Learning Tracker: Topic 7 – Run for your life

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| **SPECIFICATION POINTS** | **R** | **Y** | **G** |
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| 7.1 Know the way in which muscles, tendons, the skeleton and ligaments interact to enable movement, including antagonistic muscle pairs, extensors and flexors. |  |  |  |
| 7.2 Understand the process of contraction of skeletal muscle in terms of the sliding filament theory, including the role of actin, myosin, troponin, tropomyosin, calcium ions (Ca2+), ATP and ATPase. |  |  |  |
| 7.3 i) Understand the overall reaction of aerobic respiration as splitting of the respiratory substrate, to release carbon dioxide as a waste product and reuniting of hydrogen with atmospheric oxygen with the release of a large amount of energy.  ii) Understand that respiration is a many-stepped process with each step controlled and catalysed by a specific intracellular enzyme. |  |  |  |
| 7.4 Understand the roles of glycolysis in aerobic and anaerobic respiration, including the phosphorylation of hexoses, the production of ATP, reduced coenzyme, pyruvate and lactate (details of intermediate stages and compounds are not required). |  |  |  |
| 7.5 Understand the role of the link reaction and the Krebs cycle in the complete oxidation of glucose and formation of carbon dioxide (CO2), ATP, reduced NAD and reduced FAD (names of other compounds are not required) and why these steps take place in the mitochondria, unlike glycolysis which occurs in the cytoplasm. |  |  |  |
| 7.6 Understand how ATP is synthesised by oxidative phosphorylation associated with the electron transport chain in mitochondria, including the role of chemiosmosis and ATP synthase. |  |  |  |
| 7.7 Understand what happens to lactate after a period of anaerobic respiration in animals. |  |  |  |
| CORE PRACTICAL 16: Investigate rate of respiration. |  |  |  |
| 7.8 i) Know the myogenic nature of cardiac muscle.  ii) Understand how the normal electrical activity of the heart coordinates the heart beat, including the roles of the sinoatrial node (SAN), the atrioventricular node (AVN), the bundle of His and the Purkyne fibres.  iii) Understand how the use of electrocardiograms (ECGs) can aid the diagnosis of cardiovascular disease (CVD) and other heart conditions |  |  |  |
| 7.9 i) Be able to calculate cardiac output.  ii) Understand how variations in ventilation and cardiac output enable rapid delivery of oxygen to tissues and the removal of carbon dioxide from them, including how the heart rate and ventilation rate are controlled and the roles of the cardiovascular control centre and the ventilation centre in the medulla oblongata. |  |  |  |
| CORE PRACTICAL 17: Investigate the effects of exercise on tidal volume, breathing rate, respiratory minute ventilation and oxygen consumption using data from spirometer traces. |  |  |  |
| 7.10 i) Know the structure of a muscle fibre.  ii) Understand the structural and physiological differences between fast and slow twitch muscle fibres. |  |  |  |
| 7.11 i) Understand what is meant by negative feedback and positive feedback control.  ii) Understand the principle of negative feedback in maintaining systems within narrow limits. |  |  |  |
| 7.12 Understand homeostasis and its importance in maintaining the body in a state of dynamic equilibrium during exercise, including the role of the hypothalamus and the mechanisms of thermoregulation. |  |  |  |
| 7.13 Understand the analysis and interpretation of data relating to possible disadvantages of exercising too much (wear and tear on joints, suppression of the immune system) and exercising too little (increased risk of obesity, cardiovascular disease (CVD) and diabetes), recognising correlation and causal relationships. |  |  |  |
| 7.14 Understand how medical technology, including the use of keyhole surgery and prostheses, is enabling those with injuries and disabilities to participate in sports. |  |  |  |
| 7.15 Be able to discuss different ethical positions relating to whether the use of performance-enhancing substances by athletes is acceptable. |  |  |  |
| 7.16 Understand how genes can be switched on and off by DNA transcription factors including hormones. |  |  |  |

**How can I improve?**

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**Revision Actions taken**

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