

BLOG.SQD

What is energy and where does it come from?

All energy starts as light from the sun. Plants convert sunlight into chemical energy through the process of photosynthesis. We then eat the plants, or we eat the animals that have eaten plants, and in turn this stored chemical energy is passed on to us.

Energy is stored in food in the form of Carbohydrates, Proteins or Fats. To allow us to walk, run, lift weights and sustain every bodily function the body must extract chemical energy by breaking down the food nutrients that we consume - You really are what you eat!

What are our energy systems?

In order to extract the energy from the foods we eat and turn it into the chemical energy that our bodies can use, we have three separate energy production systems, these are the:

- ATP-PC system
- Anaerobic glycolytic system
- Aerobic system

How do they work?

The three energy systems work together in order to ensure there is a continuous and sufficient supply of energy for all our daily activities.

Each system is different in the way that chemical energy (ATP) is produced from different sources and at different intensities.

The ATP-PC system and the anaerobic glycolytic system are both anaerobic systems, meaning that oxygen is not used by these systems to synthesise ATP. These systems are quicker at producing energy, however they do not last very long.

However, the aerobic system relies heavily on oxygen to synthesise ATP. The use of oxygen to produce energy is more complex and as result the aerobic system is slower at making energy, but can keep producing energy as long as enough oxygen is present.

Training and the impact on our energy systems

It is important to understand the role our energy systems play in training and sporting performance. Depending on the intensity and duration of the exercise, one particular energy system may be more influential than the others. With higher intensity exercise over a short time period the bodies reliance for energy will be placed on the anaerobic energy systems (ATP-PC system / anaerobic glycolytic system). Lower intensity exercise over a longer time places greater reliance on the aerobic energy systems.

If these energy systems are trained incorrectly - i.e. the wrong energy system is trained for your goal/sport - then this will be detrimental to performance.

It is important to remember that the energy systems do not work independently of each other and all three will contribute different amounts during a training session, game etc, however one or two will dominate and it's those systems that training should be focussed around.

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Glossary

Anaerobic

Means production of energy through processes that do not require oxygen. When applied to exercise, anaerobic refers to all exercise that does not rely on oxygen to help produce energy

Aerobic

Means production of energy through processes that require oxygen. When applied to exercise, aerobic refers to all exercise that requires oxygen to help produce energy.

ATP

Stands for adenosine triphosphate. ATP is essentially the energy currency of the body. It is the breakdown of ATP that releases energy which the body's tissues such as muscle can use to create movement.

ADP

Stands for adenosine diphosphate. ADP is the by-product of the breakdown of ATP for energy. It is the remaining adenosine molecule and two (di) phosphate molecules

Pi

Stands for one phosphate molecule, such as the phosphate that is released when ATP is broken down to provide energy for the body to use

PC

Stands for phosphocreatine and is also known as creatine phosphate. It is stored in muscle cells and used as a fuel to create or 'synthesize' ATP

ATPase

ATPase are a group of enzymes which contribute to either the breakdown of ATP or the manufacture (synthesis) of new ATP

Glycolysis

Glycolysis means the breakdown (lysis) of glucose and consists of a series of chemical reactions controlled by enzymes

Synthesis

This refers to a 'building' process where two different elements are brought together to create a new element, such as ADP and Pi being brought together to create or manufacture ATP

Krebs cycle

The krebs cycle is part of the aerobic energy system and creates ATP through a series of chemical reactions involving oxygen

Electron transport chain

The electron transport chain is part of the aerobic energy system and also creates ATP through a series of chemical reactions involving oxygen.