

Metabolic Blueprint Quest: 11th Grade Bio-Nutrient Analysis Quiz

Evaluate hormonal regulation of satiety, the glycemic index of complex starch structures, and micronutrient bioavailability in varied physiological contexts.

1. Which hormone, secreted by adipose tissue, acts as a long-term signal to the hypothalamus to decrease food intake and increase energy expenditure?

- A. Ghrelin
- B. Leptin
- C. Glucagon
- D. Somatostatin

2. The enzymatic breakdown of _____ begins in the mouth via salivary amylase, though its glycemic impact is determined by its amylose-to-amylopectin ratio.

- A. Insoluble fiber
- B. Polypeptides
- C. Complex carbohydrates
- D. Triglycerides

3. Consuming fat-soluble vitamins (A, D, E, K) without a source of dietary lipid significantly impairs their bioavailability and absorption in the small intestine.

- A. True
- B. False

4. An athlete experiencing 'hitting the wall' during a marathon has most likely reached a state of metabolic depletion regarding which specific fuel source?

- A. Intramuscular triglycerides
- B. Adipose tissue fatty acids
- C. Liver and muscle glycogen
- D. Circulating amino acids

5. The presence of _____, a compound found in spinach and rhubarb, can form insoluble precipitates with calcium, inhibiting its absorption in the gut.

- A. Oxalic acid
- B. Ascorbic acid
- C. Folic acid
- D. Amino acids

6. Which lipoprotein is responsible for 'reverse cholesterol transport,' moving cholesterol from the peripheral tissues back to the liver for excretion?

- A. VLDL (Very Low-Density Lipoprotein)

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- B. LDL (Low-Density Lipoprotein)
- C. HDL (High-Density Lipoprotein)
- D. Chylomicrons

7. Intrinsic factor, a glycoprotein secreted by the parietal cells of the stomach, is mandatory for the absorption of Vitamin B12 in the terminal ileum.

- A. True
- B. False

8. In the context of the 'Thrifty Gene' hypothesis, what is the primary evolutionary explanation for the modern prevalence of Type 2 Diabetes?

- A. A sudden mutation in the human insulin receptor
- B. Biological adaptations for fat storage that are now maladaptive in a food-abundant environment
- C. The inability of the human body to process high-potassium foods
- D. A decline in the production of digestive enzymes over the last century

9. Vegetarians must often combine legumes with grains to obtain all nine _____, which the body cannot synthesize endogenously.

- A. Non-essential fatty acids
- B. Essential amino acids
- C. Saturated lipids
- D. Micronutrient cofactors

10. The Thermic Effect of Food (TEF) is highest for dietary fats compared to proteins and carbohydrates because fats are the most energy-dense macro-nutrient.

- A. True
- B. False