Protein diet in athletes

Science, Biology

Protein Diet in Athletes Affiliation Protein Diet in Athletes Introduction

Proteins serve various functions in the body including building and repairing of muscle and tissues, synthesis of red blood cells, hormones and enzymes as well as energy production. In highly physical activities such as athletics, the adequacy of Recommended Dietary Allowance (RDA) and the role of the amino acid on performance are debatable.

Protein Dietary Requirement for Athletes

Protein requirement in athletes depends on various factors including the type of athlete, body weight, total energy intake, training status, intensity and duration of exercise. The American College of Sports Medicine, the Dietitians of Canada, and the American Dietetic Association noted that athletes require about 150 – 200 percent more proteins than the RDA protein requirement of 0. 8g/kg/day. Moreover, resistance athletes who want to build muscle mass and strength require higher amounts of proteins than endurance-trained athletes. The standard requirement for endurance and resistance athletes is 1. 2 to 1. 4 g/kg/day and 1. 6 to 1. 7 g/kg/day respectively. Clark (2013) recommended the following diet to provide 1. 3 -2. 0 g/kg of proteins per day and supply 35 percent energy for a growing athlete. Meat, beans and eggs of 7g each; bread and cereal of 4g each, milk of 4g and Vegetable 2g.

The importance of protein anabolism and catabolism in muscle building activities

The muscle growth depends on the balance between protein synthesis (anabolism) and protein breakdown (catabolism). Exercise affects this balance and for activities that cause muscle hypertrophy, the anabolic

process must exceed the catabolic process. In highly physically active individuals, proteins enhance nitrogen retention and prevent protein catabolism during prolonged exercise. Besides, they prevent sports anemia and resynthesize muscle glycogen after exercise. The balance between anabolic and catabolic processes in the body can be determined by the essential amino acid, leucine. A positive leucine balance indicates the presence of the acid in the cells that favor protein anabolism. Decrease in amino acid availability due to low protein intake increases muscle protein catabolism while increased amino acid availability stimulates muscle protein synthesis and greater muscle anabolism. Hormones such as insulin and testosterone also play a role in muscle protein synthesis and hypertrophy. After exercise, insulin inhibits further muscle protein breakdown, and when small amounts of amino acids are ingested with carbohydrates, transient muscle protein anabolism occurs since carbohydrates restore supply.

Amino acid supplementation and impact the athlete’s performance

No consensus has been reached on the role of amino acid supplementation on athlete’s performance. Williams (2005) noted that when branched-chain amino acids (BCAA) supplementation is used before and after exercise, it decreases exercise-induced muscle damage as well as promoting muscle protein synthesis. However, the Dietary Reference Intakes (DRI) for protein and the National Academy of Sciences noted that healthy individuals in resistance or endurance exercise do not require additional dietary protein. In improving athletic performance, amino acids are thought to increase anabolic hormones secretion, modify energy consumption during exercise, and prevent mental fatigue and adverse effects of overtraining (Williams,

2005). BCAA supplementation reduces mental fatigue during prolonged exercise, improves cognitive performance after exercise and may improve physical performance. Ohtani, Sugita, & Maruyama (2006) also noted that a mixture of branched amino acids, arginine and glutamate had beneficial effects on muscle function, fatigue, and recovery in exercising athletes. Thus, there is evidence of improved training efficiency.

References

Clark, N. (2013). Nancy Clarks Sports Nutrition Guidebook, 5E. Human Kinetics.

Ohtani, M., Sugita, M., & Maruyama, K. (2006). Amino acid mixture improves training efficiency in athletes. The Journal of nutrition, 136(2), 538S-543S.

Williams, M. (2005). Dietary supplements and sports performance: amino acids. J Int Soc Sports Nutr, 2(2), 63-67.