Cellular Respiration

Takes place in Mitochondria	
starch is the major source of fuel	broken down into glucose
energy harvest	Glocose is broken down in steps to harvest energy
ETC	A sequence of membrane proteins that shuttle electrons down a series of redox reactions
ETC	releases energy used to make ATP
4 Stages:	Glycolysis - Pyruvate Oxidation - the citric acid cycle (Krebs Cycle) - Oxidative phosphorylation

Glycolysis

Occurs in the cytosol	
Splits glucose (6C) into 2 pyruvates (3C)	
Two stages	Energy investment stage & Energy payoff stage
Energy investment stage	the cell uses ATP to phosphorylate compounds of glucose
Energy payoff stage	energy is produced by substrate level phosphorylation
The net energy yield per 1 glucose	2 ATP + 2 NADH
EI stage	2 ATP to 2 ADP + P
EP stage	4 ADP + P to 4 ATP
Net	2 Pyruvate + 2H2O + 2ATP + 2NADH +2H+

Pyruvate Oxidation and Cotroc Acid Cycle

Pyruvate Oxidation	Turns to Acetyl CoA
Citric Acid Cycle	AKA Krebs cycle

Pyruvate Oxidation and Cotroc Acid Cycle (cont)

Occurs in the mitochondrial matrix	
turns acetyl CoA into citrate	releases CO2, synthesize ATP, and transfer electrons to NADH and FADH2
Inputs	2 acetyl CoA
Outputs	2ATP 6NADH 4CO2 2FADH2

Oxidative Phosphorylation

Consists of	Electron transport chain and Chemiosmosis
Electron Transport Chain	located in the inner membrane of the mitochondria
ETC	Collection of proteins
ETC	Does not produce ATP directly, BUT Helps manage the release of energy by creating several small steps for “fall” of electrons
The cristae increase the surface area for the reactions to occur	
final electron acceptor	oxygen
One major function	to create a proton (H+) gradient across the membrane
As proteins shuttle electrons along the ETC, they also pump H+ into the intermembrane space	Use the exergonic flow of electrons from NADH and FADH2
This gradient will power chemiosmosis	Uses hydrogen ions to power cellular work
Chemiosmosis	ATP synthase
ATP synthase	the enzyme that makes ATP from ADP + P

Oxidative Phosphorylation (cont)

ATP synthase	Uses energy from the H+ gradient across the membrane
Chemiosmosis	H+ ions flow down their gradient through ATP synthase
ATP synthase acts like a rotor	When H+ binds the rotor spins -- Activates catalytic sites to turn ADP + P into ATP
Produces	26-28 ATP per glucose

Respiration without Oxygen

Anaerobic Respiration	generates ATP using an ETC in the absence of oxygen
Takes place in prokaryotic organisms that live in environments with no oxygen	
The final electron acceptors: sulfates or nitrates	
Fermentation	generates ATP without an ETC
Extension of glycolysis	Recycles NAD+, Occurs in the cytosol, NO oxygen
Two types	Alcohol fermentation and Lactic acid fermentation
Alcohol Fermentation (bacteria, yeast)	pyruvate is converted into ethanol
Lactic Acid Fermentation (muscle cells)	When muscles run out of oxygen, they can go through lactic acid fermentation to produce ATP
Lactic Acid Fermentation	Breakdown of lactate

Ph	
Photosynthesis	the conversion of light energy to chemical energy
Site of Photosynthesis	Chloroplast and Stomata
Chloroplas	organelle for the location of photosynthesis
Stomata	pores in leaves that allow CO2 in and O2 out
Stroma	aqueous internal fluid
Thylakoids	form stacks known as grana
Chlorophyll	green pigment in thylakoid membranes
PS II	Light energy (photon) causes an e- to go from an excited state back to a ground state
PS I	Electrons go down a second transport chain
Calvin Cycle	The calvin cycle is cyclic electron flow
Three phases:	1. Carbon fixation 2. Reduction 3. Regeneration of RuBP

By **CJLEE**
cheatography.com/cjlee/

Not published yet.
Last updated 18th January, 2023.