Name: _____ **Date:** _____

Answer Key: Think You Know Your Body? Prove Your Exercise Physiology Mastery!

Challenge your understanding of bioenergetic pathways and acute cardiovascular shifts to see if you truly grasp the mechanics of physical performance.

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1. Which of the following occurs as a result of an acute bout of aerobic exercise to meet the increased demand for oxygen delivery to peripheral tissues?

Answer: B) Hemoconcentration (reduced plasma volume)

During acute exercise, plasma volume often decreases (hemoconcentration) due to fluid shifting into interstitial spaces and sweat loss, which actually increases the concentration of red blood cells to aid oxygen transport.

2. The primary metabolic pathway utilized during a maximal effort lasting approximately 30 to 90 seconds (such as a 400-meter dash) is _____.

Answer: C) Fast Glycolysis

Fast glycolysis (anaerobic) is the dominant energy system for high-intensity activities lasting between 30 seconds and 2 minutes, as it breaks down glycogen into lactate when oxygen demand exceeds supply.

3. True or False: Hypertrophy refers to an increase in the total number of muscle fibers within a specific muscle group.

Answer: B) False

Hypertrophy is the increase in the cross-sectional area (size) of existing muscle fibers. An increase in the number of fibers is called hyperplasia, which is rarely observed in humans.

4. What chronic adaptation to the respiratory system is commonly seen in elite endurance athletes compared to sedentary individuals?

Answer: A) Increased maximum voluntary ventilation

While lung size (total capacity) does not change significantly with training, the efficiency and strength of respiratory muscles improve, leading to a higher maximum voluntary ventilation.

5. The Frank-Starling Mechanism explains how an increase in _____ leads to a more forceful cardiac contraction and increased stroke volume.

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Answer: B) End-diastolic volume (EDV)

The Frank-Starling Law states that the heart will contract more forcefully when its chambers are stretched further by a larger volume of blood (EDV) returning to the heart.

6. True or False: EPOC (Excess Post-exercise Oxygen Consumption) is the phenomenon where oxygen uptake remains elevated above resting levels for a period after exercise has stopped.

Answer: A) True

EPOC represents the 'oxygen debt' the body pays back to restore ATP/CP stores, clear lactate, and return the body to a homeostatic state (including cooling and hormone balancing).

7. Which muscle fiber type is characterized by high mitochondrial density, high resistance to fatigue, and low glycolytic capacity?

Answer: C) Type I

Type I fibers, also known as slow-twitch fibers, are designed for endurance. They rely on aerobic metabolism and are packed with mitochondria and myoglobin.

8. In exercise physiology, the 'Overload Principle' suggests that for training adaptations to occur, the body must be _____.

Answer: C) Stressed beyond its normal limits

The Overload Principle is a fundamental concept stating that physiological systems must be taxed with a greater load than they are accustomed to in order to stimulate growth or efficiency.

9. True or False: During high-intensity exercise, the Respiratory Exchange Ratio (RER) typically decreases as the body shifts from burning carbohydrates to burning fats.

Answer: B) False

RER actually increases with intensity. An RER of 0.7 indicates fat usage, while an RER of 1.0 or higher indicates primary reliance on carbohydrates and anaerobic metabolism.

10. Delayed Onset Muscle Soreness (DOMS) is most strongly associated with which type of muscle action?

Answer: D) Eccentric

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Eccentric actions (muscle lengthening under tension) cause the most micro-trauma to the sarcomeres, which is the primary driver of DOMS 24–48 hours after exercise.