

[International Society of Sports Nutrition position stand: Nutrient timing.](#)

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ABSTRACT: Position Statement: The position of the Society regarding nutrient timing and the intake of carbohydrates, proteins, and fats in reference to healthy, exercising individuals is summarized by the following eight points:

1.) Maximal endogenous glycogen stores are best promoted by following a high-glycemic, high-carbohydrate (CHO) diet (600 - 1000 grams CHO or ~8 - 10 g CHO/kg/d), and ingestion of **free amino acids** and protein (PRO) alone or in combination with CHO before resistance exercise can maximally stimulate protein synthesis.

2.) During exercise, CHO should be consumed at a rate of 30 - 60 grams of CHO/hour in a 6 - 8% CHO solution (8 - 16 fluid ounces) every 10 - 15 minutes. Adding PRO to create a CHO:PRO ratio of 3 - 4:1 may increase endurance performance and maximally promotes glycogen re-synthesis during acute and subsequent bouts of endurance exercise.

3.) Ingesting CHO alone or in combination with PRO during resistance exercise increases muscle glycogen, offsets muscle damage, and facilitates greater training adaptations after either acute or prolonged periods of supplementation with resistance training.

4.) Post-exercise (within 30 minutes) consumption of CHO at high dosages (8 - 10 g CHO/kg/day) have been shown to stimulate muscle glycogen re-synthesis, while adding PRO (0.2 g - 0.5 g PRO/kg/day) to CHO at a ratio of 3 - 4:1 (CHO: PRO) may further enhance glycogen re-synthesis.

5.) Post-exercise ingestion (immediately to 3 h post) of amino acids, primarily **essential amino acids**, has been shown to stimulate robust increases in muscle protein synthesis, while the addition of CHO may stimulate even greater levels of protein synthesis. Additionally, **pre-exercise consumption** of a CHO + PRO supplement may result in peak levels of **protein synthesis**.

6.) During consistent, prolonged resistance training, post-exercise consumption of varying doses of CHO + PRO supplements in varying dosages have been shown to stimulate improvements in **strength and body composition** when compared to control or placebo conditions.

7.) The addition of creatine (Cr) (0.1 g Cr/kg/day) to a CHO + PRO supplement may facilitate even greater adaptations to resistance training.

8.) Nutrient timing incorporates the use of methodical planning and eating of whole foods, nutrients extracted from food, and other sources. The timing of the energy intake and the ratio of certain ingested macronutrients are likely the attributes which allow for enhanced recovery and tissue repair following high-volume exercise, augmented muscle protein synthesis, and improved mood states when compared with unplanned or traditional strategies of nutrient intake.