

- Needed to help in the formation, growth and repair of body cells.
- Used only as an emergency fuel for working muscles during exercise.
- Help in the repair and recovery of damaged tissues such as muscles.
- Produce red blood cells, hormones, antibodies and enzymes. (Enzymes are proteins, and all chemical reactions in the body rely on enzymes including making energy.)
- Proteins break down into amino acids; some of these are essential and cannot be made by the body so they must be consumed.
- They are found in the muscles.
- Proteins include eggs, lean meats, fish, legumes and grains.

CARBOHYDRATES:

- Most readily available source of energy for working muscles, they are the preferred source of fuel.
- Can supply body with fuel for up to about 90 minutes of continuous exercise.
- CHO broken down into glucose and stored in the muscles and liver as glycogen, excess stored in adipose tissue.
- CHO is ranked using the glycemic index from 0-100.
- CHO is found in pasta, breads, rice, cereal and fruit.
- Easiest to break down as they don't use up as much oxygen as other fuels.
- Glucose/glycogen=fuel, carbohydrates=food.

The Glycemic Index (GI) is a ranking for CHO on a scale from 0-100 according to the extent to which they raise blood sugar levels after eating.

High GI foods are those which are rapidly digested and absorbed, and are often most useful as a dietary recovery strategy as they impact blood glucose levels quickly.

- Moderate to high GI foods/gels/drinks consumed during extended endurance activities increase carbohydrate availability and enhance performance (during extended exercise, insulin response to high GI foods is suppressed)
- High is better for recovery, it is broken down quickly, good for activities of max intensity to refuel quickly.
- This causes a suppression of free fatty acids which causes a greater reliance on glycogen stores which results in faster depletion.

Low GI foods are slowly digested and absorbed and are most useful to provide extended endurance activities with "on-going" energy sources. They impact blood glucose levels slower and are more controlled

- When consumed prior to participating in endurance activities lasting longer than 60 minutes, will lead to minimal changes in blood glucose levels and insulin being secreted.
- As a result, the amount of free fatty acids available in blood is relatively high and thus used first as a fuel source leading to glycogen sparing.
- Low is better for pre-event activities and in your general diet; slower digestion provides you with sustained energy and feeling of fullness for longer.

High GI foods include lollies, Gatorade and honey; moderate include pasta, oranges and peas; and low includes lentils, butterbeans and yoghurt.

Glycogen sparing is a long-term adaptation due to aerobic training that allows fats to be used more readily and earlier during performances, resulting in the preservation of the glycogen stores, and hence resulting in better performances later in the activity when oxygen becomes scarcer. This delays the onset of hitting the wall.

Hitting the wall is when endurance events deplete glycogen stores in the body, and the body must then use fats as an energy source to continue the activity. However, fats require a lot more oxygen to produce the same amount of energy, and take longer to break down, resulting in slower energy production and hence decreased performance.