

### 1.1.3: The short-term effects of exercise on body systems

#### The cardiovascular system

Stroke volume (the volume of blood pumped by each beat) will increase.

Heart rate (the number of beats per minute) will increase.

Cardiac output (the volume of blood pumped per minute) will increase.

Blood pressure will increase to send the oxygenated blood quickly to the working muscles, and back to the heart to remove waste products.

Body temperature will increase. To counter this, vasodilation will take place to help heat loss through radiation and prevent overheating.

#### The cardiorespiratory system

Breathing rate or breathing frequency (the number of breaths a minute) will increase.

Tidal volume (the amount of air that passes in and out of the lungs during breathing) will increase.

Minute volume (the volume of air breathed in and out in one minute) will increase.

These changes take place to increase the capacity of the cardiorespiratory system to transport oxygen from the lungs to the heart, and carbon dioxide and other waste products from the heart to the lungs where they can be removed from the body.

#### The muscular-skeletal system

The temperature of the working muscles will increase due to the friction caused by the muscles contracting, and the increased level of blood flowing through the muscles.

Muscles will become more elastic. This increased elasticity of the muscle fibres increases the mobility or range of movement at the joint. This also reduces the likelihood of the sports performer suffering a muscle injury due to their improved flexibility.

Transport of nutrients to the working muscles will increase in response to the increased demands made by these muscles.

#### Energy systems

The short-term effects of exercise on the energy systems will depend upon the level of intensity and duration of the sporting activity, as these factors will determine which energy system will be used. It is likely however, that the production of waste products will be increased.

These waste products could include:

- Lactic acid
- Pyruvic acid
- Carbon dioxide.

The build-up of any waste products will eventually impact on the level of performance as the performer will suffer tiredness and fatigue.