

Transportation of carbon dioxide and oxygen

Cardiac output increases as exercise intensity increases as more blood is demanded. Blood consists of 45% blood cells and 55% plasma whereby oxygen and carbon dioxide are transported.

Oxygen transport

Oxygen transport from two ways:

- 97% -Within protein haemoglobin packed with red blood cells as oxyhaemoglobin (HbO₂)
- 3% -Within blood plasma.

Haemoglobin happily combines with oxygen when it is available and just as importantly, readily gives the oxygen to tissues where oxygen concentration is low. each haemoglobin can hold four molecules of oxygen.

Carbon dioxide transport

Carbon dioxide transport from two ways:

- 70% -Combined with water within red blood cells as carbonic acid.
- 23% -Combined with haemoglobin as carbaminohaemoglobin. (HbCO₂)
- 7% -Dissolved in plasma

Performance and O₂/CO₂ transport

Transport of oxygen is essential in the efficiency of blood transport in terms of how much is wasted if it isn't carrying sufficient oxygen to supply the working muscles.

Efficient transport

Efficient transport of O₂ and CO₂ aids working muscles in that it:

- Prolongs the duration of anaerobic and aerobic activity
- Delays anaerobic threshold which...
- ... increases possible work rate intensity for the activity and...
- ...speeds up recovery during and after exercise.

Efficient O₂ and CO₂ has a positive effect on performance as it supplies working muscles with demanded O₂ much quicker.

Smokings impact on O₂ transportation

- Cigarette smoke contains carbon monoxide.
- Haemoglobin prefers (+240) carbon monoxide so combine with CO in preference to O₂.
- As a result it reduces HbO₂ association in the lungs and thus maximum O₂ intake.
- This reduces O₂ to the working muscles and lactate threshold thus decreasing maximum performance.
- So all positive effects of O₂ and CO₂ are reversed.