء المجهرية

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The Chemiosmotic Mechanism of ATP Generation

17. Protons being pumped across the membrane generate a proton motive force as electrons move through a series of acceptors or carriers.
18. Energy produced from movement of the protons back across the membrane is used by ATP synthase to make ATP from ADP and **p .**
19. In eukaryotes, electron carriers are located in the inner mitochondrial membrane; in prokaryotes, electron carriers are in the plasma membrane.

A Summary of Aerobic Respiration

20. In aerobic prokaryotes, 38 ATP molecules can be produced from complete oxidation of a glucose molecule in glycolysis, the Krebs cycle, and the electron transport chain.
21. In eukaryotes, 36 ATP molecules are produced from complete oxidation of a glucose molecule.

Anaerobic Respiration

22. The final electron acceptors in anaerobic respiration include N03 - ,SO-4 , and CO3-2 .
23. The total ATP yield is less than in aerobic respiration because only part of the Krebs cycle operates under anaerobic conditions.

Fermentation

24. Fermentation releases energy from sugars or other organic molecules by oxidation.
25. O2 is not required in fermentation.
26. Two ATP molecules are produced by substrate-level phosphorylation.
27. Electrons removed from the substrate reduce NAD+.
28. The final electron acceptor is an organic molecule.

29. In lactic acid fermentation, pyruvic acid is reduced by NADH to lactic acid.
30. In alcohol fermentation, acetaldehyde is reduced by NADH to produce ethanol.
31. Heterolactic fermenters can use the pentose phosphate pathway to produce lactic acid and ethanol.

Lipid and Protein Catabolism

1. Lipases hydrolyze lipids into glycerol and fatty acids.
2. Fatty acids and other hydrocarbons are catabolized by
3. Catabolic products can be further broken down in glycolysis and the Krebs cycle.
4. Before amino acids can be catabolized, they must be converted to various substances that enter the Krebs cycle.
5. Transamination, decarboxylation, and dehydrogenation reactions convert the amino acids to be catabolized.

Biochemical Tests and Bacterial Identification

1. Bacteria and yeast can be identified *by* detecting action of their enzymes.
2. Fermentation tests are used to dete rmine whether an organism can ferment a carbohydrate to produce acid and gas.

Photosynthesis

1. Photosynthesis is the conversion of light energy from the sun into chemical energy; the chemical energy is used for carbon fixation.

The light-Dependent Reactions: Photophosphorylation

2. Chlorophyll *a* is used by green plants, algae, and cyanobacteria; it is found in thylakoid membranes.
3. Electrons from chlorophyll pass through an electron transport chain, from which ATP is produced by chemiosmosis.
4. In cyclic photophosphorylation, the electrons return to the chlorophyll .
5. In noncyclic photophosphorylation, the electrons are used to reduce NADP+. The electrons from H20 or H2S replace those lost from chlorophylL
6. When H20 is oxidized by green plants, algae, and cyanobacteria, O2 is produced; when H2S is oxidized by the sulfur bacteria, S granules are produced.

The light-Independent Reactions: The Calvin-Benson Cycle

7. CO_2 is used to synthesize sugars in the Calvin-Benson cycle.

References': 1- Microbiology an introduction TWELFTH EDITION. Gerard. Tortora.2016.

2- Microbiology an introduction TENTH EDITION. Gerard. Tortora.2010.