NANP Board Practice Exam (Sample)

Study Guide

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Questions

1. What type of fatty acid has exactly one double bond between carbon atoms?

A. Monounsaturated fatty acid

B. Polyunsaturated fatty acid

C. Saturated fatty acid

D. Trans fatty acid

2. Which food is one of the richest sources of creatine?

A. Broccoli

B. Lean meat

C. Pumpkin seeds

D. Salmon

3. How can the synthesis of eicosanoids be inhibited?

A. Dietary antioxidants like vitamin E, quercetin, and licorice

B. Trans fatty acids

C. Vitamin A supplements

D. Intake of olive oil

4. Which vitamin is primarily involved in blood clotting?

A. Vitamin A

B. Vitamin D

C. Vitamin K

D. Vitamin E

5. Which of the following measurements would be considered alkaline?

A. 6.5

B. 7.0

C. 7.3

D. 8.0

6. Which one of the following would be considered a macro mineral?

A. Boron

B. Iron

C. Potassium

D. Zinc

7. Why might mineral absorption be impacted by dietary fiber?

A. Fibers release minerals rapidly in the digestive tract

B. Minerals bind to fiber, becoming less available for absorption

C. Fiber increases the acidity in the digestive tract

D. Fibers neutralize nutrients in the digestive tract

8. Which mineral is most associated with a positive charge and is an essential electrolyte?

A. Boron

B. Magnesium

C. Phosphorus

D. Zinc

9. Which molecule is produced for each acetyl CoA that enters the Krebs Cycle?

A. 1 ATP

B. 3 NADH

C. FADH2

D. GTP

10. Which essential aspect of cell membranes do essential fatty acids (EFAs) help maintain?

A. Complexity

B. Fluidity

C. Permeability

D. Thickness

Answers

1. A
2. B
3. A
4. C
5. A
6. C
7. B
8. A
9. A
10. B

Explanations

1. What type of fatty acid has exactly one double bond between carbon atoms?

A. Monounsaturated fatty acid

B. Polyunsaturated fatty acid

C. Saturated fatty acid

D. Trans fatty acid

A fatty acid that has exactly one double bond between carbon atoms is classified as a monounsaturated fatty acid. This specific structure contributes to its unique properties and health benefits. Monounsaturated fatty acids, commonly found in foods such as olive oil, avocados, and certain nuts, are known to support heart health by helping to reduce bad cholesterol levels in the blood. In contrast to polyunsaturated fatty acids, which contain two or more double bonds, monounsaturated fats provide a simpler structure that can still deliver significant health benefits. Saturated fatty acids, on the other hand, do not have any double bonds and are typically solid at room temperature, often found in animal fats and some plant oils. Trans fatty acids, while they may also involve some degree of hydrogenation that creates trans configurations, are not defined solely by having one double bond. Thus, the classification as a monounsaturated fatty acid fits perfectly for the description given in the question.

2. Which food is one of the richest sources of creatine?

A. Broccoli

B. Lean meat

C. Pumpkin seeds

D. Salmon

Lean meat is recognized as one of the richest sources of creatine due to its high concentration of this compound, which is vital for energy production in muscle cells. Creatine plays a significant role in enhancing physical performance, particularly in high-intensity exercise and sports. In animal tissues, especially in muscles, creatine is found at higher levels, which is why meat, particularly lean beef and pork, is often emphasized as a primary dietary source. While salmon does contain creatine as well, its overall concentration is lower compared to lean meat. Broccoli and pumpkin seeds do not provide significant amounts of creatine, as they are plant-based sources and creatine is predominantly found in animal products. Therefore, among these options, lean meat stands out as the most substantial source of creatine.

3. How can the synthesis of eicosanoids be inhibited?

A. Dietary antioxidants like vitamin E, quercetin, and licorice

B. Trans fatty acids

C. Vitamin A supplements

D. Intake of olive oil

The synthesis of eicosanoids can be inhibited primarily through the action of dietary antioxidants, which include compounds like vitamin E, quercetin, and licorice. These antioxidants work by mitigating oxidative stress and inflammatory processes in the body, which are pivotal in the synthesis of eicosanoids—signaling molecules derived from fatty acids that play crucial roles in inflammation and immunity. Antioxidants, particularly vitamin E, have been shown to regulate inflammatory pathways and may help modulate the activity of enzymes involved in eicosanoid production, thus leading to a decreased synthesis of pro-inflammatory eicosanoids. Quercetin, a common plant flavonoid, also exhibits anti-inflammatory properties, while certain compounds in licorice can influence the biosynthesis of these molecules. In contrast, trans fatty acids are known to increase inflammation and might promote the synthesis of certain eicosanoids rather than inhibit it. Vitamin A supplements do not have a direct role in inhibiting eicosanoid synthesis and may have varied effects depending on other dietary components. Intake of olive oil, while healthful and associated with anti-inflammatory benefits, is rich in omega-3 and omega-6 fatty acids, which are precursors to eicosanoids and do not inhibit

4. Which vitamin is primarily involved in blood clotting?

A. Vitamin A

B. Vitamin D

C. Vitamin K

D. Vitamin E

The vitamin primarily involved in blood clotting is vitamin K. This vitamin plays a crucial role in the synthesis of proteins known as clotting factors, which help control bleeding. Vitamin K is essential for the conversion of certain proteins into their active forms, allowing them to function effectively in the coagulation cascade, which is vital for stopping excessive bleeding when injuries occur. While vitamin A is important for vision, immune function, and skin health, and vitamin D is critical for calcium absorption and bone health, neither contributes directly to the blood clotting process. Vitamin E is an antioxidant that helps protect cells from oxidative damage and does not play a role in the coagulation process like vitamin K does. Thus, for understanding blood clotting and its biochemical pathways, vitamin K stands out as the key nutrient involved.

5. Which of the following measurements would be considered alkaline?

A. 6.5

B. 7.0

C. 7.3

D. 8.0

The correct measurement that would be considered alkaline is 8.0. In the context of pH, any value above 7 indicates an alkaline or basic solution. A measurement of 7.0 is neutral, while values below 7 indicate acidity. As such, the values of 6.5 and 7.0 do not fall into the alkaline range. An understanding of the pH scale is crucial here. It ranges from 0 (highly acidic) to 14 (highly alkaline), with 7 as the neutral midpoint. Therefore, measurements like 7.3 and 8.0 clearly indicate a shift into alkaline territory.

6. Which one of the following would be considered a macro mineral?

A. Boron

B. Iron

C. Potassium

D. Zinc

Potassium is indeed classified as a macro mineral, essential for various bodily functions such as maintaining fluid balance, supporting nerve function, and regulating muscle contractions, including the heartbeat. Macro minerals are needed in larger amounts compared to trace minerals and play critical roles in sustaining health, with potassium being one of the most abundant minerals in the body. In contrast, the other minerals listed are categorized differently. Boron is typically regarded as a trace mineral, as it is required in much smaller amounts. Iron, while essential for health, is also considered a trace mineral despite its significant role in oxygen transport and cellular metabolism. Zinc, similar to iron and boron, is classified as a trace mineral, necessary for immune function, DNA synthesis, and wound healing but required in relatively low quantities. Thus, potassium stands out as the appropriate choice when identifying a macro mineral.

7. Why might mineral absorption be impacted by dietary fiber?

A. Fibers release minerals rapidly in the digestive tract

B. Minerals bind to fiber, becoming less available for absorption

C. Fiber increases the acidity in the digestive tract

D. Fibers neutralize nutrients in the digestive tract

Dietary fiber can indeed impact mineral absorption in the digestive tract. One way this can happen is by minerals binding to the fiber, making them less available for absorption by the body. This means that even if minerals are present in the diet, if they bind to fiber, the body may not be able to absorb them effectively. This can interfere with the body's ability to utilize essential minerals for various physiological functions.

8. Which mineral is most associated with a positive charge and is an essential electrolyte?

A. Boron

B. Magnesium

C. Phosphorus

D. Zinc

The mineral most associated with a positive charge and is an essential electrolyte is magnesium. Magnesium is a positively charged ion (cation) that plays a crucial role in many biochemical processes in the body, including muscle and nerve function, blood glucose control, and blood pressure regulation. Additionally, it is vital in the body's electrolyte balance, helping to maintain hydration and optimize cellular function. Other minerals listed, such as boron, phosphorus, and zinc, do not primarily function as essential electrolytes that exert a significant positive charge in physiological processes. While they are important for various bodily functions, they do not fulfill the same role in electrolyte balance that magnesium does.

9. Which molecule is produced for each acetyl CoA that enters the Krebs Cycle?

A. 1 ATP

B. 3 NADH

C. FADH2

D. GTP

In the Krebs Cycle, also known as the citric acid cycle or TCA cycle, each molecule of acetyl CoA that enters results in the production of multiple high-energy carriers. Specifically, for each acetyl CoA processed, three molecules of NADH and one molecule of FADH2 are generated, along with one molecule of GTP or ATP. While GTP is structurally similar to ATP and is used in some cells as an energy currency, the primary focus on the production of high-energy molecules points towards the significant role of the NADH and FADH2 generated during the cycle. These carriers are crucial for the electron transport chain, ultimately leading to the generation of ATP through oxidative phosphorylation. Thus, the most accurate and relevant answer emphasizes the extensive generation of NADH and FADH2, rather than just focusing on the production of ATP or GTP. Each acetyl CoA effectively produces three NADH, one FADH2, and one GTP, illustrating the energy yield from this essential metabolic pathway.

10. Which essential aspect of cell membranes do essential fatty acids (EFAs) help maintain?

A. Complexity

B. Fluidity

C. Permeability

D. Thickness

Essential fatty acids (EFAs) play a crucial role in maintaining the fluidity of cell membranes. Cell membranes require a balance of fluidity to function properly. EFAs, such as omega-3 and omega-6 fatty acids, are components of cell membranes and help regulate their fluidity by influencing the arrangement of phospholipids within the membrane. Proper fluidity is essential for various cellular processes, including nutrient uptake, signal transduction, and waste removal. Therefore, option B is the correct choice as EFAs contribute significantly to maintaining the optimal fluidity of cell membranes.