Acute Responses to Exercise

**Respiratory**
- Ventilation: How much air is breathed in or out in one minute
- Diffusion: The movement of molecules from an area of higher concentration to one of lower concentration

**Cardiovascular**
- Cardiac Output: The amount of blood pumped out of the heart in one minute
- Oxygen Consumption: As exercise increases, so does oxygen consumption
- Blood Pressure: Systolic Blood Pressure: Pressure in the arteries following contraction of ventricles as blood is pumped out of the heart
  - Diastolic Blood Pressure: Pressure in the arteries when the heart relaxes and ventricles fill with blood
- Blood Flow: Blood flow is redirected away from the spleen, kidney and other inactive muscles so that these muscles receive the greatest percentage of the cardiac output
- Venous Return: Amount of blood returning to the heart to fill the ventricles
- a-vO2 Difference: Difference in oxygen concentration in the arterioles compared with the venules
- Redistribution of Blood Flow: Blood flow to the heart increases
- Redistribution of Blood Flow: Blood flow to the skin assists in the regulation of body temperature through heat exchange with the environment.
- Redistribution of Blood Flow: During submaximal exercise, blood flow to the skin increases, however during maximal efforts, the skin is redirected away from the skin

**Muscular**
- Motor Unit Recruitment
- Lactate: Difference in oxygen concentration in the arterioles compared with the venules

**Energy Substrates**
- ATP: ATP is the immediate source of fuel for all muscular contractions
  - As a result of exercise, ATP stores decrease in the muscle, and stores of ADP, the by product of ATP increase
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- Lactate: As exercise starts, large amounts of oxygen are released from the muscle due to anaerobic production of ATP

**Temperature**
- Heat is a by product of the process of converting chemical energy (fuel) into mechanical energy (movement)

**Motor Unit Recruitment**
- The all or nothing principle: A motor unit will either contract maximally or not at all, depending on the strength of the stimulus
- A motor unit is a neuron and the muscle fibres which it stimulates
- It is the means by which the Central Nervous System communicates with the muscles to control muscular contractions

**Venous Return**
- Increased via: The muscle pump, the respiratory pump and venoconstriction

**Oxygen Consumption**
- As exercise increases, so does oxygen consumption

**a-vO2 Difference**
- Difference in oxygen concentration in the arterioles compared with the venules

**Cardiac Output**
- Q = SV x HR

**Blood Pressure**
- An increase in cardiac output results in an increase of blood pressure
- Exercise using large muscle groups affect systolic blood pressure more than diastolic blood pressure

**Oxygen Consumption**
- As exercise increases, so does oxygen consumption
- Stores of ADP, the by product of ATP increase
- When exercise intensity increases, there is an increase in the rate of metabolism required to produce ATP in the muscles

**Redistribution of Blood Flow**
- Blood flow to the heart increases
- Blood flow to the skin assists in the regulation of body temperature through heat exchange with the environment.
- During submaximal exercise, blood flow to the skin increases, however during maximal efforts, the skin is redirected away from the skin