Name: _____ **Date:** _____

Your Mission to the Cellular Core: A 10th Grade Exercise Bioenergetics Quest

Synthesize complex data on mitochondrial biogenesis and metabolic pathways to predict how the human body optimizes performance under extreme physiological stress.

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1. During a high-intensity interval training (HIIT) session, your body experiences an oxygen deficit. Which physiological phenomenon explains the continued elevated oxygen consumption during your cool-down period?

A. Post-Activation Potentiation (PAP)
B. Excess Post-exercise Oxygen Consumption (EPOC)
C. The Bohr Effect during hemoglobin saturation
D. Myofibrillar hypertrophy saturation

2. Long-term endurance training leads to an increase in the size and number of _____, which enhances the cell's ability to produce ATP through oxidative phosphorylation.

A. Sarcoplasmic reticulums
B. Ribosomes
C. Mitochondria
D. Lysosomes

3. The Frank-Starling Mechanism states that the heart's stroke volume increases in response to an increase in the volume of blood filling the heart (end-diastolic volume).

A. True
B. False

4. A marathon runner hitting 'the wall' typically signifies the depletion of which specific energy substrate in the liver and skeletal muscles?

A. Phosphocreatine
B. Triglycerides
C. Glycogen
D. Amino acids

5. The respiratory exchange ratio (RER) is the ratio between the volume of CO_2 produced and O_2 consumed. An RER of 1.0 indicates the body is primarily burning _____.

A. Fats
B. Proteins
C. Carbohydrates
D. Ketones

6. Ventilatory Threshold 2 (VT2) represents the point where lactate begins to accumulate in the blood faster than it can be removed, often called the 'Point of No Return.'

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A. True
B. False

7. Which specific hormone, released during the 'fight or flight' acute response, stimulates glycogenolysis and increases cardiac output?

A. Epinephrine
B. Insulin
C. Leptin
D. Melatonin

8. The principle of _____ states that for physiological adaptations to occur, the body must be subjected to loads greater than those to which it is accustomed.

A. Reversibility
B. Overload
C. Specificity
D. Periodization

9. In the Cori Cycle, which organ is responsible for converting lactate back into glucose to be used by the muscles?

A. Pancreas
B. Kidney
C. Liver
D. Spleen

10. Chronic resistance training primarily results in hyperplasia, which is the creation of brand new muscle fibers, rather than hypertrophy of existing fibers.

A. True
B. False