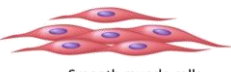
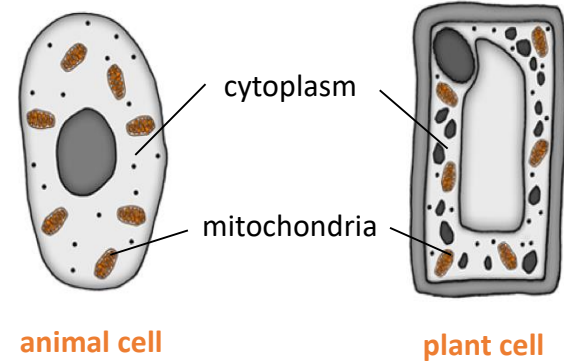




During long periods of vigorous activity muscles become fatigued and stop contracting efficiently

An organism will receive all the energy it needs for living processes as a result of the energy transferred from respiration	For movement	 Smooth muscle cells	To enable muscles to contract in animals.
	For keeping warm		To keep a steady body temperature in a cold environment.
	For chemical reactions		To build larger molecules from smaller one.



Electron micrograph of a mitochondrion

Response to exercise

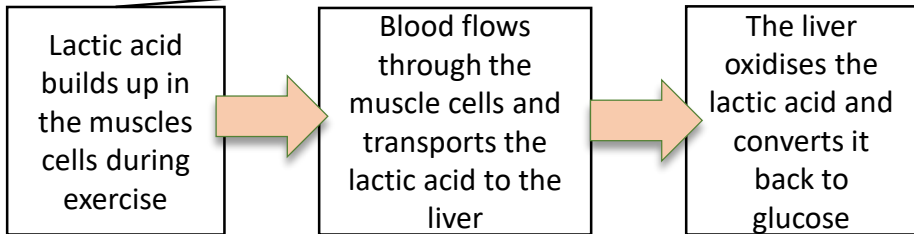
During exercise the human body reacts to increased demand for energy	Heart rate increases	Top pump oxygenated blood faster to the muscle tissues and cells.
	Breathing rate and breath volume increase	This increases the amount of oxygen entering the blood stream.

Metabolism is the sum of all the reactions in a cell or the body

Metabolism

Metabolism	The energy transferred by respiration in cells is used by the organism for the continual enzyme controlled processes of metabolism.	Conversion of glucose to starch, glycogen and cellulose.
		The formation of lipid molecules from a molecule of glycerol and three molecules of fatty acid.
		The use of glucose and nitrate ions to form amino acids which in turn are used to synthesise proteins.
		Respiration
		Breakdown of excess proteins to form urea for excretion.

The extra amount of oxygen required to remove all lactic acids from cells is called the oxygen debt



Response to exercise HT only

Respiration

AQA GCSE BIOENERGETICS part 2



Cellular respiration is an exothermic reaction which is continuously occurring in all living cells

Anaerobic respiration in plant and yeast cells

The end products are ethanol and carbon dioxide. Anaerobic respiration in yeast cells is called fermentation



This process is economically important in the manufacture of alcoholic drinks and bread.



Anaerobic respiration

Respiration when oxygen is in short supply. Occurs during intensive exercise

During hard exercise, muscle cells are respiring so fast that blood cannot transport enough oxygen to meet their needs.

Glucose is partially oxidised to produce lactic acid which builds up in muscle tissue causing them to become painful and fatigued.



Anaerobic respiration releases a much smaller amount of energy than aerobic respiration.

The incomplete oxidation of glucose causes a build up of lactic acid and creates an oxygen debt

Aerobic respiration

Respiration with oxygen. Occurs inside the mitochondria continuously

Glucose is oxidised by oxygen to transfer the energy the organism needs to perform its functions.



glucose + oxygen → carbon dioxide + water

Aerobic respiration releases a large amount of energy from each glucose molecule