



Knowledge Organiser- Unit 1- Body Systems- Energy Systems



Key words-

Adenosine tri-phosphate (ATP)
Adenosine di-Phosphate (ADP)
Energy
Exothermic
Endothermic
Lactic Acid System-
Lactic Acid
Glycogen
Pyruvic Acid
Sarcoplasm
Glycolysis
Glycogen Phosphorylase (GPP)
Phosphofructokinase (PFK)
Lactate dehydrogenase (LDH)

Aerobic-

Mitochondria
Matrix
Cristae
Citric Acid Cycle
Electron Transport chain (ETC)
Nicotinamide adenine dinucleotide (NAD)
Triglycerides
Palmitic Acid

Fitness levels-

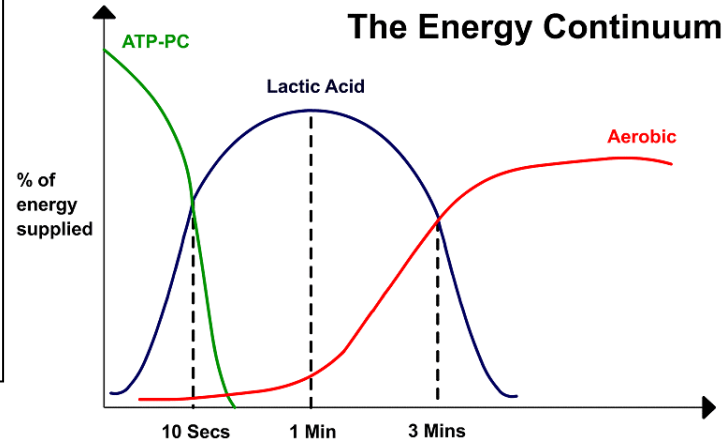
1. The more aerobically fit the performer the better their CV and respiratory systems work.
2. They can take in, transport and use oxygen more efficiently to re-synthesise ATP.
3. Being aerobically fit means you can start to burn FFAs before running out of glycogen.
4. This benefits the performer by delaying OBLA and preserving glycogen to be used at a later stage.
5. The elite/trained performer will be able to work at higher intensities before meeting their aerobic threshold.

Time Zones-

Immediate energy (ATP-PCr system): approx. 6–10 s
Short-term energy (Lactic Acid system): approx. 2 min
Long-term energy (Aerobic system): more than 2 min

Aerobic

1. Uses oxygen.
2. Metabolises glycogen and free fatty acids.
3. Glycolysis occurs in the sarcoplasm. Krebs's cycle occurs in the mitochondrial matrix. Electron transport chain occurs in the mitochondrial cristae.
4. Enzymes used are glycogen phosphorylase and phosphofructokinase.
5. Energy yield of 38 ATP resynthesised from one molecule of glycogen.
6. Aerobic glycolysis = 2 ATP. Krebs's cycle = 2 ATP. electron transport chain = 34 ATP.
7. Water and carbon dioxide are by products.



Anerobic- Lactic Acid

1. Produces energy without oxygen.
2. Metabolises glycogen.
3. Occurs in the muscle sarcoplasm.
4. Enzymes used are glycogen phosphorylase, phosphofructokinase and lactate dehydrogenase.
5. Energy yield of 2 ATP resynthesised from one molecule of glycogen.
6. G-gp-G-pfk-PA-ldh-LA (absence of oxygen).
7. Lactic acid is the by product.

ATP- PC

1. Produces energy without oxygen.
2. The fuels used in Phospho-Creatine.
3. Occurs in the muscle sarcoplasm.
4. Enzyme used is creatine kinase.
5. Energy yield of one ATP resynthesised from one molecule of PC.
6. PC(ck)=Energy+P+C
7. Phosphorous and Creatine are the by products..

Duration & Intensity of exercise-

1. When duration is low and intensity high (10 seconds and below) the PC system is predominant.
2. When duration is low and intensity high (10-180 seconds) the LA system is predominant.
3. When duration is high and intensity low (2-3 minutes onwards) the aerobic system is predominant.
4. All three systems will be working.
5. During games they will interchange depending on the intensity.

Oxygen debt

The anaerobic systems require oxygen to restore them which is called an oxygen debt. After taking part in exercise, a person continues to breathe more deeply and rapidly than when at rest to take in additional oxygen to repay this oxygen debt. The oxygen is then used to: break down lactic acid to carbon dioxide and water replenish the creatine phosphate stores