

NUTRITION NEWS

A Wyoming Beef Council Nutrition & Health Publication

Sarcopenia: Age-Related Loss of Muscle Mass and Strength

Most people are aware of the frailty that comes from porous, gradually weakening bones, and know the name for it – osteoporosis – “osteo” for bone, and “poros” for pore. But, perhaps even more critical than loss of bone is loss of muscle. Sarcopenia – “sarco” for flesh and “penia” for loss – is the name of a debilitating loss of muscle and strength as one ages. The term sarcopenia describes the process of declining muscle mass beginning around the age of 45 and continuing at a rate of about 1 percent each year. Women, who have about one-third less muscle mass than men, face risks from muscle loss in particular as the impact can be seen sooner. As muscle mass decreases, so does strength, eventually leading to decreased physical functioning.

Prevention of this debilitating disease is especially important to ensure people can continue to live well and independently since loss of muscle can decrease stamina, lessen the ability to perform daily tasks and lead to an increased risk of falls and bone fractures.

The cause of sarcopenia is thought to be linked to the loss of certain nerve cells that link the brain to the muscles. In turn, loss of chemical connections between the two causes a loss of muscle cells themselves. Protein metabolism slows considerably with aging. Muscle-protein synthesis rates are approximately 30 percent lower in older adults than in younger adults. Over time, this results in a net loss of muscle mass consisting of a numeric loss of muscle fi-

bers, as well as a qualitative change in the cross-sectional area of the remaining fibers. Other age-related declines, including a gradually weakening immune system and decreasing levels of hormones that stimulate muscle growth such as testosterone, estrogen, and growth hormone, all fall with age. There also is the issue of disuse, which creates a vicious cycle of loss of strength from lack of activity. While sarcopenia cannot be stopped completely, there is much that can be done to slow it dramatically and thereby help individuals remain nearly as active in their seventies and eighties as much earlier in life. Some, who were inactive in younger years, can even end up with more muscle mass in later years, and more strength, with the proper care and daily efforts to maintain muscle mass.

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Caring for aging muscles

Two key components to caring for aging muscles are strength training and daily adequate protein intake. Although sarcopenia cannot be prevented totally with physical activity, the disease is clearly accelerated when physical activity, the type of activity that overloads the skeletal muscles, is lacking. Resistance exercise, also called weight-lifting, or strength-training, works to build muscle by forcing your body to heal the damage to muscle cells that your efforts

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Sarcopenia continued.

create. High-intensity lifting creates microscopic tears in the muscle fibers, the muscle fibers rebuild using protein, making the muscle cell stronger. Two or three sessions a week are optimal to see changes in strength, and never two days in a row on the same muscle, as muscles need time to recover. Resource materials, including strength-training programs, are widely available.

Adequate nutrition is fundamental

While muscle-building and muscle maintenance are influenced by multiple complex factors, including calories consumed, physical activity and hormones, it is now well-established that essential amino acids directly stimulate muscle protein synthesis. Research shows that supplementing individuals with free amino acids can stimulate a net gain in muscle protein synthesis. And recent beef checkoff-funded research found that, compared to free amino acid supplements, beef is a superior means of obtaining these essential nutrients in the diet. The research study, "Aging does not impair the anabolic response to a protein-rich meal," published in the August edition of the *American Journal of Clinical Nutrition*, examined the ability of a protein-rich food, specifically lean beef, to stimulate muscle protein synthesis (which helps with muscle growth). The study found that consuming a single four-ounce serving of lean beef acutely stimulated muscle protein synthesis by 50 percent in both young and elderly volunteers. These results are particularly good news for the growing boomer population, as they suggest that aging does not diminish the ability of protein-rich foods to stimulate muscle growth. In addition, this is significant news, given that older adults are not eating enough protein. In fact, approximately 20 percent of older adults eat less than the USDA's recommended dietary allowance of protein. For the majority of the population, including older adults, the most practical dietary strategy to stimulate muscle growth is to include high-quality protein during each meal. This recent data suggest that lean beef is an effective and practical source of dietary protein for all healthy adults.

Power Up on Lean Protein

Incorporating high-quality lean protein can be an easy and delicious part of an active healthy lifestyle at any age. Try these suggestions to enjoy enough high-quality protein throughout the day.

Breakfast

- ◆ Incorporate spice into a breakfast burrito by adding 95% lean ground beef cooked with taco seasoning.
- ◆ Enhance the protein content of an omelet by adding low fat or fat-free cheese.

Lunch

- ◆ Power up a traditional salad by adding a hardboiled egg or flank steak strips.
- ◆ Make a protein-rich smoothie with low fat yogurt and fresh or frozen fruit.
- ◆ Add slices of grilled beef or lean pork to a vegetable wrap topped with basil and drizzled with balsamic vinaigrette.
- ◆ Pump up mac'n'cheese by adding lean ground beef or turkey.

Dinner

- ◆ Mix 95% lean ground beef meatballs into a tomato and grilled vegetable spaghetti sauce.
- ◆ Place lean pork or beef sirloin strips in a stir-fry loaded with fresh broccoli and carrots.
- ◆ Load tacos with lean ground beef, spinach, tomatoes and low fat cheese.



Updating Beef's Nutritional Image

In recent years, the beef checkoff has collaborated with USDA to update the USDA National Nutrient Database for Standard Reference Release 20—considered to be the complete source of nutrient information on foods commonly consumed in America—to reflect the growing list of lean beef cuts. It is absolutely critical that the database avoid misinformation as researchers use it to identify mean nutrient intakes and establish correlations between dietary patterns and disease, and it serves as the foundation for government feeding programs, such as the school lunch program. Last year, the checkoff's nutrition research staff met with representatives of the Nutrient Data Laboratory (NDL) and researchers from three universities to launch the most ambitious overhaul of beef's nutrient data to date. During the next several years, analysis will be completed for 33 cuts, including the new chuck roll cuts developed through the checkoff; popular cuts at retail that are leaner and trimmed more closely than they used to be;

“Half the fatty acids in lean beef are monounsaturated, the same heart-healthy fat found in olive oil.”

and additional cuts that never have been analyzed. Results are expected to shed a more positive light on beef's image and provide researchers with accurate information. Retailers will also be able to access a subset of the database to respond to upcoming mandatory nutrition labeling rules. To access the latest version of the database, go to www.nal.usda.gov.

Like most other foods containing fat, meat products such as beef are composed of a variety of fatty acids. There is a common misperception that the majority of fatty acids in beef are saturated. Many people don't realize half the fatty acids in lean beef are actually monounsaturated, the same heart-healthy fat found in olive oil.

About one-third of the saturated fat in beef is stearic acid, which has been shown to have a neutral effect on blood cholesterol levels in humans. The remaining saturated fat that potentially can raise blood cholesterol levels is comparable in lean beef, fish and chicken.

The Power of Protein Boosts the Benefits of Exercise

Recent studies have shown that exercise is most effective when paired with a moderately high-protein diet. Research has concluded that consuming a protein-rich diet is helpful in maintaining muscle mass while burning fat because protein foods, like lean beef, contain high levels of the amino acid leucine, which works with insulin to promote muscle growth. But when it comes to choosing protein, it is important to realize that not all proteins are created equal. Animal proteins, such as lean beef and low-fat dairy products, are complete, high-quality proteins that contain all the essential amino acids the body needs to build and maintain muscle mass.

Key findings from a randomized, four-month weight-loss trial conducted by Donald Layman PhD, and his team at the University of Illinois found exercise is much more effective when it is coupled with a protein-rich diet. This study adds to the growing body of evidence supporting protein's beneficial role in weight

management. This study demonstrated that a protein-rich diet with reduced carbohydrates, combined with exercise, additively improved body composition during weight loss, improving lean body mass and decreasing body fat. Compared to the subjects following the higher-carbohydrate plus exercise plan, subjects following the protein-rich diet and protein-rich diet plus exercise plan lost more total weight, lost more fat, and maintained muscle tissue. Serum lipids improved in all groups, but changes varied among diet treatments. Those following the carbohydrate diet had larger reductions in total cholesterol and LDL (bad) cholesterol. Those following the protein-rich diet had greater reductions in triglyceride levels and maintained higher HDL (good) cholesterol levels.



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Nutrient-Rich Meals

SLOW-COOKED BEEF RISOTTO

Total preparation and cooking time: 2 to 2 1/2 hours

Ingredients

- 2 lbs beef for stew cut into 1-1 1/2 inch pieces
- 2 cups water
- 2 cloves garlic, minced
- 1 package (5.5 to 8 oz) mushroom or cheese risotto mix
- 1 cup frozen peas
- 1/3 cup shredded parmesan cheese (optional)

Instructions

1. Cook beef, water and garlic in stockpot; bring to a boil. Reduce heat; cover tightly and simmer 1 1/4 hours.
2. Stir in contents of risotto mix package, omitting butter or oil; continue simmering covered, 18 to 20 minutes or until rice is tender and beef is fork-tender. Stir in peas; remove from heat. Let stand 5 minutes.
3. Stir in cheese. Serve with additional cheese, if desired.



Nutrition information per serving (1/4 of recipe):
415 calories; 12 g fat (5 g saturated fat; 5 g monounsaturated fat); 96 mg cholesterol; 835 mg sodium; 35 g carbohydrate; 1.9 g fiber; 39 g protein; 4.9 mg niacin; 0.4 mg vitamin B6; 2.9 mcg vitamin B12; 4.0 mg iron; 25.1 mcg selenium; 7.7 mg zinc.

Nutrition information per serving (1/6 of recipe):
277 calories; 8 g fat (3 g saturated fat; 3 g monounsaturated fat); 64 mg cholesterol; 556 mg sodium; 23 g carbohydrate; 1.3 g fiber; 26 g protein; 3.3 mg niacin; 0.3 mg vitamin B6; 1.9 mcg vitamin B12; 2.7 mg iron; 16.7 mcg selenium; 5.2 mg zinc.

This recipe is an excellent source of protein, vitamin B₆, vitamin B₁₂, selenium and zinc; and a good source of niacin and iron.

Makes 4-6 servings

This recipe was developed with beef checkoff dollars.

www.beefitswhatsfordinner.com

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