

# July 26, 2018

Continuing our discussion from last week regarding macronutrients, this week's focus will be on the second out of three macronutrients: protein.

## *Macronutrient of the Week: Protein (PRO)*

Protein is a macronutrient that contains carbon, hydrogen, oxygen, and nitrogen atoms. Protein plays a role in metabolism, our immune system, maintaining fluid balance, transporting nutrients, and even provides energy in some situations (Thompson, Manore, & Vaughan, 2014, p. 218). Like carbohydrates, protein contains 4 kcal/gram and common sources are meat, poultry, fish, eggs, beans, grains, nuts and seeds, and even small amounts in vegetables (Bonci, 2009, p. 22).

Proteins consist of various combinations of amino acids (molecules that contain nitrogen, and when amino acids combine, they form various proteins) (Thompson, Manore, & Vaughan, 2014, p. 218). Amino acids are divided into two categories: essential and nonessential. Essential amino acids are those that the body cannot produce or cannot produce in large enough quantities to meet the body's needs (Thompson, Manore, & Vaughan, 2014, p. 219). Nonessential amino acids are equally as important as essential amino acids to the body, but our body can make enough of them, so they do not necessarily need to be consumed in our diet (Thompson, Manore, & Vaughan, 2014, p. 220). A list of essential and nonessential amino acids can be found on the next page.

Food sources containing protein are classified into two categories: complete and incomplete. This classification describes the amino acid profile of each food. Those which contain all the essential amino acids are considered complete proteins (protein from animal sources, soy, and quinoa) and those which do not contain all the essential amino acids in sufficient amounts are considered incomplete. Just because a food is considered an incomplete source of protein, does not mean it is a bad source. Two or more incomplete protein foods can be combined to create complete protein combinations. It is not necessary to consume complementary protein foods at the same meal either, you can eat them at different times during the day and it will still provide your body with the amino acids it needs (Thompson, Manore, & Vaughan, 2014, p. 227)! Examples of complementary foods can be found on the next page as well.

## *Why do we need protein?*

Proteins are constantly being broken down, repaired, and replaced within the body. They are essential for cell growth, repair, and maintenance (think muscle and other bodily tissues and organs), assisting in the transport and storage of nutrients, creating compounds such as neurotransmitters, hormones, and enzymes, and providing energy under certain circumstances. They also play a role in maintaining the following: fluid and electrolyte balance, acid-base balance, and supporting a strong immune system (Thompson, Manore, & Vaughan, 2014, p. 231-234). Protein is also necessary for the body to produce hemoglobin (the iron-containing protein in red blood cells that carries oxygen in the blood) (Bonci, 2009, p. 21).

## *Importance for athletes*

Ensuring athletes consume adequate amounts (not too little or too much) of protein is crucial. Athletes who do not consume enough protein are at risk for having decreased muscle mass, a suppressed immune system, delayed or impaired recovery, and are at higher risk for injury. On the other hand, athletes who consume too much protein are at higher risk for dehydration, increasing fat stores, are prone to quicker fatigue placing performance in jeopardy, and often are not meeting their carbohydrate needs (Bonci, 2009, p. 22). This said, athletes increasing intensity, frequency, or duration of training will need more protein (0.7-0.9g/lb bodyweight) to help synthesize more red blood cells and myoglobin (protein in muscle cells that carries oxygen) as well as to aid in recovery from these workouts (Bonci, 2009, p. 24).

## *How much do you need?*

How much protein you need depends on your level of activity, how intensely you exercise/the type of exercise you are partaking in, and the sources of protein you are consuming. Sedentary individuals will require less protein than an active individual, and strength athletes will require more protein than endurance athletes. Regarding requirements based on the source of protein, if you are choosing foods such as beans, grains, and/or vegetables to meet your protein needs, you will need to consume more of these foods than if you were consuming animal sources of protein. Also, protein from plant sources may not be as bio-available to the body as those from animal sources, again meaning you may need to consume more of these foods to satisfy your requirements. On the next two pages, you will find tables to help you get a general idea for how much protein you should be consuming, as well as lists of various foods and their protein contents per serving.

*Note:* It is best to get your protein from whole foods, try to avoid relying on sports bars and other processed foods to meet your protein requirements. While they can be convenient for a quick after-practice snack, other options such as [Soz of chocolate milk](#) (or any type of milk), trail mix with various types of nuts, a small container of Greek yogurt with granola (or a smoothie with Greek yogurt), or a peanut butter sandwich (if you can stomach heavier food after a workout) are great whole food options for a post-workout snack!

## *Protein for the vegetarian athlete*

While it may seem like most of the information regarding sports nutrition is geared towards meat-eaters, it is in fact possible to be a healthy and successful vegetarian athlete. You can substitute lentils, beans, whole grains, and certain vegetables for meat in almost any recipe, and there are so many resources for these types of recipes out there and instructions on how to make them. Here are a few of the ones I have found to be pretty good: [Naturally Ella](#), [My New Roots](#), [Oh She Glows](#), [Minimalist Baker](#), and [Oh My Veggies](#). In addition, [here](#) are [two](#) good resources for the vegetarian athlete to check out!

You can reference the tables below to see just how much protein is in a typical serving of foods you may eat every day, and this can help to give you an idea of how much protein you are eating in relation to how much you need.

**TABLE 6.1 Amino Acids of the Human Body**

Essential Amino Acids	Nonessential Amino Acids
<i>These amino acids must be consumed in the diet.</i>	<i>These amino acids can be manufactured by the body.</i>
Histidine	Alanine
Isoleucine	Arginine
Leucine	Asparagine
Lysine	Aspartic acid
Methionine	Cysteine
Phenylalanine	Glutamic acid
Threonine	Glutamine
Tryptophan	Glycine
Valine	Proline
	Serine
	Tyrosine

*Above: List of essential and nonessential amino acids*

**Protein Requirements for Various Types of Athletes**

Type of athlete	Daily protein requirement, g/lb (g/kg) of body weight
Recreational athlete	.5-.75 (1.1-1.6)
Competitive athlete	.6-.9 (1.3-2)
Athlete building mass	.7-.9 (1.5-2)
Teenage athlete	.9-1.0 (2-2.2)
Athlete restricting intake (e.g., crew, wrestling)	.7-.9 (1.5-2)
Maximal usable amount by athletes in weight-class sports (e.g., crew, wrestling)	.9 (2.0)

*Above: Protein requirements for various activity levels*

**Breakfast**

- Add peanut butter to toast
- Add a scoop of nonfat dry milk powder to oatmeal
- Have cottage cheese instead of yogurt
- Have a hardboiled egg

**Lunch**

- Add two more slices of turkey or ham to the sandwich
- Add another slice of cheese
- Choose milk instead of juice, water, sports drinks, or carbonated beverages

**Snacks**

- Have a handful of nuts instead of pretzels
- Have tortilla chips and bean dip instead of potato chips with sour cream dip
- Make a yogurt, milk, and fruit smoothie

**Dinner**

- Have a larger piece of beef, poultry, or fish
- Add some cheese to pasta
- Choose milk instead of juice, water, sports drinks, or carbonated beverages

*Above: Ways to incorporate more protein into your diet*

**Combining Complementary Foods**

Limiting Amino Acids	Complementary Foods	Complete Protein Combinations
<b>Legumes:</b> limited in methionine and cysteine	Grains Nuts and Seeds	Red beans and rice Minestrone soup Chickpeas and couscous Hummus (garbanzo beans and sesame seeds)
<b>Grains:</b> limited in lysine	Legumes	Peanut butter and bread Barley and lentil soup Corn tortilla and beans
<b>Vegetables:</b> limited in lysine, methionine, and cysteine	Legumes (lysine) Grains (methionine and cysteine) Nuts and Seeds (methionine and cysteine)	Tofu and broccoli with almonds Spinach salad with pine nuts and kidney beans
<b>Nuts and Seeds:</b> limited in lysine and isoleucine	Legumes	Lentil soup with slivered almonds Sesame seeds with mixed bean salad

*Above: Examples of food combining to create a complete protein meal*

A 150-pound (68 kg) teenage baseball player who is trying to increase mass would require the following amount of protein daily:

$$150 \text{ pounds (68 kg)} \times .9\text{--}1.0 \text{ grams of protein per pound (or } 2\text{--}2.2 \text{ g/kg)} = 135 \text{ to } 150 \text{ grams of protein per day}$$

Here's a meal plan that would achieve this protein intake.

**Breakfast**

- Two scrambled eggs
- Two slices of toast
- 12 ounces (360 ml) skim milk
- Protein: 30 grams

**Lunch**

- Tuna salad sandwich with 3 ounces (90 g) tuna
- Two slices of bread
- Pretzels
- 8 ounces (240 ml) low-fat chocolate milk
- Protein: 33 grams

**Snack After School**

- 12 crackers with 2 tablespoons peanut butter
- Protein: 10 grams

**Dinner**

- 6 ounces (175 g) roast chicken
- 1 cup mashed potatoes
- 1 cup carrots and peas
- 12 ounces (360 ml) apple juice
- Protein: 50 grams

**Evening Snack**

- 2 cups (60 g) cereal
- 8 ounces (240 ml) low-fat milk
- Protein: 12 grams

**Grand total: 135 grams of protein**

*Above: Example of calculated PRO needs + example of foods eaten to meet athlete's requirements*

Food	Amount	Protein, g
Chicken breast	3 oz (90 g)	21
Chicken thigh	3 oz (90 g)	21
Cod	3 oz (90 g)	21
Hamburger	3 oz (90 g)	21
Steak	3 oz (90 g)	21
Pork chop	3 oz (90 g)	21
Egg	One	7
Soy burger	One	15-18
Nuts	1/4 cup (35 g)	10
Peanut butter	2 tbsps	8
Cheese	One slice	7
Refried beans	1/2 cup	7
Milk	8 oz (240 ml)	8
Yogurt	8 oz (230 g)	9-11
Protein powder	One scoop	32-45
Nonfat dry milk powder	1/4 cup (30 g)	8

*Above: Protein content of common foods*

**TABLE 6.5 Protein Content of Commonly Consumed Foods**

Food	Serving Size	Protein (g)
<b>Beef</b>		
Ground, lean, baked (15% fat)		
Beef tenderloin steak, broiled (1/8-in. fat)	3 oz	22
Top sirloin, broiled (1/8-in. fat)	3 oz	21.5
	3 oz	23
<b>Poultry</b>		
Chicken breast, broiled, no skin (bone removed)		
Chicken thigh, bone and skin removed	½ breast	27
Turkey breast, roasted, Louis Rich	1 thigh	20
	3 oz	15
<b>Seafood</b>		
Cod, cooked		
Salmon, Chinook, baked	3 oz	19
Shrimp, steamed	3 oz	22
Tuna, light, in water, drained	3 oz	19
	3 oz	22
<b>Pork</b>		
Pork loin chop, broiled		
Ham, roasted, extra lean (5% fat)	3 oz	21
	3 oz	18
<b>Dairy</b>		
Whole milk (3.3% fat)		
1% milk	8 fl. oz	7.7
Skim milk	8 fl. oz	8.2
Low-fat, plain yogurt	8 fl. oz	8.3
American cheese, processed	8 fl. oz	12
Cottage cheese, low-fat (2%)	1 oz	5
	1 cup	27
<b>Soy Products</b>		
Tofu		
Tempeh, cooked	½ cup	10
Soy milk beverage	3 oz	15.5
	1 cup	8
<b>Beans</b>		
Refried		
Kidney, red	½ cup	6
Black	½ cup	8
	½ cup	7.6
<b>Nuts</b>		
Peanuts, dry roasted		
Peanut butter, creamy	1 oz	6.7
Almonds, blanched	2 tbsp.	8
	1 oz	6
<b>Cereals, Grains, and Breads</b>		
Oatmeal, quick instant		
Cheerios	1 packet	6.6
Grape Nuts	1 cup	3
Raisin Bran	1/2 cup	7.2
Brown rice, cooked	1 cup	4.7
Whole-wheat bread	1 cup	5
Bagel, 3½-in. diameter	1 slice	3.6
	1 each	10.5
<b>Vegetables</b>		
Carrots, raw (7.5 × 1 1/8 in.)		
Broccoli, raw, chopped	1 each	0.7
Collards, cooked from frozen	1 cup	2.6
Spinach, raw	1 cup	5
	1 cup	0.9

*Above: More common foods and their protein contents*

**TABLE 6.5 Nutrients of Concern in a Vegan Diet**

Nutrient	Functions	Non-Meat/Nondairy Food Sources
Vitamin B <sub>12</sub>	Assists with DNA synthesis; protection and growth of nerve fibers	Vitamin B <sub>12</sub> -fortified cereals, yeast, soy products, and other meat analogues; vitamin B <sub>12</sub> supplements
Vitamin D	Promotes bone growth	Vitamin D-fortified cereals, margarines, and soy products; adequate exposure to sunlight; supplementation may be necessary for those who do not get adequate exposure to sunlight
Riboflavin (vitamin B <sub>2</sub> )	Promotes release of energy; supports normal vision and skin health	Whole and enriched grains, green leafy vegetables, mushrooms, beans, nuts, seeds
Iron	Assists with oxygen transport; involved in making amino acids and hormones	Whole-grain products, prune juice, dried fruits, beans, nuts, seeds, leafy vegetables such as spinach
Calcium	Maintains bone health; assists with muscle contraction, blood pressure, and nerve transmission	Fortified soy milk and tofu, almonds, dry beans, leafy vegetables, calcium-fortified juices, fortified breakfast cereals
Zinc	Assists with DNA and RNA synthesis, immune function, and growth	Whole-grain products, wheat germ, beans, nuts, seeds

*Above: Nutrients vegetarians/vegans tend to be deficient or low in due to lower amounts of these nutrients in plant-based foods. The best way to tell if you are sufficient in a nutrient is to have blood work done and consult a dietician with the results to correct any deficiencies in the proper way.*

*Left: Examples of quality PRO choices*

Best
Very lean ground beef
Pork
Veal
Lamb
Venison
Poultry
Fish
Shellfish
Soy foods
Beans
Eggs
Low-fat milk
Low-fat yogurt
Low-fat cheese
Low-fat cottage cheese
OK
Low-fat ham
Lean ground meat
Fish canned in oil
Low-fat hot dogs
Sliced cheese
Light margarine
Not so hot
Fried meats
Sausage, bacon
Pepperoni
Burgers
Salami, bologna

*Here are a few more resources for you to check out regarding protein and its importance for athletes:*

[Romotsky & Bonci NSCA Coach](#)

[2.1 Protein](#)

*The site linked below is a great resource for all nutrition topics. The Academy of Nutrition and Dietetics is the credentialing agency for all dietetic professionals in the United States, I have also linked their homepage, so you can browse any topic you'd like!*

[Academy of Nutrition and Dietetics: Protein for Athletes](#)

[Academy of Nutrition and Dietetics: Home Page](#)

*Lastly, here is one more outstanding resource with countless articles written by nutrition professionals on any topic you could imagine!*

[Today's Dietitian: Protein for Athletes](#)

[Today's Dietitian: Home Page](#)

*References:*

*(Information & Pictures)*

Bonci, L. (2009). *Sport nutrition for coaches*. East Peoria, IL: Versa Press.

Thompson, J., Manore, M., Vaughan, L. (2014). *The science of nutrition: Third edition*. Glenview, IL: Pearson Education.

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# Stuffed Peppers

These recipes require a little more time to prepare than the ones from previous weeks, but they are simple to make and the longest part in making them comes from the time these dishes spend in the oven. Like all recipes, the ingredients listed are what the initial recipes include, but items can be left out or swapped to meet personal preferences! In the first video for this recipe, the chef uses green and red peppers, but when I made it I used all green peppers and swapped the ground pork for ground turkey. Substitutions, eliminations, or additions can be made anywhere in the recipes. Another swap I like to make for the second recipe is to use different types of rice (brown, black, etc.) or substitute quinoa for rice! You will enjoy the recipes more, the more you tailor them to your personal taste preferences. It is always fun to try new foods, but the best way to incorporate new foods into your diet is to do it slowly, sometimes one or two ingredients at a time! Have fun and enjoy!

## Recipe #1

### INGREDIENTS

- 6 bell peppers (any color will do!)
- ¾ pound each ground beef & ground pork (or 1.5lb any ground meat)
- ½ an onion
- 1 medium size Zucchini
- ½ teaspoon dried Thyme
- ¼ cup walnuts
- 2 cloves garlic
- 1 tablespoon tomato paste
- ½ teaspoon each smoked paprika & cumin
- ¼ teaspoon cayenne pepper
- 1/3 cup chicken stock/broth
- 1 egg
- 1 cup shredded cheddar cheese
- ½ cup grated parmesan cheese
- 28 oz can tomato puree
- Kosher salt & black pepper
- Olive oil

### INSTRUCTIONS

1. Preheat oven to 350°F
- Preparing the Stuffing:
2. Preheat a large, non-stick pan over medium heat and add 2 TBSP olive oil.
  3. Add onions, zucchini, thyme, ½ tsp salt, and some pepper to the pan and mix.
  4. Cook for 10 minutes while stirring frequently.
  5. In the meantime, cut tops off peppers and rip out the seeds and membranes inside.
  6. After roughly 10 minutes, add walnuts, garlic, tomato paste, smoked paprika, cumin, and cayenne (optional) to pan mixture and cook for about 3 minutes, continuing to stir frequently.
  7. After 3 minutes, add chicken stock to pan and cook for 1 minute, or until most of the liquid is absorbed and mixture looks wet. Once this is done, set mixture in pan aside.
  8. Place ground meat of choice into a large bowl and season with 1 tsp salt, some pepper, and an egg. Mix with your hands until all ingredients are well mixed.
  9. Add pan mixture to ground meat mixture and mix again until all ingredients are evenly distributed/well mixed.

### Fixing the Pan & Stuffing/Baking the Peppers:

1. Add tomato puree to baking dish along with ½ tsp salt and some pepper; mix well and then add the peppers.
2. Stuff the peppers in the baking dish with the previously prepared stuffing mixture.
3. Cover baking dish with tin foil, place dish on another baking sheet to catch any spill-over.
4. Bake for 30 minutes, then remove tin foil and bake for another 30 minutes.
5. After an hour, top the peppers with your choice of shredded cheese (optional) and bake for an additional 25-30 minutes

### Testing for Doneness:

1. After the peppers have been cooking for roughly an hour and a half, check to ensure the meat has been fully cooked. The most reliable way is to use a meat thermometer (similar to [this](#) one) to ensure the internal temperature has reached 165°F. Otherwise another option is to cut into one of the peppers to see if the meat is still pink or the color it was when it was raw. If the meat is not fully cooked, place it back in the oven and continue to check its internal temperature at 5-10 minute intervals depending on how much is still not fully cooked.

\*\*The peppers will keep in the fridge for 5-6 days, but you can also freeze them for up to 3 months! To defrost, just place them in the oven at 350°F until they're thawed\*\*

[Full Recipe and Video](#)



Below: Minimum Safe Internal Cooking Temperatures

TABLE 2  
Minimum Safe Internal Cooking Temperatures of Foods

FOOD	TEMPERATURE (°F)
Meat (whole cuts of beef, lamb)	160
Pork (whole cuts)	145
Ground meat (beef, pork, lamb)	165
Poultry (whole and ground)	165
Finfish	145

## Recipe #2

### *Ingredients*

- 5 large bell peppers (any color of your choice)
- 1 cup rice, cooked (any type or quinoa!)
- 1lb ground meat of choice
- 1 TBSP chili powder
- 1 tsp garlic powder
- 1 ½ tsp ground cumin
- ½ tsp red pepper flakes (optional, they add some heat!)
- ½ tsp dried oregano
- ½ tsp paprika
- 1 cup tomato sauce
- 1 large onion, diced
- 1 cup zucchini, chopped
- ¾ cup peppers (from tops of peppers)
- 1 cup mushrooms, diced
- 5 cloves garlic, minced
- ½ cup shredded cheese (optional)
- Cheese to top peppers
- Salt & pepper to taste

### *Instructions*

1. Preheat oven to 375°F.
2. Cut off tops of peppers and remove the seeds and membranes. Save the tops and dice to be added to stuffing mixture.
3. Place cut and cleaned peppers into boiling water for 3-4 minutes and cook until they are slightly tender. Remove once done and set aside to cool.
4. Cook rice, or have rice prepared ahead of time. If cooking your rice at the time of making this recipe, use chicken, beef, or vegetable stock to cook rice to give it more flavor.
5. In a large [Sauté](#) pan, add ground meat, salt and pepper, and cook until the meat browns or appears cooked-through. When fully cooked, transfer meat to a strainer and rinse with water (if you do not own a strainer, you can just use the lid from the pan to drain the excess fat from the meat).
6. Add all seasonings and ½ cup tomato sauce to the ground meat and cook to warm the mixture through.
7. Remove this mixture into a bowl and set aside.
8. Using the same pan as before, add the onion, zucchini, and diced pepper (from the tops), season with salt and pepper and cook until softened (about 5 minutes). When softened, add mushrooms (optional) and garlic and cook for another couple of minutes.
9. Add remaining tomato sauce to pan, the previously cooked ground meat, the cooked rice, and the ½ cup shredded cheese (optional) and stir to combine mixture.
10. Use the filling in the sauté pan to fill each pepper, packing the stuffing into each one.
11. Place peppers in a baking dish and cover with foil. Place them in the preheated oven for 40 minutes. After the first 15 minutes, remove the foil and continue baking the peppers.
12. (Optional) with 5 minutes remaining, top peppers with cheese and set oven to broil for 3-5 minutes to melt the cheese. **\*\*The cheese may bubble or turn a golden-brown in some spots and that's okay!**

[Full Recipe and Video](#)



### *Bonus: Vegetarian Stuffed Peppers*

For those following a vegetarian diet, here are a few links to recipes for meatless stuffed peppers! I personally have never tried any of these myself but would love feedback on how they turn out if anyone decides to try and make them!!



[Veg Recipe #1](#)



[Veg Recipe #2](#)



[Veg Recipe #3](#)