

- Receptors -> medulla oblongata -> intercostal nerve -> abdominis and internal intercostals

## Diet and Nutrition and Performance:

### A Balanced Diet:

- Carbs, proteins, fats, fibre, vitamins and mineral all need to be taken in in the correct proportions
- Not enough protein means inability to grow properly and repair yourself, e.g. after exercise
- Not enough energy containing foods (carbs and fats) will make you very tired & lethargic causing a severe drop in performance in any sport or exercise related activity.
- Too much energy containing foods cause you to become overweight, potentially leading to obesity

### Recommended daily allowances are:

- Carbs 50-65%
- Fats 20-30%
- Proteins 10-20%
- Carbs = our main source of energy
- Fats source of energy and important in relation to fat soluble vitamins
- Proteins = Essential to growth and repair of muscle
- Vitamins = Water and fat soluble vitamins play important roles in many chemical processes, e.g. Vitamin A - maintenance of skin
- Minerals = Inorganic elements occurring in the body and which are critical to its normal functions, e.g. calcium - needed for bone and tooth formation
- Water = Essential to normal body functions, 60% of the human body is water - used as a medium for carrying other nutrients, e.g. glucose in the blood and its use to control body temperature
- Fibre = Essential to health of the digestive system

## Intermittent hypoxic training

- Athlete lives by sea but trains under hypoxic conditions
- Pros
  - Increased rate of adaptations
  - Increased RBCs and haemoglobin volume
  - Increased O<sub>2</sub> carrying capacity
  - Increased mitochondrial density
- Cons
  - Benefits lost when training stops
  - Lose motivation
  - Hard to reach normal work
  - Risk of infection

- Remove lactic acid - converts back to pyruvic acid
  - Lactic acid converted into: 65% h<sub>2</sub>o + co<sub>2</sub>, 20% glycogen, 10% protein and 5% glucose
- Maintain ventilation, circulation and body temperature
  - Breathing slightly elevated, more o<sub>2</sub> delivered to tissue, co<sub>2</sub> removed from tissue
  - Heat production higher than heat removal, remains elevated to allow gradual decrease
- Requires 5-8L of o<sub>2</sub>

### Implications of recovery

- Warm up
  - Early increase in o<sub>2</sub>, minimise o<sub>2</sub> deficit
- Cool down
  - Increase o<sub>2</sub> to tissue, speeds fast and slow components
- Specificity of training
  - Athlete learn to recover quicker
- Strategies
  - Use of time, tactics, subs, timeouts to recover
- Diets and nutritions
  - Effective diet before, during and after exercise can delay fatigue and speed recover

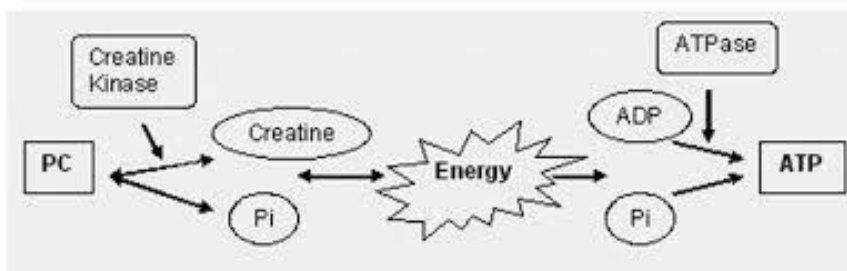
### Energy systems

- Ability to perform work – can be **chemical** (in the food we eat) **potential** (stored in the body tissues) and converted to **kinetic energy** for movement as we contract our muscles.

### Adenosine Triphosphate

- Eaten food stored as amino acids, glycerides and glycogen
- ATP - useable energy
- Readily available in small amounts
- Runs out after 2 seconds do of movement
- $ATP = ADP + P_i$ 
  - ATPase breaks ATP to ADP
  - Energy released

### Alactic energy system



- Phosphocreatine broken by creatine kinase
- Creatine and phosphate released
- Energy released

- A pressure gradient forming and an additional Magnus force being created downwards (all gases move from an area of high pressure to an area of low pressure)
- The downwards Magnus force adds to the **weight of the projectile and the effect of gravity is increased**. This causes the projectile to 'dip' in flight, giving less time in the air as the flight path short

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**Page 23 of 23**