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Understanding Protein Timing + Intake to Build Muscle

Cut the confusion with protein intake with these practical findings from the latest research.

Protein timing and intake are essential for optimal muscle hypertrophy, but which is most important? Net protein balance regulates whether the body will promote protein synthesis or breakdown (Deldicque). In this article, we'll answer some of your biggest questions regarding protein if muscle hypertrophy is your goal. These questions include protein timing, quantity, and quality.

Protein Timing

We all want to get the most bang for our buck regarding protein intake. How often should you consume protein during workouts and throughout the day? Luckily, you don't have to put too much pressure on yourself to time your protein intake because research shows that total daily protein intake is the most decisive factor in hypertrophy (Schoenfeld). These findings dispel the belief that protein timing around a training session is critical.

A meta-analysis on the role of protein timing and hypertrophy analyzed studies that utilized different protein timing, such as not around a workout and right after or before a workout (Wirth). Protein supplementation had a significant impact on hypertrophy independent of its timing. You should focus on increasing the overall protein intake instead of trying to time it in a particular way.

The International Society of Sports Nutrition's 2017 position on protein also emphasizes total protein intake. However, contrary to recent recommendations, ISSN recommends protein within 2 hours of a workout and spaced daily intake every 3-4 hours with up to a 40g dose (9).

Protein Quantity

Now that we know that the anabolic window of opportunity for protein timing isn't restricted to near the workout but rather the entire day, how much protein is needed for hypertrophy? The Recommended Dietary Allowance 10th edition suggests 0.8g/kg/day of protein intake (RDA). However, this has been known to be too little for a while now (Jager). The Acceptable Macronutrient Distribution Range recommends intakes of protein between 10-35% of daily caloric intake (Wolfe).

Active people should not be close to the RDA of 0.8g/kg/day since that was created for the minimum to prevent muscle protein breakdown and does not consider activity level. The AMDR of 10-35% caloric intake, or 1.05–3.67 g/kg/day, is more appropriate. For healthy adults who exercise, 1-1.6g/kg/day may be relevant.

A higher protein intake may be recommended for weight loss adults in a caloric deficit. For example, in a study with participants in a 40% caloric deficit, the 2.4 g/kg/day group resulted in more muscle preservation and more fat mass loss compared to a group consuming 1.2 g/kg/day (Longland). Increased satiety, reduced hunger, and mitigated stress were also found in weight loss adults near 2.8 g/kg/day compared to 1.8 g/kg/day (Roberts, Helms).

Higher protein intake is also recommended for those looking to put on muscle. The research ranges from 1.6-2.7 g/kg/day of protein (Roberts). Since there is currently little evidence that high protein intake negatively impacts health in healthy populations, 1.8-2.7 g/kg/day, or up to 3.5 g/kg/day to mitigate hunger, is recommended as long as fat or carbohydrate in the diet isn't displaced to the degree that it impairs performance.

Protein Quality

Studies comparing plant vs animal protein often measure muscle protein synthesis or strength and hypertrophy gains. Muscle protein synthesis doesn't always mean strength and hypertrophy will increase practically (Witard). Therefore, it is essential to focus more on the studies that show practical chronic differences, such as increased strength and hypertrophy, rather than acute muscle protein synthesis changes.

Omnivorous and vegan diets can support similar muscle size and strength during prolonged high-volume resistance training, irrespective of the type of dietary protein (Monteyne, Hevia). Therefore, a carefully designed vegan diet can support optimal muscle improvements to resistance training. Pea protein has the best amino acid profile for vegans.

Conclusion

While the timing of protein intake around workouts may not be as critical as once thought, the total daily protein intake remains the most important factor for muscle hypertrophy. Research consistently supports prioritizing overall protein consumption, with recommendations varying depending on individual goals, activity levels, and dietary preferences. For those aiming to build muscle, a protein intake of 1.6-2.7 g/kg/day is generally ideal, with higher intakes potentially benefiting those in a caloric deficit or looking to mitigate hunger. Both plant and animal proteins can be effective for hypertrophy, with well-planned vegan diets offering comparable results to omnivorous ones. Ultimately, focusing on total protein intake and quality will maximize hypertrophy and support overall muscle growth.

References

1. Deldicque L. Protein Intake and Exercise-Induced Skeletal Muscle Hypertrophy: An Update. Nutrients. 2020 Jul 7;12(7):2023. doi: 10.3390/nu12072023. PMID: 32646013; PMCID: PMC7400877.

2. Kerksick CM, Arent S, Schoenfeld BJ, Stout JR, Campbell B, Wilborn CD, Taylor L, Kalman D, Smith-Ryan AE, Kreider RB, Willoughby D, Arciero PJ, VanDusseldorp TA, Ormsbee MJ, Wildman R, Greenwood M, Ziegenfuss TN, Aragon AA, Antonio J. International society of sports nutrition position stand: nutrient timing. J Int Soc Sports Nutr. 2017 Aug 29;14:33. doi: 10.1186/s12970-017-0189-4. PMID: 28919842; PMCID: PMC5596471.

3. Wirth J, Hillesheim E, Brennan L. The Role of Protein Intake and its Timing on Body Composition and Muscle Function in Healthy Adults: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. J Nutr. 2020 Jun 1;150(6):1443-1460. doi: 10.1093/jn/nxaa049. PMID: 32232404.

4. Schoenfeld BJ, Aragon AA, Krieger JW. The effect of protein timing on muscle strength and hypertrophy: a meta-analysis. J Int Soc Sports Nutr. 2013 Dec 3;10(1):53. doi: 10.1186/1550-2783-10-53. PMID: 24299050; PMCID: PMC3879660.

5. J Nutr. 2023 Jun;153(6):1680-1695. doi: 10.1016/j.tjnut.2023.02.023. Epub 2023 Feb 22.

6. National Research Council (US) Subcommittee on the Tenth Edition of the Recommended Dietary Allowances. Recommended Dietary Allowances: 10th Edition. Washington (DC): National Academies Press (US); 1989. 6, Protein and Amino Acids. Available from: https://www.ncbi.nlm.nih.gov/books/NBK234922/

7. Jäger R, Kerksick CM, Campbell BI, Cribb PJ, Wells SD, Skwiat TM, Purpura M, Ziegenfuss TN, Ferrando AA, Arent SM, Smith-Ryan AE, Stout JR, Arciero PJ, Ormsbee MJ, Taylor LW, Wilborn CD, Kalman DS, Kreider RB, Willoughby DS, Hoffman JR, Krzykowski JL, Antonio J. International Society of Sports Nutrition Position Stand: protein and exercise. J Int Soc Sports Nutr. 2017 Jun 20;14:20. doi: 10.1186/s12970-017-0177-8. PMID: 28642676; PMCID: PMC5477153.

8. Wolfe RR, Cifelli AM, Kostas G, Kim IY. Optimizing Protein Intake in Adults: Interpretation and Application of the Recommended Dietary Allowance Compared with the Acceptable Macronutrient Distribution Range. Adv Nutr. 2017 Mar 15;8(2):266-275. doi: 10.3945/an.116.013821. PMID: 28298271; PMCID: PMC5347101.

9. J Int Soc Sports Nutr. 2017 Aug 29;14:33. doi: 10.1186/s12970-017-0189-4

1. Longland TM, Oikawa SY, Mitchell CJ, Devries MJ, Phillips SM. Higher compared with lower dietary protein during an energy deficit combined with intense exercise promotes greater lean mass gain and fat mass loss: a randomized trial. Am J Clin Nutr. 2016;103:738–46.

2. Roberts J, Zinchenko A, Mahbubani K, Johnstone J, Smith L, Merzbach V, Blacutt M, Banderas O, Villasenor L, Varvik FT, Henselmans M. Satiating Effect of High Protein Diets on Resistance-Trained Subjects in Energy Deficit. Nutrients. 2018. p. 11.

3. Helms ER, Zinn CR, Rowlands DS, Naidoo R, Cronin J. High-protein, low-fat, short-term diet results in less stress and fatigue than moderate-protein moderate-fat diet during weight loss in male weightlifters: a pilot study. Int J Sport Nutr Exerc Metab. 2015;25:163–70.

4. Roberts BM, Helms ER, Trexler ET, Fitschen PJ. Nutritional Recommendations for Physique Athletes. J Hum Kinet. 2020 Jan 31;71:79-108. doi: 10.2478/hukin-2019-0096. PMID: 32148575; PMCID: PMC7052702.

5. Witard OC, Bannock L, Tipton KD. Making Sense of Muscle Protein Synthesis: A Focus on Muscle Growth During Resistance Training. Int J Sport Nutr Exerc Metab. 2022 Jan 1;32(1):49-61. doi: 10.1123/ijsnem.2021-0139. Epub 2021 Oct 25. PMID: 34697259.

6. Monteyne AJ, Coelho MOC, Murton AJ, Abdelrahman DR, Blackwell JR, Koscien CP, Knapp KM, Fulford J, Finnigan TJA, Dirks ML, Stephens FB, Wall BT. Vegan and Omnivorous High Protein Diets Support Comparable Daily Myofibrillar Protein Synthesis Rates and Skeletal Muscle Hypertrophy in Young Adults. J Nutr. 2023 Jun;153(6):1680-1695. doi: 10.1016/j.tjnut.2023.02.023. Epub 2023 Feb 22. PMID: 36822394; PMCID: PMC10308267.

7. Hevia-Larraín V, Gualano B, Longobardi I, Gil S, Fernandes AL, Costa LAR, Pereira RMR, Artioli GG, Phillips SM, Roschel H. High-Protein Plant-Based Diet Versus a Protein-Matched Omnivorous Diet to Support Resistance Training Adaptations: A Comparison Between Habitual Vegans and Omnivores. Sports Med. 2021 Jun;51(6):1317-1330. doi: 10.1007/s40279-021-01434-9. Epub 2021 Feb 18. PMID: 33599941.