CISSN and ISSN-SNS EXAM STUDY GUIDE

TIPS FOR PASSING THE ISSN'S SPORTS NUTRITION CERTIFICATION EXAMS

- Read the latest publications in JISSN, www.jissn.com (the last 2 years of publications).
- Memorize the answers to the Study Guide questions listed below.
- Please study ALL of the ISSN Position Papers. They are listed below.

Review Open Access Highly accessed

International society of sports nutrition position stand: Beta-Alanine
Eric Trexler, Abbie Smith-Ryan, Jeffrey Stout, Jay Hoffman, Colin Wilborn, Craig Sale, Richard Kreider, Ralf Jäger, Conrad Earnest, Laurent Bannock, Bill Campbell, Douglas Kalman, Tim Ziegenfuss, Jose Antonio
Journal of the International Society of Sports Nutrition 2015, **12**:30 (15 July 2015)
Abstract | Full text | PDF | PubMed

Review Open Access Highly accessed
International Society of Sports Nutrition Position Stand: beta-hydroxy-beta-methylbutyrate (HMB)
Jacob M Wilson, Peter J Fitschen, Bill Campbell, Gabriel J Wilson, Nelo Zanchi, Lem Taylor, Colin Wilborn, Douglas S Kalman, Jeffrey R Stout, Jay R Hoffman, Tim N Ziegenfuss, Hector L Lopez, Richard B Kreider, Abbie E Smith-Ryan, Jose Antonio*Journal of the International Society of Sports Nutrition* 2013, **10**:6 (2 February 2013)
Abstract | Full text | PDF | PubMed | Cited on BioMed Central| Editor's summary

Review Open Access Highly accessed
International Society of Sports Nutrition position stand: energy drinks
Bill Campbell, Colin Wilborn, Paul La Bounty, Lem Taylor, Mike T Nelson, Mike Greenwood, Tim N Ziegenfuss, Hector L Lopez, Jay R Hoffman, Jeffrey R Stout, Stephen Schmitz, Rick Collins, Doug S Kalman, Jose Antonio, Richard B Kreider*Journal of the International Society of Sports Nutrition* 2013, **10**:1 (3 January 2013)
Abstract | Full text | PDF | PubMed | Cited on BioMed Central| Editor's summary

Review Open Access Highly accessed
International Society of Sports Nutrition position stand: meal frequency
Paul M La Bounty, Bill I Campbell, Jacob Wilson, Elfego Galvan, John Berardi, Susan M Kleiner, Richard B Kreider, Jeffrey R Stout, Tim Ziegenfuss, Marie Spano, Abbie Smith, Jose Antonio*Journal of the International Society of Sports Nutrition* 2011, **8**:4 (16 March 2011)
Abstract | Full text | PDF | PubMed | Cited on BioMed Central

Review Open Access Highly accessed
ISSN exercise & sport nutrition review: research & recommendations
Richard B Kreider, Colin D Wilborn, Lem Taylor, Bill Campbell, Anthony L Almada, Rick Collins, Mathew Cooke, Conrad P Earnest, Mike Greenwood, Douglas S Kalman, Chad M Kerksick, Susan M Kleiner, Brian Leutholtz, Hector Lopez, Lonnie M Lowery, Ron Mendel, Abbie Smith, Marie Spano, Robert Wildman, Darryn S Willoughby, Tim N Ziegenfuss, Jose Antonio*Journal of the International Society of Sports Nutrition* 2010, **7**:7 (2 February 2010)
Abstract | Full text | PDF | PubMed | Cited on BioMed Central

Review Open Access Highly accessed
International society of sports nutrition position stand: caffeine and performance
Erica R Goldstein, Tim Ziegenfuss, Doug Kalman, Richard Kreider, Bill Campbell, Colin Wilborn, Lem Taylor, Darryn Willoughby, Jeff Stout, B Sue Graves, Robert Wildman, John L Ivy, Marie Spano, Abbie E Smith, Jose Antonio*Journal of the International Society of Sports Nutrition* 2010, **7**:5 (27 January 2010)
Abstract | Full text | PDF | PubMed | Cited on BioMed Central

Review Open Access Highly accessed

International Society of Sports Nutrition position stand: Nutrient timing

Chad Kerksick, Travis Harvey, Jeff Stout, Bill Campbell, Colin Wilborn, Richard Kreider, Doug Kalman, Tim Ziegenfuss, Hector Lopez, Jamie Landis, John L Ivy, Jose Antonio*Journal of the International Society of Sports Nutrition* 2008, **5**:17 (3 October 2008)

Abstract | Full text | PDF | PubMed | Cited on BioMed Central

Commentary Open Access Highly accessed

International Society of Sports Nutrition position stand: protein and exercise

Bill Campbell, Richard B Kreider, Tim Ziegenfuss, Paul La Bounty, Mike Roberts, Darren Burke, Jamie Landis, Hector Lopez, Jose Antonio*Journal of the International Society of Sports Nutrition* 2007, **4**:8 (26 September 2007)

Abstract | Full text | PDF | PubMed | Cited on BioMed Central

Commentary Open Access Highly accessed

International Society of Sports Nutrition position stand: creatine supplementation and exercise

Thomas W Buford, Richard B Kreider, Jeffrey R Stout, Mike Greenwood, Bill Campbell, Marie Spano, Tim Ziegenfuss, Hector Lopez, Jamie Landis, Jose Antonio*Journal of the International Society of Sports Nutrition* 2007, **4**:6 (30 August 2007)

Abstract | Full text | PDF | PubMed | Cited on BioMed Central

STUDY GUIDE QUESTIONS

1. Explain how carnosine is synthesized within the body.
2. What is a waxy maize starch and what effect does it have on blood glucose?
3. Based on recent studies, which vitamin shows evidence of positively affecting muscle function? Hint: sunshine
4. Regarding energy drinks (ED), are the following true or false?
    - The primary ergogenic nutrients in most ED and ES appear to be carbohydrate and/or caffeine.
    - The ergogenic value of caffeine on mental and physical performance has been well-established but the potential additive benefits of other nutrients contained in ED and ES remains to be determined.
    - Consuming ED 10-60 minutes before exercise can improve mental focus, alertness, anaerobic performance, and/or endurance performance.
5. What is needed for gluconeogenesis in humans? Give examples of gluconeogenic precursors.
6. What effect does long-term coffee consumption have on Type II Diabetes?
7. What effect does supplementing with WPI have on muscle damage?
8. When glycogen stores are depleted, what macronutrient becomes the predominant fuel source during distance running?
9. What are the effects of pre-exercise dehydration on thermoregulation and exercise performance?
10. What are the effects of L-alanyl-L-glutamine supplementation on time-to- exhaustion and dehydration stress?
11. What effects can a low-carbohydrate diet have on prolonged physical activity?
12. Approximately how many days of heat exposure does it take to fully acclimate to exercising in the heat?
13. What is HICA and what are the effects of its supplementation for a period of 4 weeks? (See www.jissn.com)
14. What is a BOD POD? DEXA?

15. Compare fat and carbohydrate oxidation during exercise. Under what conditions does one fuel source predominate over the other?
16. What effect does betaine supplementation have on exercise performance? (See www.jissn.com)
17. Chronic heavy resistance training causes what adaptations in skeletal muscle?
18. Regular aerobic training causes what adaptations in skeletal muscle?
19. What has the greatest effect on the sedentary person's daily energy expenditure? (i.e. TEF, RMR, NEAT or Activity)
20. What activities or sports use ATP-PCr energy system as the main energy system?
21. What dose of creatine, after creating loading, will maintain elevated creatine levels for 28 days?
22. What role do vitamins play in metabolism?
23. Where does most of the energy for ATP phosphorylation come from?
24. What does pre-exercise ingestion of glycerol do?
25. What is the glucose-alanine cycle?
26. What is the Cori cycle?
27. Why is fat considered to be the ideal cellular fuel?
28. What are essential amino acids? What are some conditionally essential amino acids?
29. What is the process of glycogen synthesis called?
30. What is the main function of a carbohydrate?
31. Compare/contrast creatine monohydrate and creatine ethyl ester. (see www.jissn.com)
32. What is the primary fuel source for high-jump? 1500 meter run? Marathon?
33. Know the equivalent kcal values for 1g of carbohydrate, 1g fat and 1 g protein.
34. What is beta-alanine and what does it do when ingested during intense training?
35. What are the effects of creatine supplementation?
36. What is the SI unit for energy?
37. What is sweat and where does it come from?
38. Which activities or sports use aerobic energy system as the main energy system?
39. What is protein and what is it used for in the body?
40. What are skeletal muscle satellite cells? Their function(s)?
41. Describe the effects of chronic aerobic exercise on resting and exercise HR, Q, and SV. What are its effects on cardiac muscle?
42. Describe the difference between glycemic load and glycemic index.
43. Which amino acid is considered to be the most naturally abundant in plasma and skeletal muscle?
44. What nutrients improve or support immune system function?
45. What is the thermic effect of fat? Protein? Carbohydrate?
46. What is the relationship of anabolic steroid use to plasma lipids? (see publication by Bhasin et al.)
47. Know the differences between Type I and Type IIa, IIx skeletal muscle fibers.
48. What is lactate?
49. What is the rate limiting step in glycolysis?
50. The process of splitting triglycerides is known as what?
51. What organ(s) is/are involved in nitrogen elimination?
52. During which process do amino acids lose their amine or nitrogen group and where does it happen?
53. What are the functions of vitamins C, E and beta-carotene?

54. What is/are the mechanism(s) for caffeine's ergogenic effect during exercise?
55. What acts as an antioxidant within the respiratory chain?
56. How does dietary fiber reduce the amount of food that may be absorbed?
57. What nutrients are difficult to get in a vegetarian diet?
58. What body systems are affected by supplementation with omega-3 rich fish oils? (see www.jissn.com)
59. Which common food (hint: a drink) has been shown to be an effective aid to post-exercise muscle recovery?
60. Know the differences between labeling such as "Nutrition facts" versus "Dietary facts" and other labels and what categories they pertain to.
61. List the trace minerals.
62. What are the functions of testosterone in men and women?
63. List the fat-soluble and water-soluble vitamins.
64. What serves as the major source of carbohydrate energy during exercise?
65. Is caffeine banned by the International Olympic Committee? Creatine? Whey protein?
66. How does an extremely high-protein/low-carbohydrate diet affect appetite?
67. What does calcium do in the body?
68. What are the functions of cholesterol?
69. Be able to explain how blood lactate changes during incremental exercise.
70. What is protein's role as fuel during exercise?
71. What are major lipids and what are they comprised of? Their structure?
72. What are the differences in thermoregulation between men and women?
73. What is L-carnitine?
74. What is GPLC? What effect does it seem to have on exercise metabolism and performance (see www.jissn.com)?
75. What are retinoids? List them.
76. Know various reactions involving creatine kinase, creatine phosphorylase, ATP kinase, and ATP phosphorylase.
77. What is the effect of carbohydrate consumption before vs. during the exercise?
78. What is phosphatidylserine and what are its purported ergogenic effects?
79. What is IGF-1 and where is it produced?
80. Know the correlation between high/low fat diet and testosterone.
81. Know the contractile and cytoskeletal proteins in skeletal muscle.
82. Name the branched chain amino acids.
83. What is the RDA for protein?
84. How does overfeeding on protein affect body composition? That is, does it result in an increase in body fat?
85. What is the effect of frequent feeding (i.e. 6 meals a day) on appetite and metabolic rate? (see www.jissn.com)
86. Know the rate of absorption of glucose and fructose.
87. What is the Female Athlete Triad?
88. What are most commonly-found electrolytes in the body?
89. What are the energy-generating capacities of the body's three main energy systems?
90. How can an athlete increase their muscle protein synthesis after they perform resistance training?

91. Know examples of mono-, di- and polysaccharides.
92. What is a major gluconeogenic amino acid?
93. Know sports that use lactic acid energy system as primary energy system.
94. What is the function of cholesterol? What is HDL-, LDL- and VLDL- cholesterol?
95. Understand maximal oxygen uptake and aerobic power. What is the primary limitation of $V0_2max$?
96. Where does glycolysis occur in the cell? The Krebs cycle?
97. Why is carbohydrate considered the preferred fuel source for intense exercise?
98. What are the effects of caffeine on metabolism?
99. What type of cyanobacterium improves fat oxidation?
100. Which amino acid, together with insulin, allows protein synthesis to be coordinated with dietary intake?
101. Which 3 sources supply the body's primary needs for water?
102. What is an effective post-workout meal if the goal is promoting skeletal muscle hypertrophy via the enhancement of muscle protein synthesis?
103. Know these terms: ergogenic aid, exergonic reaction and endergonic reaction.
104. Know the factors that determine total daily energy expenditure.
105. What minerals may be depleted as a result of sweating?
106. Know the effects of (excessive) sweating during exercise.
107. What is the main fuel source during light to moderate exercise?
108. What is a vitamin megadose and how does it relate to RDA?
109. What are the effects of a decrease in intramuscular pH secondary to intense anaerobic exercise? What is the primary fate of lactate?
110. What is plasma homocysteine levels a marker of?
111. What are the effects of Vitamin D on cardiovascular health?
112. What are anabolic hormones with respect to skeletal muscle?
113. What are the effects of glycogen storage on body mass? That is, how much water is stored with glycogen (gram for gram)?
114. What is considered dehydration as it relates to percent change in body weight?
115. What are the metabolic effects of vanadyl sulfate?
116. The body is unable to oxidize the nitrogen component of which macromolecule?
117. How does low-glycemic carbohydrate intake affect the body during exercise?
118. Know approximate glycemic indices for various carbohydrate sources
119. Understand oxidative stress and free radicals.
120. What are the contributors to the anti-oxidant capacity of blood?
121. Which supplement(s) improves buffering capacity during intense exercise?
122. Know trace minerals and general functions.
123. What is HMB? Effects on LBM?
124. Are the following true or false regarding HMB supplementation?
    - Currently, two forms of HMB have been used: Calcium HMB (HMB-Ca) and a free acid form of HMB (HMB-FA). HMB-FA may increase plasma absorption and retention of HMB to a greater extent than HMB-CA.
    - HMB has been demonstrated to increase LBM and functionality in elderly, sedentary populations.
125. The intake of which vitamins, below RDA, can result in physical performance impairment?

126. What are the effects of pre-exercise bicarbonate loading?
127. What are the effects of losing weight through diet only? Diet plus exercise?
128. What is complete cessation of the menstrual cycle called?
129. Understand the benefits in the timing for essential amino acid ingestion as it relates to exercise.
130. Know the general roles of Calcium, Potassium and Sodium.
131. Which vitamins play a major role in body's metabolism?
132. What effect does elevated blood glucose have on beta cells of the pancreas?
133. What serves as the predominant energy source for the body as the exercise intensity increases and in which part of the body is it stored?
134. What are ketones? How are they produced?
135. Know RER's (respiratory exchange ratios) for carbohydrate, fat and protein.
136. Know the functions of glutamine.
137. Know these terms: placebo-controlled and double-blind.
138. What are the effects of supplementation with oat bran on muscle glycogen? (See www.jissn.com)
139. What are functions of cholesterol?
140. What are functions of alpha-hydroxy-isocaproic acid supplementation?
141. Know dietary sources of unsaturated and saturated fatty acids.
142. Differentiate amylose, amylopectin, cellulose and hemicellulose.
143. What prepares the fatty acids to enter the Krebs cycle?
144. What population sees the greatest effect from beta-hydroxy-beta- methylbutyrate (HMB) supplementation?
145. Which skeletal muscle protein determines the contractile speed of a muscle fiber?
146. Supplementation with glutamine and phosphatidylserine is used to counteract the effects of which catabolic hormone?
147. Increased insulin sensitivity and improved glucose metabolism are benefits of what supplement?
148. What is the primary active ingredient of Bitter Orange or Citrus Aurantium?
149. What is the required dose for beta-alanine (to achieve an ergogenic effect)?
150. Which buffer is responsible for regulating the acid-base balance in the kidneys and the intracellular fluids?
151. What is the type of fatty acid that contains two or more double bonds along the main carbon chain?
152. What are the effects of quercetin on exercise?
153. What is EGCG?
154. What are cellular mechanisms governing the ergogenic benefits of beta-alanine, creatine, caffeine and protein (vis a vis nutrient timing)?
155. What is the main energy systems used for sprint events lasting less than 10 seconds?
156. What is the primary fate of lactate upon the cessation of intense exercise?
157. What is the difference between motor unit recruitment and rate coding?
158. What is the main difference between whey protein concentrate, whey protein isolate and whey protein hydrolysate?
159. What effect does ATP supplementation have on blood flow?

160. What effect does BCAA plus Taurine supplementation have on exercise-induced DOMS?
161. Does the production of lactate and H+ result in DOMS?