
STRENGTH

THE FIELD MANUAL

Nutrition that gives you strength to be your best self



Michael Roussell, PhD
with National Cattlemen's Beef Association, a contractor to the Beef Checkoff



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Letter from Michael Roussell, PhD



My interest in strength is a lifelong constant, yet my pursuit of strength has continued to evolve. As a kid I was interested in developing strong legs and lungs so that I would have endless energy on the athletic fields. As I got older, I became more interested in weight training and muscular strength which led to an interest in nutrition and how the foods we eat can accelerate our development of physical strength. My interest in nutrition quickly turned into a passion that I pursued in the form of a PhD in nutrition.

After finishing my PhD work, I began working in a one-on-one capacity with people interested in improving their health. This helped me glean greater insights into why some people have more success with their health goals while others struggle to have similar success. I observed that the people who experienced the greatest success took a multifaceted, long-term approach to their wellness through being physically active, eating a wholesome balanced diet, and being part of a community that supported and nurtured them. Through this approach they developed physical, mental, and emotional strength in concert, enabling them to persist and reach their goals.

At one point in my life, I would have defined strength by a physical feat such as deadlifting 500 lbs. However, I have discovered that puts a limit on what strength can be. Strength touches many overlapping aspects of your life. Pursuing and achieving it should cause ripple effects across your life. After I deadlifted 500 lbs, nothing else in my life really changed.

Now I view strength differently. It is a daily endeavor. One that is grounded in a diet rich in protein to fuel my physical and mental pursuits. But that is just the foundation. For me, several additional elements are integral to the pursuit of strength: daily physical activity, time with loved ones, adequate sleep and being outside in nature. Small, daily actions in each of these areas has made a positive impact, rippling out to touch all areas of my life. These actions help me stay healthy and fit as well as be a steadfast support to those in my life. In other words...they help me stay strong.

I wrote *Strength: The Field Manual* to give you the information and tools you need to develop strength in your life. I call it a field manual because it walks you through a combination of why and how to take action with your nutrition and fitness to build strength. My goal was to create a resource that you would want to keep in your backpack so that you could reference it as needed throughout your day. This manual is designed to both inspire and guide you as you build strength in all areas of your life. I would like to thank the National Cattlemen's Beef Association, a contractor to the Beef Checkoff, for their support of this educational project.

Yours in pursuit of strength,

A handwritten signature in black ink that reads "Michael Roussell". The signature is fluid and cursive.



Part 1

Principles of Strength



Chapter 1

Understanding

Strength

By defining the variables of strength, we identify the tools we can use in the journey to become the strongest, best versions of ourselves.

WHAT IS STRENGTH?

The drive to be stronger is innate. And though strength can refer to our musculature, it's not limited to physical pursuits. Strength is anything that gives us the ability to live our lives to the fullest. Our quest for strength is very personal and is defined by each of us according to our desires and where we are in life's journey. No matter your personal definition, this manual will serve as your field guide — a practical handbook to living a vibrant and fulfilling life, grounded in one of our greatest sources for strength: food.

Before we get into the how-to, we need to dig a little deeper into the concept and principles of strength. Why do we need strength, and how can we expect food to give us the strength needed to achieve our goals at different stages of life?

Take a moment and think of people in your life who you consider to be strong. What makes them strong? Is it resilience? Fortitude? Vitality? Focus? Amount of muscle? Physical endurance? The connection they have with friends and family? A combination of these characteristics? No matter how you define strength, there's one thing we can all agree on — being strong enables each of us to be our best self.

focus
strong
toughness
staying power
independent
recovery
fortitude
energy
confidence
emotional bonding
vibrant
family connection
solidity
vitality
stamina
resilience
endurance
attitude
driven
force

Strength is a tangible thing. But, it's also much more: it's a feeling. Through the process of seeking strength, we enrich our lives and the lives of people around us. By making a healthy meal that we eat with our family or by inviting a friend on a run with us, we are helping instill strength in others.

Strength also grows and develops through community. We are in this journey together. Throughout this field manual, you will meet a variety of people who demonstrate how strength transcends physical abilities. You will also find references to additional resources that can be found on BeefItsWhatsforDinner.com/strengthfieldmanual

DEVELOPING STRENGTH IN LIFE

Your definition of strength should not be limited to pounds lifted, speed of miles run, or number of minutes working out. Strength isn't only about numbers. It can be the ability to work a physically demanding job while still having the energy to play with your children at the end of the day. Or it can be enjoying pain-free hiking and biking with your friends and family on the weekends.

How do you develop this kind of strength? True strength is derived from the intersection of a strong, balanced diet, regular physical activity and good health. The question isn't, "diet *or* exercise?" "Run outside *or* enjoy a meal with loved ones?" It's not about *or* – it's about *and*. Enjoying the synergy between food and fitness is how you develop strength.

A functional definition of how you achieve and embody strength is:

What makes the pursuit of strength so powerful is that these components are interrelated. As one or more components improve, your capacity to improve the others increases.

For example, throughout life, studies show that *regular physical activity* combined with a consistent, balanced diet with protein-rich meals helps:

- Strengthen your mind as well as your muscles, improving your mental health¹
- Build and maintain muscle, a key marker of health and longevity²
- Support heart health by lowering cholesterol and blood pressure levels^{3,4}
- Maintain a healthy weight, taking stress off your joints and lessening the likeliness of pain⁵

These are just a few examples of how a balanced diet, regular physical activity and good health intersect to create greater strength.

This field manual puts the greatest emphasis on nutrition and a balanced diet. The science of each component is explained, and practical ways you can implement an eating style that helps you be your strongest and best self are provided. Several key nutrients integral to building and maintaining a strong mind and body are central to this dietary approach.

**Strength = Balanced Diet +
Physical Activity + Good Health**

Meet Lance Pekus

**The Cattle Rancher Turned
Cowboy Ninja**



Lance Pekus is a husband, father, cattle rancher and Cowboy Ninja. As if working hard on his Idaho cattle ranch all day isn't enough, he also makes time for the agility, strength and obstacle drills for his ninja training. For Pekus, it's not just about being physically strong to achieve success. He says he derives his greatest source of strength from his family.

To me, strength comes in all sorts of forms. My kids are strong to me. The strength they show when they're runnin' around and they fall over and just get up, dust themselves off and say, "I'm okay." That's strong. And my wife, what she goes through physically and mentally every day with us, that's strength.

A lot of people say I'm strong, but I look at people in my life, and I've got family strength. You know—the closeness we have with my wife's family and working with my father-in-law, and having dinner with them. Being able to sit down at a dinner table with family and either eating something I cooked on the grill or a roast that's been cooking all day. That builds family strength, emotional strength and mental strength.

From his physique to his performance on the ninja course, Pekus embodies physical strength. Like all of us, though, his life is busy, and he needs to prioritize and get creative with his time and his training to fit it all in. We all can find inspiration in his "can-do" attitude.

Not everyone wants to go out and run a marathon, but if you just want to get out and get physically active, it's just little by little. People think you gotta go out and kill yourself with the workout every day to get physically fit, but a lot of times I don't have time in the day to go put a two- or three-hour workout in. I squeeze them in throughout the day. If I can get a five-minute workout in here and a five-minute workout in there, maybe throughout the day I might get a total of an hour- or two-hour workout, but it's not all going to be at once. I believe a lot of people think, "oh I don't have the time to go do that." But while you're thinking about the time you have, you have the time right then and there that you can do push-ups. You can do it, it's just that mental attitude toward life.



Principles of Strength

Chapter 2

Nutrients Central to the Pursuit of Strength

Fueling your pursuit of strength – your journey to be at your best – requires optimal nutrition. You want to function at your very best. One way to do so is to prioritize foods with the nutrients your body needs to thrive, such as protein, zinc, iron, B vitamins and selenium, as essential to your diet.

PROTEIN

Protein is a key foundational nutrient for supporting strength.⁶⁻⁸ It plays an important role in building muscle by providing your body with the building blocks needed to fuel recovery from physical activity.⁹ It also aids in maintaining a healthy body weight by helping you feel full long after your meal is over.¹⁰⁻¹¹

In addition, protein supports proper function of the brain and immune system.¹² Studies also show that protein is instrumental in controlling and reducing risk factors for cardiovascular disease such as high cholesterol and blood pressure.^{3,13}

Most people eat enough protein to meet the body's *minimum* requirements, but few get what many scientists see as the *optimal* amount needed for good health.^{14,15} You'll find more information about optimal protein needs in Chapter 3.

ZINC

Zinc is an important mineral for strength.^{16,17} The brain has a significant concentration of zinc, which is needed for proper growth and to strengthen communications between neurons.^{17,18}

Zinc also supports a strong immune system,¹⁹ which helps to fortify your body to fight infection and disease. Most healthy individuals consume adequate amounts of zinc each day.²⁰ However, exercise, physically demanding work and stress can increase your body's need for zinc, making it a nutrient of priority.²¹

IRON

Iron is an essential nutrient for both the function and growth of your body;²² however, it is estimated that more than 5.5 percent of the U.S. population suffers from iron-deficiency anemia. Women are almost twice as likely to be iron-deficient as men.²³

Iron is responsible for taking oxygen from your lungs and shuttling it throughout your body, powering every one of your cells.²² Thus, insufficient iron intake compromises fuel production, leaving you fatigued and lacking strength.^{24,25}

The importance of iron doesn't stop there. Iron plays a vital role in producing neurotransmitters (used by your brain and nerves to transmit information) and myelin (insulation that covers and protects nerves, ensuring proper transmission of information).²²

Iron is in the diet in two forms – heme iron, found in animal proteins, and non-heme iron, found in plants and grains. Heme is a specific structure of molecules that surround the iron and act as a chaperone, guiding it efficiently into your body. Heme-iron sources, like beef, are more easily absorbed in your body than non-heme iron found in plant foods.^{26,27}

Heme vs. Non-Heme Iron

Heme Iron	<ul style="list-style-type: none">15-40% absorptionNo factors impact absorption2.9 mg iron in 3 oz broiled Sirloin => 0.8 mg absorbed in the body	Non-Heme Iron	<ul style="list-style-type: none">1-15% absorptionPolyphenols, tannins, phytates, calcium decrease absorptionVitamin C enhances absorption3.2 mg iron in ½ cup of boiled spinach => 0.2 mg absorbed in the body
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B VITAMINS

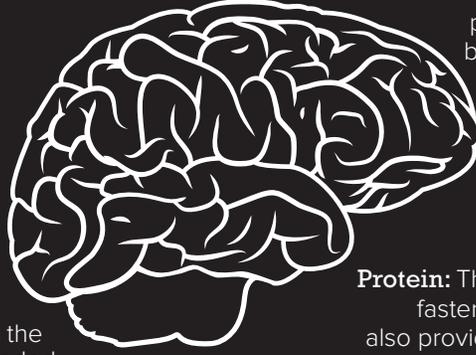
Vitamin B₁₂ is an important nutrient for your blood cells and nerves.²⁸ It serves as an essential component in the production of red blood cells and is one of the nutrients responsible for maintaining the protective coating on your nerves. It is important throughout your life, supporting the growth and development of nerves in the brains of young children and slowing age-associated brain shrinkage later in life.^{19,30}

Neuro-nutrients: Vitamins and Minerals that Play a Key Role in Brain Health

Zinc: Essential for proper growth and communication between neurons.

Selenium: Needed for the formation and function of key antioxidants that support a healthy functioning brain.

Vitamins B₂, B₃, B₆:
The brain uses half of the sugar available for energy in the body. These vitamins are needed to convert that sugar into fuel for the brain to use.



Iron: Essential for the production of nutrients needed by the brain and is also used as part of the protective sheaths that cover nerves.

Vitamin B₁₂: Needed for growth and development of nerves.

Protein: The brain uses protein 3-4 times faster than your muscles do. Protein also provides the building blocks for key nutrients needed by the brain.

Riboflavin (B₂), niacin (B₃), and vitamin B₆ are essential for the energy-producing machines in your cells, helping you produce energy from the foods you eat.³¹ Additionally, these vitamins support overall growth and health throughout your life.³²⁻³⁴

SELENIUM

Twentieth-century philanthropist and businessman W. Clement Stone encouraged people to be strong by taking daily action toward their goals. He famously observed that *little hinges*

swing big doors. Selenium is an essential mineral that serves as a *little hinge* in the body. While it is used in very small amounts, it is an essential component of at least 25 unique compounds that have a big impact on proper immune, thyroid, cardiovascular and digestive functions.³⁵ Selenium plays an important role as a primary antioxidant in the liver, the main detoxification site in the body.³⁶

Percent Daily Value* of Key Nutrients that Support Strength in Common Protein Foods

	Large Scrambled Egg	3 ounces Chicken Thigh Meat, Cooked	3 ounces Chicken Breast Meat, Cooked	1/2 cup Quinoa, Cooked	3 ounces Beef, Cooked (composite of retail cuts)
Protein	12%	42%	53%	8%	51%
Zinc	4%	11%	6%	7%	39%
Iron	4%	5%	5%	8%	14%
Vitamin B ₁₂	8%	6%	5%	0%	41%
Riboflavin (B ₂)	13%	11%	6%	6%	14%
Niacin (B ₃)	<1%	26%	59%	2%	25%
Vitamin B ₆	4%	20%	26%	6%	24%
Selenium	20%	33%	34%	4%	38%

*The Daily Value (DV) refers to the amount of a nutrient needed for a healthy adult on a 2,000-calorie diet. The %DV is the percent of a nutrient's Daily Value provided by a serving of food.

Source: US Department of Agriculture, Agricultural Research Service, Nutrient Data Laboratory. USDA National Nutrient Database for Standard Reference, Legacy. Version Current: April 2018. Internet: /nea/bhnrc/ndl, NDB #: scrambled egg - 01332, chicken thigh meat - 05098, chicken breast meat - 05064, quinoa - 20137, beef - 13364



**Fueling
Strength**

Part 2

Fueling Strength



We have reviewed characteristics of strength, discussed the various ways you can develop it and highlighted key nutrients essential to it.

Strength = Balanced Diet + Physical Activity + Good Health

FOUR CORNERSTONES OF EATING TO SUPPORT STRENGTH



One: Anchor Your Plate with Protein



Two: Pair Your Protein with Plants



Three: Focus on Fiber-rich Carbs



Four: Fuel Recovery to Be Stronger

A balanced diet that includes high-quality protein and other nutrient-rich foods is an essential component for strength.^{37,38}

This section outlines the four cornerstones of eating to support strength. You'll learn not only the science behind each, but also practical applications and stories from people who incorporate them into their healthy lifestyles.

Build your balanced meals in the order of the first three cornerstones: first protein, then fruit/vegetables and finally fiber-rich carbs.²⁷ The fourth cornerstone, using nutrition for recovery, is about rebuilding your body after physical activity so that it is stronger the next time you exercise.³⁹



Chapter 3

Cornerstone One: Anchor Your Plate with **Protein**

When you sit down to prepare, order or eat a meal, the first question you should ask yourself is “Where is the protein?” Protein is an essential component for strength and it should anchor your plate at every meal.

You can improve your diet by understanding when to eat protein and how to distribute your intake of protein throughout the day. This will help you:

- Support your body’s ongoing need to build and repair muscle¹⁴
- Feel more satisfied during and after a meal⁴⁰
- Enhance your ability to recover from exercise⁴¹

Creating a nutritious, balanced meal is easy when you make protein the starting point of your meal and build the rest of the meal around it.

Protein 101

Amino acids are the building blocks of protein. Your body can make certain amino acids, but it cannot make others. The amino acids that your body cannot make are called *essential amino acids*, and you must get them from the foods you eat. However, not all foods serve as a good source of all these important nutrients. Foods designated as *high-quality* and/or *complete* protein sources contain adequate quantities of essential amino acids. Animal proteins, like beef, are among the most nutrient-dense, complete protein sources available.⁴²⁻⁴⁴

PRINCIPLE OF STRENGTH:

EAT FOODS THAT PROVIDE YOUR BODY MULTIPLE BENEFITS

You should always strive to get the most out of what you eat. By focusing on foods that give your body multiple benefits, you improve the overall quality of your diet and minimize empty calories.

Beef is a great example of a food that provides your body with multiple benefits in an efficient calorie package. While it's best known for providing high-quality protein, beef also provides iron, zinc, B vitamins and selenium.

PROTEIN AND YOUR MUSCLE

Building and preserving muscle is a concern for everyone, not just athletes and bodybuilders. In fact, how much muscle or lean body mass you are able to maintain is a marker of your current and future health.²

PRINCIPLE OF STRENGTH:

IT IS VERY HARD TO BUILD MUSCLE AND VERY EASY TO LOSE MUSCLE

You need muscle and strength to deal with whatever life throws at you – whether in work or play. For example:

If a child suddenly jumps on your back while playing, you could injure a disc in your spine. But a strong core (abdominal and back muscles) supplies the stabilization necessary to avoid injury.

If you trip while carrying groceries up the stairs, you could tear a ligament trying to avoid the fall. With the proper musculature in your hips and legs, it's easy to slow the fall and catch yourself.

Many people don't appreciate their lean muscle mass until they lose it. Unfortunately, it's easier to lose muscle than it is to build muscle – a reality that only intensifies with age. Moreover, keep in mind if weight loss is a goal as you age, a larger proportion of weight loss for older adults comes from lean body mass (muscle) versus fat.⁴⁵

Being inactive—whether due to illness, injury or simply being tied up with family and work commitments—accelerates muscle loss.^{46,47} This sustained inactivity also reduces your body's ability to grow and repair new muscle.⁴⁸

While you cannot always control these situations, you can refocus your efforts on consuming protein consistently at each meal. Protein gives your body the strength to hold on to more muscle during inactive times.^{48,49}

Whatever your health or fitness goals, prioritizing a balanced diet will help you optimize your muscle mass, participate in activities you love and thrive at every age.

Meet Dr. Doug Paddon- Jones

**The Researcher Who
Uses Protein and Muscle
to Create a Lifestyle
Insurance Policy**



Dr. Doug Paddon-Jones is one of the world's most respected scientists in the intersection of protein, muscle, inactivity and aging. He is a professor of nutrition and metabolism, serving as the Sheridan Lorenz Distinguished Professor of Aging and Health at the University of Texas Medical Branch.

Dr. Paddon-Jones is intensely interested in the minutia of how the body uses protein and activity to regulate, protect and build muscle at any age. Thankfully, he also has an intense desire to distill these findings into useful information for anyone striving to live a healthy life.

People have a much greater appreciation for muscle after they lose it. Unfortunately, muscle is so easy to lose. If you spend 12 weeks lifting weights and working hard, you'd be fortunate to gain 2-2.5 pounds [of muscle]. But you can lose all that muscle you put all that time and effort into building if you are inactive for 7-10 days due to being sick or simply having to be at your office working more.

So, when you are young and as you progress through your 30s and 40s, it is important to create the habits of being active and eating a moderate amount of protein at each meal to maintain and build your muscle reserves. These lifestyle habits will act as insurance policies later in life when you become sick, injured or just busy and at greater risk for losing muscle.

People benefit from consistently focusing on eating moderate amounts of protein at each of their meals. Don't let yourself get tripped up by the details of grams and counting macronutrients. This will free up a lot of mental energy. When you sit to eat, is there a portion of high-quality protein? If so, you are moving in the right direction for your health.

EATING PROTEIN THROUGHOUT YOUR DAY: HOW MUCH AND WHEN?

How Much Protein Should You Eat?

After discovering that the body needs complete proteins to turn on its muscle-building machinery, scientists asked *how much protein is needed and is more better?*

Dr. Paddon-Jones found that when people ate 30 grams of beef, the rate of muscle building in their body increased by approximately 46 percent. Eating more than 30 grams didn't increase their muscle-building capacity. Eating 30 grams of protein at a meal helps to maximize the rate at which your body builds muscle.⁵⁰

What Does 30 Grams of Protein from Beef Look Like?

1 Burger Patty (size of a hockey puck)



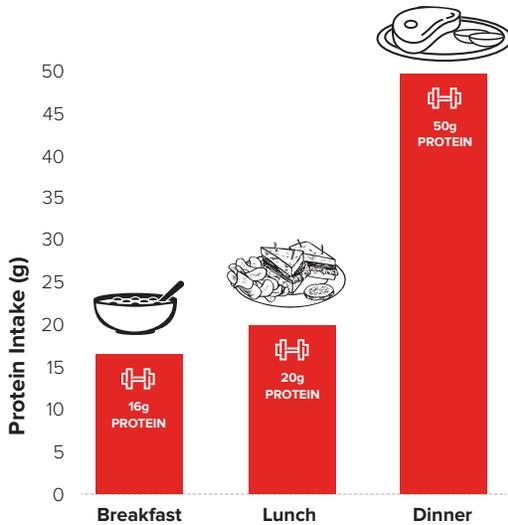
1 Steak (size of a deck of cards)



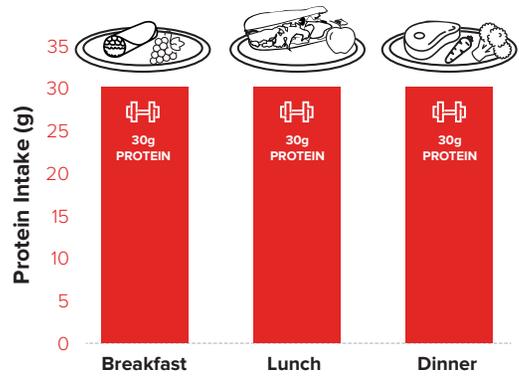
LEUCINE: THE MUSCLE- BUILDING AMINO ACID

Protein turns on the muscle-building switch in your body – but not just any protein can do it. Leucine is the essential amino acid needed.^{51,52} Complete proteins, like beef, provide the leucine needed to build muscle. They also contain the full spectrum of amino acids your body needs to build and repair muscle.

Typical Daily Protein Intake Pattern



Evenly Distributed Daily Protein Intake Pattern



MYTH: Your body can only digest 30 grams of protein at a time.

FACT: Your body can easily digest and use 30, 40, 50 or more grams of protein in a given sitting; however, the optimal amount for building and maintaining muscle is 30 grams per meal.^{50,54} The key number to remember is 30 grams per meal. It maximizes your ability to build and repair muscle⁵⁰ and is the minimum amount needed to reap protein's hunger-curbing effects.⁴⁰

When Should You Eat Your Protein?

Dr. Paddon-Jones and colleagues designed another study to determine a better way for people to eat protein throughout the day. Research shows that most of us eat very little protein at breakfast, a little more at lunch, and a lot at dinner.⁵³ One group of study participants ate protein in the typical daily pattern of most Americans.¹⁴

A second group of study participants ate 90 grams of protein distributed more evenly throughout the day.

When protein consumption was distributed evenly across meals, the researchers found that rates of muscle building and repair were significantly better at the end of the day.¹⁴

This is a great example of science showing that a moderate amount of protein (90 grams), if spread evenly across your meals, is optimal for strength through muscle maintenance.

How to Get 30 Grams of Protein at Breakfast

Start optimizing protein one meal at a time, beginning with breakfast. Eating protein in the morning sets your body up for metabolic success throughout the day by:

- Helping stop excessive muscle breakdown from your night of fasting/sleeping⁵⁵
- Reducing brain-driven cravings later in the day⁵⁶
- Improving blood-sugar control throughout the day⁵⁷

Getting 30 grams of protein at breakfast is an extremely important foundational habit for a strong diet. You can hit this target with one 3.5-ounce piece of cooked sirloin, but finding ways to eat 30 grams of protein at breakfast can be more challenging. Protein stacking offers a simple solution.

TAKE ACTION: PROTEIN STACKING

Eating 30 grams of protein at breakfast is challenging because many traditional breakfast foods, like cereal, eggs and bagels, have lower amounts of protein. Still, 30 grams of protein at breakfast is very achievable.

Think outside the box by using a process called protein stacking. Combine different sources of protein together and incorporate more non-traditional, protein-rich breakfast foods into your meal.

Protein Content of Common Breakfast Foods*



1 cup milk
8g



1 cup Greek yogurt
20g



1 cup regular low-fat
yogurt, 13g



1/3 cup dry rolled oats
4g



1 whole
egg
scrambled
6g



1 egg
white,
scrambled
3.6g



1 slice (1 oz)
cheddar cheese
6.5g

*See page 59 for nutrient content sources.

Beef up your cheese omelet with a couple slices of sirloin leftover from last night's dinner or a few spoonfuls of a cooked ground beef breakfast sausage. By stacking your protein sources, you'll be well on your way to enjoying 30 grams of protein at breakfast every day.

MYTH: Eating too much protein damages your kidneys.

FACT: Research shows that when healthy people increase their protein intake, their kidneys adapt.⁶³ It's similar to how your muscles grow stronger when you lift weights. The kidneys are still able to do their job: filtering end products of protein metabolism.



BASIC BEEF COUNTRY BREAKFAST SAUSAGE

Combine ground beef with sage, onion powder, garlic powder and hot pepper flakes for a simple, protein-packed dish that delivers the classic breakfast flavors you love. Sausage can be made into patties or crumbles and added to an omelet or sandwich for a protein-stacked breakfast. Find the full recipe at [BeefItsWhatsforDinner.com/strengthfieldmanual](https://www.beefitswhatsfordinner.com/strengthfieldmanual)

MYTH: Eating protein is bad for your liver.

FACT: People with liver disease have trouble metabolizing proteins and building proteins from amino acids. However, increased protein consumption doesn't cause liver disease. According to the U.S. National Library of Medicine, liver disease is most commonly caused by a virus (i.e. hepatitis A, B, or C), excessive alcohol consumption, certain drugs, liver cancer or genetically inherited liver diseases — not by eating protein.⁶⁴ A healthy liver can process healthy protein intakes without issue.

Here's a quick example of how to transform a traditional breakfast into a protein-stacked breakfast:

Protein Content of a Traditional Breakfast*



8 oz juice: 0g



Two slices wheat toast with butter: 6g



Two scrambled eggs: 12g



Piece of fruit: 0g

Total Protein: 18g

Protein Content of a Protein-stacked Breakfast: Fajita Scramble with Milk*



Two scrambled eggs: 12g



2 oz leftover cooked ground beef crumbles: 16g



½ cup leftover sautéed pepper and onions: 4g



½ cup frozen shredded hash browns: 2g



8 oz low-fat milk: 8g

Total Protein: 42g

**See page 59 for nutrient content sources.*

The protein-stacked breakfast relies on multiple foods and leftovers from the previous night's dinner to help you meet your protein needs. Even better, it doesn't take much more time to make. It simply requires some advanced planning.

The next time you have a beef dish for dinner, set aside a portion for breakfast the next day. Three ounces of cooked beef contains approximately 25 grams of protein, making 30 grams of protein in the morning seem not just attainable, but easy.

MAXIMIZING PROTEIN TO FEEL FULLER, LONGER

Managing hunger can be tricky because you feel hunger for different reasons. Your brain doesn't tell you why, it just tells you what: you are *hungry*.

Left unchecked, this hunger can drive you to eat excessive amounts or less-than-ideal foods and calories.

Adding more protein at breakfast can help keep you satisfied throughout the day. Science shows that protein can help rebuff hunger by controlling the brain signals that tell us we are hungry.

How Protein Makes You Feel Fuller and Less Hungry

The most effective approach to controlling hunger is two-pronged. You want to:

- Increase feelings of fullness when you eat
- Decrease feelings of hunger between meals

Protein has you covered on both fronts. Research shows that eating whole-food, high-quality proteins sets off a cascade of signals in your digestive system telling your brain you are full and satisfied.^{58,59} Proteins send out stronger *fullness signals* than fats or carbohydrates.^{58,60}

Protein also controls your body's ability to release ghrelin.⁶¹ Ghrelin is a hormone produced by your stomach that travels to your brain to flip your *hunger switch*. It's the only known compound to stimulate hunger. When you start eating less, your stomach produces more ghrelin to encourage you to eat more. Research shows that when you eat protein, ghrelin levels decrease.⁶¹ This is one reason eating protein at every meal needs to be a cornerstone strategy of a strong diet.

MYTH: Eating protein weakens bones.

FACT: If you under consume calcium for an extended period of time while overconsuming protein (2.5 times recommended amounts), you may increase the risk of impaired bone strength. However, not eating enough protein remains a much bigger problem.^{65,66} Several studies have shown that inadequate protein intake is associated with decreased bone health and risk of osteoporosis.⁶⁷



Meet Dr. Heather Leidy

**The Protein Researcher Who Excels in the
Weight Room Powered by Whole-food Proteins**



Dr. Heather Leidy, an associate professor at Purdue University, is one of the world's foremost experts on protein and satiety. A former competitive powerlifter and strongwoman competitor, Dr. Leidy converted a three-car garage into a home gym. She knows the real-world value of protein and strength. Her experience developing both a strong mind and strong body gives her a unique perspective:

When you are involved in the strength training world, you quickly realize that protein, protein timing and the amount of protein play a really big role. But when I applied my background in exercise physiology with my nutrition knowledge of protein, my diet and performance really changed. When I was consistently eating more protein throughout the day, my strength in the gym went through the roof. I have always been a weightlifter, so my improvements in strength were not due to being new to lifting weight. They were due to how I changed the timing and amount of the protein in my diet. It really made a big difference.

After I turned 40, it became much more difficult to gain lean mass. I've had a significant shift in my mindset where I want to retain as much muscle as I can regardless of what life throws at me. What I am finding over the last couple years is that I can maintain what I have. Even when I'm extremely busy, I still make the time to get to the gym at least three days a week, and I spread my protein intake throughout the day. If I can keep this up until I turn 60, that's a win in my book!

In the world of strength and conditioning, drinking protein shakes sometimes can be synonymous with drinking water. However, Dr. Leidy prefers to rely on whole-food, high-quality proteins to meet her daily protein needs.

The main reason has to do with satiety. We've done studies looking at drinking your protein versus eating your protein. You feel fuller and eat less throughout the day when you eat food rather than drink food. We've looked at this over the long term as well, and you gain less fat when you eat your food versus drinking it.

I know drinking a shake is convenient, but my mindset is, "I will grill up a steak in five to 10 minutes after I work out," and I'd much rather eat a steak than drink a shake.

Fueling Strength



Chapter 4 Cornerstone Two: Pair Your Protein with **Plants**

Once you have anchored your plate with protein, the next step is to fill at least half of your plate with colorful vegetables and fruits.

Vegetables and fruit are the nutrient-dense utility players in your diet. They provide:

- Carbohydrates to support your energy needs
- Fiber to support your digestion
- Vitamins and minerals to help your cells and bodily processes run as they should
- Antioxidants to help buffer your body against the stresses of everyday life^{69,70}

PROTEIN- AND VEGETABLE-RICH DIETS CONSISTANTLY DELIVER RESULTS

A strong body is a healthy body, and that means being at a healthy weight.

A healthy body weight keeps you metabolically strong and makes it easier to maintain normal blood pressure⁷¹ and blood-sugar levels,⁷² thus helping reduce the risk of chronic diseases.⁷³ A healthy body weight also limits the stress on your joints and heart, supporting physical activity and strength.

As discussed in the last chapter, eating protein at every meal anchors a balanced diet. Pairing your protein with plants is one more key factor to long-term nutritional success. Research shows the power of this combination.

In a European study, almost 800 participants lost about 8 percent of their body weight and reached a healthy weight. Then, they focused on maintaining their healthy body weight for six months. The most successful participants ate the most vegetables and protein. These participants also had the highest rate of completion in the study, demonstrating that pairing protein and plants increases adherence to a diet.^{74,75}

Let's dig in to how and why half of your plate should be piled with vegetables and fruit.

How Much Should You Eat?

Filling half your plate at each meal with vegetables and/or fruit is a solid start. A diet based on that premise alone has great potential for success. However, if you prefer to measure your portions, aim for 4-5 servings of vegetables and 4-5 servings of fruit each day. For smaller individuals or appetites, 3-4 servings of each daily is also an option.⁷⁶

These targets are based on the diets used in the landmark Beef in an Optimal Lean Diet (BOLD) study conducted at Penn State University. Researchers put adults with a history of struggling to lose weight on a heart-healthy diet containing lean beef. Study participants successfully decreased their risk factors for cardiovascular disease over the course of the study.^{3,13} They consistently reported feeling full because of the combination of lean protein, fruits, vegetables and whole grains – likely a key factor in the success of the diet.

What Is a Serving Size of Vegetables or Fruit

Amounts for One Serving

Cooked vegetables = ½ cup



Raw vegetables = ½ cup chopped or 1 cup leafy vegetables



Fruit = 1 medium piece or ½ cup fresh or frozen



Hand Measurements

1 cup vegetables = 1 clenched fist



½ cup of fruit or vegetables = 1 cupped hand



Source: United States Department of Health and Human Services, United States Department of Agriculture, United States Dietary Guidelines Advisory Committee. *Dietary guidelines for Americans, 2015-2020*. Eighth edition. Washington, D.C.: U.S. Department of Health and Human Services and U.S. Department of Agriculture; 2015.

TAKE ACTION:

PAIR YOUR PROTEIN WITH PLANTS

Pairing fruits and vegetables with protein at every meal is an important dietary cornerstone. Think about the last meal you ate. How many servings of fruits and/or vegetables would you estimate you had? Could you have added more? How? Apply these adaptations to your next meal.

STRENGTH IN NUMBERS

FIVE KEYS FOR PAIRING PROTEIN AND PLANTS FOR GREATER FULLNESS

1. Add vegetables to your protein-rich meal to help control calories while feeling satisfied and strong
2. Research shows the more vegetables you eat at a meal, the fewer calories you will consume⁷⁷
3. If you are very hungry, eat vegetables in the form of a salad before your main meal to help control how much food you eat during the meal⁷⁸
4. Start your main meal by eating your protein, then vegetables and finally fiber-rich carbs, which will create a greater feeling of fullness and help control blood-sugar levels⁷⁹
5. Pay attention to the signals your body sends you – stop eating when you are full, not stuffed





Chapter 5

Cornerstone Three: Focus on Fiber-rich Carbs

Carbs are a hot topic in nutrition, diet and health today. The previous chapter discussed the importance of pairing protein and plants at every meal. While vegetables and fruit contain carbohydrates, this chapter specifically looks at starchy vegetables, whole grains, beans and legumes.

You can use higher-carbohydrate foods as a dietary tool to fuel your daily activities. Focus more on choosing fiber-rich carbs and less on *good vs. bad* carbs. This will make it easy to ensure you are getting the highest-quality carbs possible.

WHY DOES FIBER MATTER?

Fiber is important because it works on a variety of levels to improve your overall health and wellness. Fiber can help:

- Lower cholesterol levels in your body, which helps reduce risk of cardiovascular disease⁸⁰
- Slow the rate at which your blood sugar rises after a meal, which supports optimal metabolic health⁸¹
- Support helpful bacteria in your digestive system, which can boost your immune system⁸²
- Slow the rate of digestion, helping you feel fuller as you eat⁸³

Despite the many health benefits of fiber, we do not eat enough of it. The 2015 U.S. Dietary Guidelines recommend that half the grains you consume be fiber-containing whole grains. On average, Americans eat only about 15 grams of fiber per day, but the optimal intake is significantly higher (38 grams for men and 25 grams for women).²⁷

5 GO-TO FIBER-RICH CARBS*

Whole-Grain Bread

The right kind of whole-grain bread gives you fiber, nutrients and the versatility to make amazing, portable meals. Look for at least 5 grams of fiber per slice and the words *whole-grain* or *whole-wheat* at the beginning of the ingredient list. If you are trying to be carb-conscious, use one slice instead of two for an open-faced sandwich.



Oats

Steel cut or rolled (also called old-fashioned) oats are both great nutrient- and fiber-packed carb sources for breakfast, snacks or even as a substitute for breadcrumbs in your favorite meatball or meatloaf recipes. Oats contain high levels of soluble fiber, which helps slow the digestion of your food while also helping to lower cholesterol levels.^{84,85}



Quinoa

Quinoa is the seed from a plant that looks much like spinach. With approximately 60 percent more fiber than brown rice and a cooking time of just 15 minutes, quinoa is a great alternative to rice in any dish when you are cooking a quick meal.⁸⁵



Beans and Legumes

Canned beans and legumes are a quick and simple way to boost the fiber content of a soup, stew, stir-fry or salad. Just ½-cup serving of beans or legumes can pack up to 6 grams of fiber.⁸⁵ When buying canned beans, look for the low-sodium variety and rinse well before adding to your meal.



Potatoes

When it comes to getting the most bang for your buck, it is hard to find a carb nutritionally or financially superior to white potatoes. They are packed with fiber, potassium, vitamin C, B vitamins, and magnesium.⁸⁵ When cooked and cooled, potatoes also create a unique fiber called resistant starch (RS).⁸⁶ Research shows that RS can support healthy blood-sugar control, digestion and immune function.^{87,88}



*See page 59 for nutrient content sources.

TAKE ACTION:

SWITCH TO WHOLE GRAINS

Take a minute to think about the grains and starch-based carbohydrates in your diet. The U.S. Dietary Guidelines recommend that you make half of the grains in your diet whole grains.²⁷ Which carbohydrates could be swapped out with a whole-grain, fiber-rich variety? What would the alternative be, and how can you incorporate it into your next meal to accompany the protein and plants on your plate?



White Rice

VS.



Brown Rice



White Bread

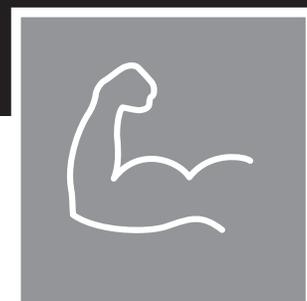
VS.



Whole-grain Bread



Fueling Strength



Chapter 6

Cornerstone Four:

Fuel **Recovery** to Be Stronger

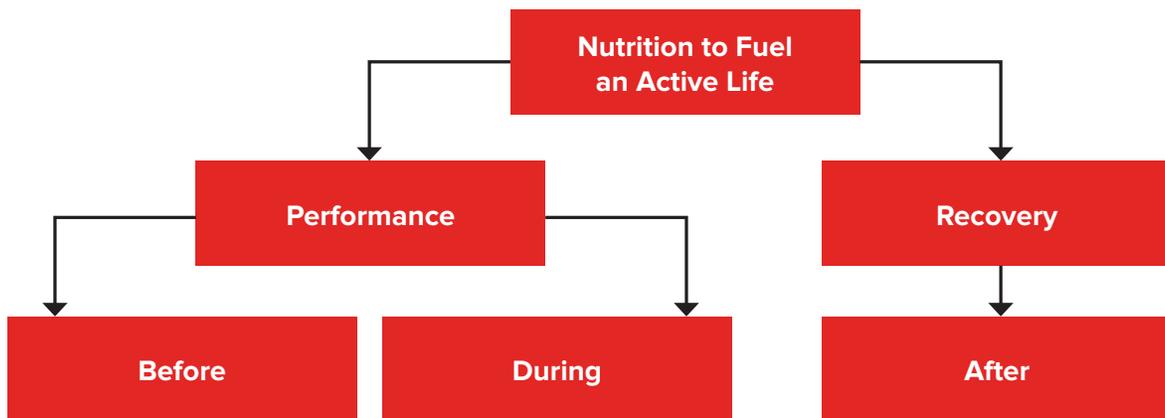
In the previous three chapters we created a solid foundation to a strong diet. This diet is anchored in protein, piled high with vegetables and fruit, and finished with wholesome, fiber-rich carbs. We will now take a closer look at why nutrition is important for performance and recovery.

This chapter takes our knowledge to the next level. Since an active lifestyle is a foundational component of strength, we'll discuss how to use nutrition to support metabolic changes brought on by exercise. This will help improve how your body uses the food you eat and help maximize your recovery.

PERFORMANCE AND RECOVERY

Modern sports nutrition considers two main categories: performance and recovery. You can structure your diet to enhance performance in a desired activity. Appropriate nutrition also helps your body recover faster and more completely to prepare for the next time you work out, race or compete.

Performance and recovery are not limited to those who consider themselves athletes. It applies to everyone who wants to be a little better the next time they embark on a physical adventure, whether that's a workout with a set of dumbbells in your garage, a hike, soccer practice or yoga.



Depending on the timing and intensity of your exercise, your nutrition needs for optimal performance and recovery may vary — before, during or after your activity.

Intensity

Higher-intensity exercise relies more on your muscle’s carbohydrate reserves. The more intense your activity, the greater your body’s need to replenish carbohydrates afterward. To determine the intensity of your workout, see *Understand Your Effort: RPE* on the next page.

Duration

In general, longer workouts place greater stress on the body. Your recovery strategy should focus on rebuilding muscle as well as replenishing carbohydrates.

For example, a 20-minute workout at a moderate intensity (such as a jog) simply requires staying hydrated and eating a protein-rich meal at least 1-2 hours afterward.

But if you take that same moderate-intensity workout and stretch it to 90 minutes, you will need to be more diligent about eating a planned post-workout meal containing protein (for muscle recovery), vegetables (for electrolytes, vitamins and minerals) and fiber-rich grains or starches (to replenish the carbohydrate stores in your muscles). This workout also requires that you hydrate beforehand and might require that you add a small snack during your workout to sustain your energy levels.

Frequency

How often you work out greatly impacts how diligent you need to be about your recovery plans. When you start a workout without having recovered from the previous one, you can’t perform at your best. This additional fatigue becomes a liability when compounded over subsequent workouts. For example, four higher-intensity workouts each week will require more of a focus on recovery nutrition than one per week.

PRINCIPLE OF STRENGTH: THE MISSING KEY TO ACTIVE NUTRITION

As you work through this section and create fueling and recovery strategies for physical activity, remember that context is extremely important. As the intensity, duration, and frequency of your workouts increase, so should your focus on nutrition for optimal fueling and recovery.

Understand Your Effort: RPE

The science and technology of measuring and monitoring exercise – and effort exerted during exercise – is a quickly growing field. Even in today’s world of bands, straps, watches and apps, low tech is sometimes the best tech. Try the Borg Rating of Perceived Exertion (RPE) Scale,⁸⁹ pioneered by now-emeritus professor Dr. Gunnar Borg at Stockholm University. This scale from 6 to 20 is a simple way to rate and identify the amount of effort you are putting forth at any given moment during physical activity (like running) or activities of daily living (like doing chores).

Using the scale below, identify the number that correlates with how you’d describe your exertion effort during an activity.

YOUR PERCEIVED EXERTION

None, Light, Fairly Light

Reading a book, folding clothes, walking through a grocery store. This level of activity is not enough to speed your breathing.

Somewhat Hard

Activities that increase your heart rate and breathing but don’t leave you out of breath, such as brisk walking, canoeing or a leisurely bike ride.

Hard

Running, biking, swimming or lifting weights in a way that takes significant effort, increases your heart rate and leaves you out of breath.

Very Hard, Extremely Hard

The highest level of activity you can sustain to a burst of effort that you cannot maintain for long.

RPE ratings of 12-14 are considered moderate-intensity activity. When your RPE hits 15 or higher, you’re doing high-intensity activity, which draws more aggressively from the sugar in your muscles. If you want to sustain this intensity for an hour or longer, you need to consume an easily digestible carbohydrate (like a sports drink or rice cake) at the 60-minute mark.

BORG RATING OF PERCEIVED EXERTION



TAKE ACTION:

ANY ACTIVITY IS BETTER THAN NO ACTIVITY

Being physically active isn't defined by going to the gym. It can be as simple as doing several sets of push-ups and sit-ups before breakfast, walking up and down flights of stairs in your building for 20 minutes, or canoeing around a lake after dinner. In our world, physical fitness is becoming more and more driven by technologies, equipment and metrics. Don't get distracted: the most important thing is still *moving your body every day*.

START STRONG

What to Do Before You Exercise

The goal of pre-workout nutrition is to ensure you are not starting your training session with a nutritional and metabolic deficit. A great workout isn't possible if you are running on empty.

Staying Hydrated

The easiest way to maintain a high level of performance is to stay hydrated, as water is extremely important to your body. Research shows that just a 2.5 percent decrease in body weight from dehydration can cause an elevated heart rate, decreased ability to regulate your body temperature (which may cause overheating) and increased perceived effort (exercise feels harder than it should).⁹⁰

There are no hard and fast recommendations for staying hydrated. The amount of water you need to stay hydrated varies depending on factors like body size, climate and activity level. However, aim to drink at least one glass of water with each meal, between meals, before exercise and after exercise.

Pre-Workout Meals

What and when to eat before exercise is also very individualized. Some people can't stomach much food before they exercise, while others have no problem.

If you are going to have a meal with solid food before a workout, do so 90-120 minutes prior to activity. This helps ensure digestion and exercise won't be competing for your body's resources.

If your schedule requires that you eat less than 90 minutes prior to exercise, liquid nutrition is preferable as it is digested faster and easier.⁹²

STAY STRONG

How to Fuel During Activity

If your workouts are less than 90 minutes, the food and nutrients from your pre-workout meal should be enough to sustain you through your workout. However, if you are exercising in a hot environment at high intensities or for longer than 90 minutes, you may need nutrition during your workout to help you perform at your best.³⁹

Eating during exercise helps replenish your body's resources and enhance and maintain your performance. Just as there are many kinds of exercise, there are also many strategies for nutrition during training. While sports drinks are common, the intensity and duration of your activity should determine how you fuel, and you will probably find that water and whole foods work just fine.

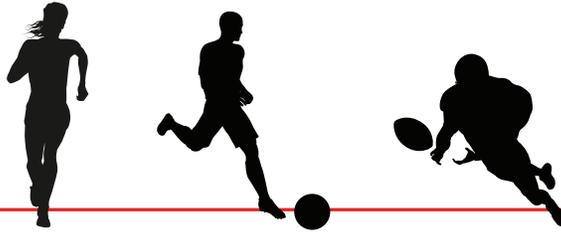
The next two pages provide advice on fueling several different activities: running or a game, a weight-training workout, and a hike. Regardless of your activity of choice, you can use a hybrid of these strategies to perfect your own fueling plan for exercise.

KEEP IN MIND

Your body has carbohydrates stored up in your muscles to use during exercise, so you don't need to replenish gram-for-gram.



FUELING A RUN OR A GAME



When you head out for a long run or play in a sporting event like a soccer or football game, several factors impact how you need to fuel:



Temperature



How much you sweat

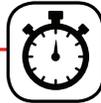


Duration

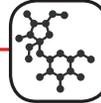


Intensity

Research shows that your body uses about 1 gram of carbohydrates per minute of exercise, so 1 hour of exercise can burn up to 60 grams of carbohydrates.³⁹



1 HOUR



60 GRAMS



15
G
8
OZ

A traditional sports drink contains about 15 grams of carbohydrates per 8 ounces.



If you are going to be active for 60 to 90 minutes, choose a diluted sports drink to provide a total of 30 grams of carbohydrates. Sip it throughout your activity just as you would water. Use this as your starting point for your 60- to 90-minute workout. Remember, you can adjust how much you dilute your drink, making it weaker or stronger, based on your individual preference and performance.³⁹

TAKE ACTION:

SEEK VARIETY

There is no one best type of exercise. Different kinds of exercise and activities have different effects and benefits. There are health benefits to both endurance (running, biking, walking, etc.) and muscle-strengthening (weight lifting, sprinting, etc.) activities. Experts recommend that you shoot for at least 2.5 hours of moderately-intense exercise each week, whatever activities you choose.⁹⁴

Fueling a Strength Training Workout

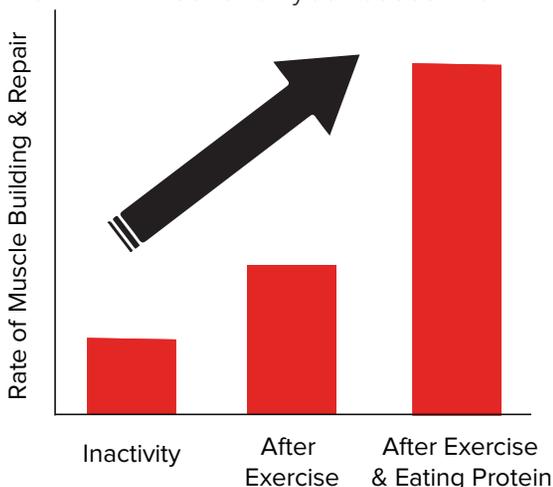
When lifting weights, especially eight- to 15-rep sets, your body will primarily use carbohydrates to fuel your lifts. However, there is enough carbohydrate stored in your muscles to fuel just about any weight-training workout. If you find that you are battling fatigue toward the end of your workouts, then 8 to 16 ounces of a diluted sports drink around the midway point of your training session can help.³⁹

Fueling a Hike

When hitting the trails and hiking for several hours, your main concerns should be staying hydrated and maintaining consistent energy levels to ward off fatigue.

Pack water and a slow-digesting snack that contains fat and carbohydrates for energy, electrolytes and other minerals to replace those lost while sweating. Also include a little bit of protein to keep excessive muscle breakdown at bay.⁹³

How can you get all of this? A Beef Jerky Trail Mix will cover all your bases in a



delicious package you can carry easily in your pack or pocket. You can find the recipe at BeefItsWhatsforDinner.com/strengthfieldmanual.

FINISH STRONG

How to Use Nutrition to Recover from Exercise

Strength is grounded in recovery. During exercise, your muscle tissue breaks down. Through proper recovery, your muscle tissue grows and repairs – building strength.⁹⁵

Protein-Powered Recovery

Eating ample and consistent amounts of protein is a top priority for recovery and rebuilding muscle. Protein has a two-pronged effect during the recovery period. It first stops the muscle breakdown that occurs during exercise. Then, it promotes muscle repair and builds new muscle so you are stronger the next time around.

As shown in the graph, the act of exercising causes your body to initiate the process of building and repairing muscle. It's important to note that when you combine protein with exercise, muscle-building signals are both strengthened and sustained.^{41,96}

The muscle-building signals from exercise begin to wane after three hours. Combining protein with exercise allows those signals to persist for up to five hours. Pairing protein and exercise gives your body a greater ability to grow and repair muscle.⁴¹

4 WAYS THAT EXERCISE IMPROVES YOUR BODY'S USE OF PROTEIN FOR GREATER STRENGTH

1. **Improved insulin sensitivity:** Insulin is a hormone that shuttles amino acids from the protein you eat into your muscles. Exercise makes your muscles more responsive and sensitive to insulin.¹⁰⁰
2. **Improved blood flow:** More blood flow to your muscles brings more protein and amino acids to the site for growth and repair.¹⁰⁰
3. **Sustained muscle-building:** When you combine exercise and protein, your body leaves the muscle-building switch on longer.⁴¹
4. **More efficient use of protein:** As you age, your muscles' ability to sense protein decreases. Exercise enhances this ability, helping you build and maintain muscle mass more effectively.⁹⁹

Electrolytes

Another area to consider in your performance and recovery nutrition is electrolytes. Many of these essential minerals (i.e., sodium and chloride) are lost in sweat, but they are key to optimal recovery after exercise.

- Sodium (everywhere in the diet)
- Chloride (everywhere in the diet)
- Potassium (e.g., tomatoes, bell peppers, bananas)
- Calcium (e.g., milk/dairy, spinach, collard greens)
- Magnesium (e.g., nuts, broccoli, quinoa)

The American College of Sports Medicine recommends obtaining these electrolytes from whole foods, rather than from supplements or sports beverages.¹⁰² However, since losing just 2.5 percent of your body weight in sweat can lead to decreases in strength and performance, if you sweat heavily, sports drinks can help you stay hydrated and support healthful levels of electrolytes. It is important to keep in mind that sports drinks contain additional carbohydrates you may or may not need. Be mindful of the calorie content of sports drinks and choose ones that are in line with your exercise regimen and goals.

Protein is Essential to Recovery from Sustained and/or Intense Physical Activity

Protein is essential to your post-workout recovery once you reach a certain duration and intensity of activity. The best practice is to have a meal or a snack with 30 grams of protein within two hours of finishing your workout when your workout is:^{39,101}

Somewhat hard (RPE 13-14) intensity for >45 minutes

Hard or very hard (RPE >15) intensity for >20 minutes

Replenishing Carbs After Exercise

Your body stores carbohydrates in your muscles in the form of a sugar called glycogen. Your body has limited ability to store glycogen due to lack of space, but, unlike fat, your body can access and use this stored sugar as energy very quickly.

After you exercise, the carbohydrate stores in your muscles will be reduced based on how hard and how long you worked out. Refilling your glycogen tank is the job of your recovery nutrition, and your body is best equipped to do this right after you exercise. If you are exercising 5-6 days a week for at least 60 minutes each day, then it is important to include carbohydrates as part of your recovery nutrition. Otherwise, the carbohydrate stores in your muscles can be replenished by eating carbohydrates as you normally would throughout the day.⁶²

PRE-WORKOUT VS. POST-WORKOUT PROTEIN

Post-workout protein is one of the most discussed aspects of recovery nutrition. However, depending on the duration and intensity of your workout, the meal you eat before your workout may provide you with the post-workout protein you need.

How does this work?

Solid food takes longer for your body to process.^{97,98} At least 90 minutes are required to digest and break down a solid meal that includes whole-food proteins like beef.⁹⁷ When you leave this amount of time between a meal and exercise, the proteins will be ready for your body to use in the recovery process.⁹⁹

Protein consumed 90 minutes prior to 30 minutes of high-intensity exercise, or before 45 to 60 minutes of lower-intensity exercise, can serve as both your pre- and post-workout meal.

EXAMPLES OF COMPLETE POST-WORKOUT MEALS



Greek Beef Salad

- Carb - Pita
- Protein - Beef
- Electrolytes - Veggies



Farmer's Market Vegetable, Beef & Brown Rice Salad

- Carb - Brown Rice
- Protein - Beef
- Electrolytes - Veggies

TAKE ACTION: KEEP A FOOD JOURNAL

Think of your journey toward realizing a diet that supports strength as a map; you have a starting point and a destination. In order to reach your desired destination, you need to close the gap. You do this by slowly changing your behaviors. A food journal is a great way to help you determine your starting point on this journey to develop and embody strength.

Here are three steps to keeping a successful food journal:

Step 1: Get a Notebook

Documenting what you eat with a notebook and pen is the simplest and easiest way to become more aware of the foods and quantities you eat each day.

Step 2: Bite it, Write it

It is that simple. Don't try to record everything at the end of the day—the longer you wait the fuzzier you get on the details. Make a habit of recording each meal and snack immediately after you eat it.

Step 3: Be Specific

Make your logs as specific as possible. In addition to your food, you can include specifics about the time (breakfast, lunch, pre-workout, etc.), your location (home, restaurant, etc.), where you got the food (cooked it, ordered it) and how you are feeling (tired, stressed, happy, etc.). These details give you greater insights into your eating habits and what drives your food choices.





**Strength
in Action**

Part 3

Strength in Action



Part 3 of this field manual will help you continually take steps toward the development of strength through proper food and fueling – wherever you are in life.

The pursuit of strength is personal and unique. Perhaps you want to make changes to improve your overall health, train to achieve a personal best in a race, or maximize your mental or physical potential to feel your best. Whatever your goal, you reap the greatest benefit in your pursuit of strength from the pursuit itself.

This is true when it comes to pursuing many nutrition, activity or lifestyle-improvement goals. Some people change how they eat because they want to lose weight; others want to improve a certain health parameter, such as lowering total cholesterol; and others want to get physically stronger or faster.

Strength is derived through the process of making positive changes. Small, daily, consistent actions are the steps that keep you moving toward your bigger goals. If your big goal is to lose 10 pounds, you should focus on eating moderate amounts of protein and fewer total calories each day. If your primary goal is to complete a 5K race, you should focus on running 3-4 times per week.

You achieve strength through daily actions that move you closer to your goal, regardless of your starting point. To help you take action, we'll take a closer look into each of the components of strength.

Strength = Balanced Diet + Physical Activity + Good Health

Balanced Diet

Various meal prep strategies in Chapter 7 help you make nutritious, quick and easy, protein-packed meals. In Chapter 8 you'll also find a complete 2-day meal plan that demonstrates how everything comes together to form a balanced diet.

Physical Activity

In Chapter 6 you learned how you can use nutrition to fuel recovery from physical activity. In Chapter 9 we'll discuss different targets for physical activity and how to get started, regardless of your fitness level.

Good Health

Maintaining good health in your life is the result of a variety of factors. In Chapter 9 we'll also dive into how you can use recovery- and stress-management strategies, sleep and even just getting outside to support good health.



Chapter 7

Strengthen Your Plate One Meal at a Time: **Meal Prep** Strategies

The journey to strength includes devoting time to planning and building healthful meals. Taking the time to create quality, nutritious meals provides you with the energy needed to make it through even the busiest days.

Meal planning doesn't have to be time-intensive or fancy. It can be as simple as scribbling down meal ideas before you head out to the grocery store, calling your spouse on the way home to see what you have (or don't have) in the refrigerator for dinner, or flipping extra burgers on the grill while the kids play in the backyard. Meal planning can be whatever it takes to follow the four cornerstones of eating previously discussed.

Here are four foundational meal preparation strategies that will help you easily plan and prepare quality, wholesome meals regardless of your schedule:

- Modular Meals
- Strong Salad Matrix
- One Cut, Multiple Meals
- One-pot Meals

These strategies give you flexibility to prepare balanced meals that work for you and your family without compromising nutrition, quality or taste.

MODULAR MEALS

As the name suggests, modular meals contain different food *modules*: protein, fruit/vegetable and fiber-rich carbs. Building your meals with 1-3 different options for each component ensures you always have a balanced meal as well as variety to keep you excited and interested.

Modular meal planning also simplifies meal prep, allowing you to make a variety of dishes with a limited number of ingredients. **Start with the following foods:**

- **Protein:** Sirloin steaks
- **Vegetable:** tomato, onion, cucumbers, steamed broccoli
- **Fiber-rich Carbs:** cooked brown rice, roasted potato

Then, use the modular meal strategy to make a variety of balanced meals quickly. **For example:**

Sirloin with baked potato and steamed broccoli



Sirloin with grain salad (brown rice, onion, tomato) and steamed broccoli



Sirloin with roasted potato and Greek salad (cubed tomato, onions, cucumber, oil, vinegar, dried oregano)



Pre-Cook for Faster Meal Prep

Certain foods lend themselves to being prepared in advance. Use this to your advantage whenever possible as it allows you to prepare a meal in the moment.

Brown rice can take 60 minutes to cook. You can't get dinner on the table in 30 minutes if it takes 60 minutes for one component of the meal. A lean brisket or a pot roast can provide delicious, tender protein for multiple meals throughout the week, but it can take hours to cook properly.

Find foods you enjoy eating that have a longer cooking time. Prepare and cook them on the weekends or during the week when you have extra time at home. If freezing pre-cooked food, portion and freeze the meals in ready-to-eat containers. If refrigerating, let the food cool before covering and storing in the refrigerator.

Dinner for Lunch

One of the most efficient ways to prepare lunches is to double up on what you prepare for dinner. Simply cook an extra portion for lunch the next day.



TAKE ACTION:

BUILD YOUR OWN SALADS FOR FAMILY DINNERS

Choose one salad base and protein to anchor the meal. Add these to a bowl for each family member. Then lay out several bowls containing a variety of cut or cooked vegetables and starches/grains. Each person can add these to their bowl and build their own strong salad. This is a great way to get kids to explore and try new vegetables and food combinations on their own terms.

SALAD MATRIX

The salad matrix gives you the ultimate flexibility in taste and variety. It is also a great way to shake things up for family dinners.

A salad is a quick, versatile, nutrient-rich meal that requires minimal cooking. It's easy to follow and fits the cornerstones of eating to support strength: anchor your plate with protein and fill half your plate with vegetables and fruits.

The salad matrix strategy has 5 easy steps to build a meal with the nutrition your body needs:

1. Start with 1 handful of salad greens (e.g., romaine, spinach, mixed greens, etc.)
2. Add a 3-oz serving (the size of a deck of cards) of your favorite protein
3. Add 3 half-cup servings of vegetables or fruits
4. Add 1/3-2/3 cup fiber-rich grain or starch
5. Mix in dressing (2 tsp of olive oil + 1 tsp vinegar or 1 Tbsp of your favorite dressing)



1 handful romaine lettuce



1/2 cup chopped tomato



1/2 cup corn kernels



1 serving grilled/sliced sirloin



1/2 cup chopped cucumber



1/3 cup quinoa



1 Tbsp of creamy avocado dressing

Blend together 1 medium ripe avocado (coarsely chopped), 3/4 cup water, 1/4 cup fresh lime juice, 1 peeled clove garlic and 1/2 teaspoon salt

Meal Repetition: The Missing Key to Success

When planning your meals, don't worry about eating the same dishes again and again. Yes, it is important to eat a variety of foods in your diet so that you can get a full range of vitamins and minerals. However, as you increase the number of different meals you eat during the week, you increase the complexity of following your diet. Greater complexity also means more ingredients to buy and more meals to prepare and cook.

So, start simple and repeat. Find meals you like and eat them multiple times throughout the week. Breakfast is a great place to build in repetition. Pick two breakfast meals and alternate them during the week. The following week, swap in a new meal and repeat. You can also use one-pot meals (see page 41) that make multiple servings to fuel your lunch for the week.

For many people, repetition is the missing key for a successful diet. Repetition makes execution easier, which leads to improved adherence to your diet, and better adherence leads to better results. In addition to repeating meals throughout the week, you can also repeat proteins that you ate at dinner as part of your protein stacking at breakfast (see Chapter 3).



ONE CUT, MULTIPLE MEALS

Many different cuts of beef can be cooked in a variety of ways. This meal preparation strategy encourages you to select one cut of beef and prepare it in different ways during the week, giving you multiple meals from just one cut.

This is how you can make multiple meals from Flank Steak:

- Marinate overnight (marinate cuts like Flank Steak and Top Round for 6-24 hours to enhance tenderness.)
- Use half of the Flank Steak for fajitas
- Use the other half as part of a stir-fry the next night

Don't forget USDA's food safety tips:

Raw cuts of beef should be cooked or frozen within 3-5 days of purchase.

Ground beef and stew meat should be cooked or frozen within 1-2 days of purchase.

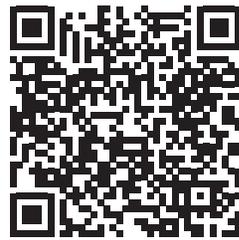


Simple Southwest Marinade

Combine $\frac{1}{2}$ cup Italian dressing, $\frac{1}{4}$ cup fresh lime juice, 1 Tbsp honey and $1\frac{1}{2}$ tsp ground cumin in a bowl. Add to a food-safe bag, then add beef. Coat beef with marinade and seal bag tightly. Place in refrigerator for 30 minutes to flavor strip steak or 6 hours to tenderize flank steak.



Marinades & Rubs



Classic Fajitas



Apricot Teriyaki Beef Stir Fry



Meatball Skewers with Cranberry Barbecue Sauce



Confetti Beef Tacos



Wrangler's Beef Chili



Ground Beef

Ground beef is another great way to use beef for this strategy.

- Separate 3-pound package of ground beef into 1-pound portions.
- Use 1 portion for meatballs to serve with whole-grain pasta and sauce
- Use 1 portion for tacos
- Use 1 portion for chili

USDA food safety tips:

To help ensure food safety and keep bacterial levels low:

- Cook or freeze fresh ground meats within 2 days
- Refrigerate fresh meats at 40 °F (4.4 °C) or below and freeze at 0 °F (-17.7 °C) or below.
- Cook raw ground beef to an internal temperature of 160 °F (71.1 °C) as measured with a food thermometer.

Chilly Day Beef Chili



ONE-POT MEALS

One-pot meals, like chili or stew, tend to require a small amount of upfront work and a longer cooking time – but once they’re in the pot, they don’t require much more effort. This makes them ideal for cooking on days when you will be at home but can’t spend hours in the kitchen.

One-Pot Meals:

- Make multiple servings and easily scale up or down to make more or fewer servings based on your needs.
- Require a little bit of prep work but cook for several hours with minimal attention.
- Can be portioned and frozen so that you have ready-to-eat meals whenever needed.



Moroccan Beef and
Sweet Potato Stew



Strength in Action



Chapter 8 2-Day **Meal Plan** Strategy

Sometimes the easiest way to begin something new is to follow a specific roadmap.

This 2-day meal plan will help you see what optimal portions look like and how you can combine simple, whole-food ingredients to make delicious meals to fuel your daily life.

Monday

Breakfast

Fruit Smoothie + Trail Mix Bar

½ cup plain, fat-free Greek yogurt
½ cup fat-free milk
1 ½ cups baby spinach
½ cup fresh strawberries
½ cup fresh blueberries
1 scoop whey protein powder
1 trail mix bar

Protein: 33g

Morning Snack

Peanut Butter Banana Toast

1 slice whole grain bread
1 Tbsp peanut butter
1 banana

Protein: 8g

Lunch

Grilled Steak + Asian Noodle Salad + Grapes

4 oz beef, top sirloin steak, cooked
1 cup cooked whole grain spaghetti
½ cup shredded carrots
½ cup red bell pepper
⅓ cup sugar snap peas
1 tsp light Asian sesame dressing
1 tsp hoisin sauce
1½ tsp lime juice
½ cup grapes

Protein: 35g

Afternoon Snack

Beef Jerky with Greek Yogurt + Crackers

1 piece (0.7 oz) beef jerky
8 oz plain, fat-free Greek yogurt
3 whole grain crackers

Protein: 31g

Calorie Saver Swap

Replace Greek yogurt and crackers with 1 clementine
Saves 160 calories

Dinner

Protein Loaded Sweet Potato + Milk

2 oz lean protein of choice, cooked*
(e.g., 93% lean ground beef, lean ground pork, lean ground turkey)

1 sweet potato
½ cup cooked brown rice
¼ cup low-sodium black beans
2 Tbsp guacamole
2 Tbsp low-fat shredded cheddar cheese
2 tsp olive oil
1 cup fat-free milk

Protein: 37g

Calories 2,037; Carbohydrate 257g; Protein 144g;
Total Fat 52g; Saturated Fat 13g; Sodium 2,116mg;
Added Sugar 3g

*Nutrition analysis reflects lean ground beef



Recipe contains beef option



Recipe available at
BeefItsWhatsForDinner.com



Tuesday

Breakfast

Beef + Spinach Breakfast Sandwich

3 oz beef, top sirloin steak, cooked

- 1 egg, scrambled
- 2 Tbsp baby spinach
- 2 Tbsp tomatoes
- 1 slice fat-free Swiss cheese
- 1 whole wheat sandwich thin
- 1 cup fat-free milk

Protein: 45g



Morning Snack

Blueberry Yogurt Parfait

- ½ cup plain, fat-free Greek yogurt
- ½ cup fresh blueberries
- 2 Tbsp granola

Protein: 13g

Lunch

Greek Salad + Pita + Hummus

- 2 cups romaine lettuce
- ⅓ cup red onion
- ⅓ cup tomato
- ⅓ cup cucumber
- 4 Kalamata olives
- 1 Tbsp low-fat feta
- ¼ cup hummus
- 1 whole grain pita bread
- 3 oz chicken breast
- 1 Tbsp balsamic vinegar
- 1 Tbsp olive oil

Protein: 42g

Afternoon Snack

Apple + Peanut Butter

- 1 apple
- 2 Tbsp peanut butter

Protein: 7g

Calorie Saver Swap

Replace apple with ½ cup celery and reduce to 1 Tbsp peanut butter
Saves 180 calories

Dinner

Asian-Style Noodle Bowl

3 oz lean protein of choice, cooked*
(e.g., beef strip steak, salmon, tofu)

- 2 oz soba noodles
- ⅓ cup red pepper
- ⅓ cup bok choy
- ⅓ cup carrots

Protein: 40g



Calories 2,007; Carbohydrate 213g; Protein 147g;
Total Fat 70g; Saturated Fat 16g; Sodium 2,362mg;
Added Sugar 2g

*Nutrition analysis reflects strip steak



Recipe contains beef option



Recipe available at
BeefItsWhatsForDinner.com

To view a full 7-day meal plan with recipes, visit
[BeefItsWhatsforDinner.com/strengthfieldmanual](https://www.beefitswhatsfordinner.com/strengthfieldmanual)







Chapter 9

Lifestyle **Habits** That Build Strength

High-quality, delicious foods provide nutrients to fuel strength, but what you do with that fuel is just as important as the fuel itself.

The following four lifestyle habits are important in supporting strength:

- Physical activity
- Sleep
- Recovery
- Time outdoors

Let's look at these and how you can use them in your life.

STRENGTH THROUGH PHYSICAL ACTIVITY

Regardless of your personal definition of strength, physical activity is important. Being active has the power to strengthen your mind, heart and muscles throughout your life. The 2018 Physical Activity Scientific Guidelines Report states:

Physically active individuals sleep better, feel better, and function better.⁹⁴

There are many types of exercise and many different ways to be physically active. Don't get overwhelmed. Instead, start slow and make it fun.

“Start Low and Go Slow”

This phrase is touted by the group of scientists who developed Physical Activity Guidelines for Americans. It's a good mantra for when you are getting started with a new type of physical activity. Start with low intensity and progress slowly by increasing the intensity or duration of your workout over time.

Aim to develop and foster habits and practices that you can sustain in one form or another for your entire life. Rushing and pushing yourself beyond your abilities can lead to injuries. As you develop your physical fitness, your body will strengthen and be able to handle longer and more intense physical workouts.

Make Physical Activity Fun and Challenging

The best kind of physical activity is the kind you do regularly. So, do things you enjoy and find challenging. These two factors will help solidify physical activity as a mainstay throughout your life. The enjoyment will keep you coming back day after day, and the challenge will push you to be a little better and work a little harder each day.

TAKE ACTION:

WAYS TO MEET/EXCEED YOUR EXERCISE TARGETS

To maintain good health, leading scientists in health and physical activity recommend that **adults aim for 2.5 hours of moderately intense (or 75 minutes of vigorously intense) physical activity each week, plus 2 days of resistance training.** Building up to 2.5 hours a week of moderate activity should be your first goal. Beyond that target, any further increase – up to 5 hours a week of activity – leads to additional health benefits. There are a variety of ways you can be physically active to meet recommended levels of activity, and chances are you might already be more active than you realize. Here are some ways leading scientists recommend you meet/exceed your physical activity goals each week:⁹⁴

Ways to meet weekly physical activity targets:

- 25 minutes of running on 3 days, lifting weights on 2 days
- 30 minutes of brisk walking on 5 days, exercising with resistance bands on 2 days
- 30 minutes of biking to and from work on 3 days, playing softball for 60 minutes on 1 day, using weight machines on 2 days

Ways to be more active and exceed initial targets:

- 45 minutes of running on 3 or 4 days, circuit weight training in a gym on 2 or 3 days
- 45 minutes of stationary bicycling on 2 days, 60 minutes of basketball on 2 days, calisthenics on 3 days

STRENGTH THROUGH SLEEP

Physical activity itself doesn't build and strengthen muscle—it breaks it down. It is through recovery and eating protein that your body repairs and rebuilds muscles to make you stronger for your next workout. Sleep is an essential time for your body to focus on recovery and restoration.¹⁰³

Consistently getting 7-9 hours of sleep each night (8-10 for adolescents and teenagers) is a simple way to ensure your body is properly rested and recovered.¹⁰⁴ It can be easy to shrug off getting enough sleep in the name of *getting more things done* or *not needing that much sleep*. However, research shows that many Americans don't get enough sleep, preventing them from being their best selves or performing at their physical best.^{27,105}



TAKE ACTION:

4 WAYS TO GET MORE QUALITY SLEEP

1. Make sleep a priority. Plan the time you go to sleep and wake up to ensure you get 7-9 hours of sleep.¹⁰⁶
2. Create a routine. Quality sleep is part physical, part psychological. Create a bedtime routine that signals to your body it is time to wind down and get ready for sleep.
3. Sleep in a dark, cool room. Light and warm temperatures can decrease the quality of your sleep.^{107,108}
4. Cut out caffeine early. Individual sensitivities to caffeine vary, but it remains in your body for more than 6 hours. If you are having trouble settling down, stop drinking caffeinated beverages by 3 p.m.

STRENGTH THROUGH RECOVERY

Recovery helps you become stronger. However, it's not just about physical recovery. Recovery in other areas of your life, like mental recovery, is vitally important and can have far-reaching effects on your body and your ability to be your strongest self.

Stress and Recovery

Research from University of Texas at Austin has shown that being under increased mental stress from school, work, or social/family situations can reduce your physical ability to recover from exercise.¹⁰⁹ You are only as strong as your ability to recover. During periods of high stress, decrease the intensity and frequency of high-intensity exercise and incorporate more recovery-based activities. Eating well and getting quality sleep can also help decrease stress.

TAKE ACTION:

3 WAYS TO DEVELOP STRENGTH THROUGH RECOVERY

1. Focused Breathing

Breathing is an amazing tool for promoting recovery, as it can directly impact your heart rate and your body's stress response. Taking extended exhalations stimulates the "rest and digest" part of the nervous system, lowers heart rate and helps control stress.¹¹⁰ Taking one or two minutes at different times during your day to slow your breathing is a simple way to promote recovery.

2. Yoga

There is a wide spectrum of yoga practices that span from high-intensity exercise to meditation. Restorative yoga, which falls closer to the meditation end of the spectrum, utilizes deliberate, slower movements, sustained pauses and mindful breathing. This type of yoga can be a key resource for promoting recovery while also staying physically active and flexible.¹¹¹

3. Walking

Walking may be one of the simplest forms of activity, but that doesn't make its effects any less profound. More and more research shows the negative effects of sitting all day.¹¹² Getting up and taking a walk is an easy step to counteract these effects. Walking improves your metabolism, which helps your body use and process nutrients in a more healthful way.¹¹³ People who regularly take walks also have improved mental health.¹¹⁴ which could be attributed to how they promote the body's "rest and digest" response.¹¹⁵



STRENGTH THROUGH NATURE

The pursuit of strength in your life should be one that brings joy and happiness, and nature has a unique and beneficial effect on our wellbeing. Research from Stanford University demonstrated that a 50-minute walk outside in a natural environment can improve mood and memory.¹¹⁶ Another study found that people who regularly took walks in the woods had lower blood pressure and lower levels of stress hormones.¹¹⁷ Other research showed that your mind can tell the difference between looking out a window to observe nature versus looking at a screen designed to simulate nature.¹¹⁸ The latter doesn't have the same benefit. Just get outside!

TAKE ACTION:

3 TIPS FOR GETTING THE MOST OUT OF YOUR TIME OUTSIDE

1. Bring a Friend

Exploring and enjoying nature doesn't need to be an act of solitude to reap the wellness benefits. Team up with a friend and explore together, whether you take longer hikes on the weekends or brief walks in the park at lunchtime.

2. Be Prepared

Spending time outside in nature should be enjoyable, so make sure that you have water, the right footwear and protection from the sun.

3. Have No Agenda

Focus on enjoying, not achieving. You can count reps when you are in the gym and track your average running speed per mile when training for your 5K. When you get outside, just be outside and enjoy.





Epilogue: Embodying Strength for Life



Meet Hollie Kenney

The Former Professional Triathlete Who Hiked Mt. Kilimanjaro with Her 7-year-old Daughter

Hollie Kenney is a running, swimming and biking coach for endurance athletes around the world. Being a professional triathlete herself for 26 years, Hollie knows what it takes to develop and sustain both physical and mental strength. This past year she had one of her biggest tests of strength when she summited Mt. Kilimanjaro with her 7-year-old daughter, Montannah, who became the youngest person to reach the top of Africa's highest mountain:

People are always surprised when they read about our journey up Mt. Kilimanjaro because it sounds shocking. It was an amazing feat, but it was also in line with the physically active culture of our family. We are very physically active. Montannah has watched me compete and coach various endurance events around the world for her entire life. The foundation of the physical strength that we needed for the Kilimanjaro journey is something that we had been building every day of our lives due to the active lifestyle we live together.

Hollie believes that summiting Mt. Kilimanjaro required more of her mental than physical strength.

I learned at a young age, through athletics, that mental strength is important. I've tried to bring those learnings into my life as a parent. Montannah and I always talk about making decisions vs. goals. A goal is something you would like to have happen but making a decision is different. Once you decide, you make it happen. Montannah had made a decision to get to the top of Kilimanjaro and she made it happen — in spite of the weather we had to endure. We hiked three miles the first day with great weather and then it rained the entire rest of the trip — seven days, non-stop rain. Everything we had, even our sleeping bags were soaked. I underestimated how hard it would be to persist through rain and being wet the entire trip. But there was never a question in Montannah's mind that we weren't going to the top.

Even though she isn't racing for a place on the podium or training to summit another of the world's highest peaks, Hollie is still focused on building strength every day in her life.

I've had to change my focus and goals around physical activity. My main goal now is to never let go of what I have. Always be persistent and active everyday so that I can maintain my health. A healthy balance of different activities is important to me. I coach a running group and the social aspect of that group keeps us all motivated to participate while also making the physical part a lot more fun.

Nutritionally, I eat foods that make me feel good and want to be active. Junk food doesn't give me that feeling while something like a high-protein breakfast does. When I was competing as a triathlete I had iron-deficiency anemia. I started including beef in my breakfasts for added protein and iron. The anemia went away. I've continued to eat beef at breakfast as the protein, iron and other nutrients keep me strong throughout my day.

You achieve strength through good health, physical activity and a balanced diet. The strength you develop through these areas gives you the power and endurance to live life as your best self.

Throughout this field manual we have outlined for you the specific dietary components and strategies needed to build and eat a balanced diet — a diet that will, in turn support good health, recovery from physical activity, and help you embrace a life of physical, mental and emotional strength.

The Four Cornerstones are tried-and-true guidelines grounded in decades of science. The strength of these nutritional cornerstones comes through consistent application, day after day.

Strength is a journey, not a destination. You now have the tools for this journey. One meal at a time, you can fuel your best, strongest, self.

FOUR CORNERSTONES OF EATING TO SUPPORT STRENGTH



One: Anchor Your Plate with Protein



Two: Pair Your Protein with Plants



Three: Focus on Fiber-rich Carbs



Four: Fuel Recovery to Be Stronger



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Chapter 3: 01079 milk; 01278 Greek yogurt; 01117 regular yogurt; 08120 oats/45004347 rolled oats; 01132 scrambled egg; 01124 egg white; 01009 cheese; 14064 orange juice; 18065 wheat toast; 23476 ground beef, cooked, crumbles; 11286 onions; 11339 peppers; 09003 apple; 13370 hash browns

Chapter 5: 20036 brown rice; 20035 quinoa; 16005/16338 beans; 11357 baked potato



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