Get a Grip: The Exploration of Emotional, Cognitive and Physical Strength as Markers of Health

April 26th 2019

Stuart Phillips, PhD
Jim White, RD, ACSM EX-P
STUART PHILLIPS, PHD, FACN, FACSM

• Tier 1 Canada Research Chair in Skeletal Muscle Health.

• Director of Physical Activity Centre of Excellence (PACE) and McMaster Centre for Nutrition, Exercise, and Health Research.

• Professor in kinesiology and adjunct professor in the School of Medicine at McMaster University.

• Research focused on the impact of nutrition and exercise on human skeletal muscle protein turnover, and diet- and exercise-induced changes in body composition.
JIM WHITE, RD, ACSM EX-P

• Nationally recognized registered dietitian nutritionist, past spokesperson for the Academy of Nutrition and Dietetics and an American College of Sports Medicine Exercise Physiologist

• Owner of three Jim White Fitness and Nutrition Studios, three medical nutrition therapy practices and a workplace wellness corporation

• Quoted in thousands of publications and featured in hundreds of television and radio segments nationwide with experience conducting seminars, interviews and appearances all around the country

• Enjoys giving back through his very own non-profit, the LIFT Fitness Foundation, which focuses on creating a foundation of wellness to empower individuals in need.
DISCLOSURE – STUART PHILLIPS, PHD FACN, FACSM

- Former consultant: Nestec AS – Nestlé SA
- Former consultant: Ajinomoto
DISCLOSURE – JIM WHITE, RD, ACSM
EX-P
Objectives

• Discuss established and emerging markers of health and how strength in all its forms across the lifecycle can support independence for an aging population.

• Understand evidence-based research supporting the role of nutrition and physical activity for improved strength outcomes in younger and middle-aged adults as they age.

• Translate the research into practical application - applying physical activity and nutrition guidelines such as strength training and inclusion of high-quality protein foods in a healthy dietary pattern – to support physical fortitude and mental strength.
A beginner’s guide to aging well: living in a kingdom of wellness

Stuart M. Phillips, Ph.D., FCAHS, FACN, FACSM
Professor, McMaster University
Ontario, CANADA

@mackinprof

www.facebook.com/SMPPh.D
E: phillis@mcmaster.ca
Over the past 100 years we have added an additional 30 years to life expectancy

WHAT WILL YOUR LAST 10 YEARS LOOK LIKE?
Active aging is the process of **optimizing opportunities for health, participation and security in order to enhance quality of life as people age.** It applies to both individuals and population groups.

The word “active” refers to **continuing participation in social, economic, cultural, spiritual and civic affairs, not just the ability to be physically active or to participate in the labour force.** Older people who retire from work, ill or live with disabilities can remain active contributors to their families, peers, communities and nations. **Active ageing aims to extend healthy life expectancy and quality of life for all people as they age.**

“Health” refers to physical, mental and social well being as expressed in the WHO definition of health. **Maintaining autonomy and independence for the older people is a key goal in the policy framework for active ageing.**

A nice definition, but what does it mean?

- Health
- Quality of life
- Healthy life expectancy
- Participation
- Autonomy
- Independence
RATE OF MORTALITY... 100%
Which of these chronic diseases are associated with reduced HRQL?

1. Cancer
2. Heart disease
3. Stroke
4. Lung disease
5. Diabetes
6. ...
What if…

• There were treatments that would lower risk and reduce symptom progression and, in some cases, be an effective treatment for all known chronic diseases: cancer, cardiovascular disease, stroke, type 2 diabetes, Alzheimer’s, dementia…

• It would work regardless of age, sex, race, and risk… Has a large evidence base on which to base recommendations… could save the healthcare system billions of dollars and cost comparatively little in return

• The side-effect profile of this treatment includes better prognoses for a variety of unrelated ailments including depression, dementia (all-cause and Alzheimer’s), self-efficacy, and suicide incidence

• If all of this came in a pill would you take it?
Aging well... reimagined

Jack LaLanne 1914 - 2011
EXERCISE IS KING.
NUTRITION IS QUEEN.
PUT THEM TOGETHER &
YOU’VE GOT A KINGDOM.

- JACK LALANNE -
Who sits on the throne?

- Fitness and strength come from the gym
- Weight is gained or lost in the kitchen (restaurant)
- Exercise is a forgiver of many sins...
- The Kingdom is in harmony when they rule side-by-side
Osteoporosis: achieve higher peak bone mass to protect against loss

https://www.wellnessgarage.ca/blog/osteoporosis-bone-health-part-2
Osteoporosis, Sarcopenia: similar message

Osteoporosis, Sarcopenia: similar message
Age-related declines in muscle mass and function with disuse

Muscle mass/function

Relative risk for disability

50 60 70 80
Age (years)

MUSCLE DISUSE AS A PIVOTAL PROBLEM IN SARCOPENIA-RELATED MUSCLE LOSS AND DYSFUNCTION

K.E. Bell, M.T. von Almen, M.C. Devries, S.M. Phillips

It is easier to mitigate decline than it is to reverse loss. #start #early (preferably lifelong)
1. The older we get the more this macronutrient becomes important for MSK health
2. Nutrient-dense proteins are important
3. Protein will not...
4. Putting it all together and living in the kingdom
Older persons and the protein landscape

• Aging is associated with reduced food intake, predisposing to energy-protein undernutrition\(^1\)
• Muscle area, & strength, decreased in older subjects fed a weight maintaining diet containing the protein RDA\(^2,3\)
• Older adults may **need** more protein than the RDA: 1.0-1.2g/kg/d to maintain muscle mass and even greater benefit may be seen with higher intakes\(^4,5\)
• Older adults are **not** consuming these intakes!\(^5,6\)

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New Recommendations from International Expert Groups Call for Higher Protein Intake* in Older Adults

Protein Levels

<table>
<thead>
<tr>
<th>Protein Levels</th>
<th>Current Recommendations &gt;65 years*</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDA (19+yrs)¹</td>
<td>0.8g/kg</td>
</tr>
<tr>
<td>Minimum protein intake for healthy people²,³</td>
<td>1.0-1.2g/kg</td>
</tr>
<tr>
<td>Acute or chronic disease²,³</td>
<td>1.2-1.5g/kg</td>
</tr>
<tr>
<td>Severe illness or injury, or marked malnutrition²</td>
<td>Up to 2.0g/kg</td>
</tr>
</tbody>
</table>

↑150%*


*increase above current Protein RDA¹
†Older people with severe kidney disease who are not on dialysis may need to limit protein intake.
Perspective: Protein Requirements and Optimal Intakes in Aging: Are We Ready to Recommend More Than the Recommended Daily Allowance?  
Daniel A Traylor, Stefan H M Gorissen, Stuart M Phillips

*Advances in Nutrition*, Volume 9, Issue 3, May 2018, Pages 171–182,  
https://doi.org/10.1093/advances/nmy003

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Observational studies showing a positive relationship between protein intake and lean mass (and function)


Evidence? Meta-analyses of intervention trials


Take home points

• More protein from dietary sources lead to better retention or, with exercise, gains in lean body mass
• Preservation of function or increases in function not consistently seen
Nutrient-dense protein as a capstone principle in dietary planning in aging
Why Protein-Containing Foods?

• Consumption of protein at levels above the RDA at optimal levels may have benefits
• Within the context of the current protein sources consumption of nutrient-rich protein foods increases overall diet quality and contributes to nutrient adequacy
• Without ingestion of nutrient-rich sources of protein it is difficult, particularly within current dietary practices, to achieve intakes of many nutrients
What Nutrients?

• Shortfall nutrients – promote increased intakes: Calcium, Vitamin D, Potassium, Fiber, Iron, Folate, and Vitamin B12

• Excess nutrients – promote decreased intakes: Sodium, Solid fats (saturated and trans fatty acids), Sugars, and Refined grains

• Importantly, **reduce energy intake** – consume less energy-dense and nutrient-poor foods (‘empty calories’) and more nutrient-dense foods
Nutrient-dense foods

• Lean meats and Poultry*
• Fat-free or Low-fat Milk and Dairy*
• Eggs*
• Seafood*
• Beans and Peas (legumes)
• Vegetables and Fruits
• Whole grain foods
• Nuts and Seeds

* Good – Excellent sources of protein and amongst the top 10 protein-containing foods (NHANES 2007-2010) currently consumed by Americans
Nancy R Rodriguez

**Introduction to Protein Summit 2.0: continued exploration of the impact of high-quality protein on optimal health**

Heather J Leidy, Peter M Clifton, Arne Astrup, Thomas P Wycherley, Margriet S Westerterp-Plantenga, Natalie D Luscombe-Marth, Stephen C Woods, and Richard D Mattes

**The role of protein in weight loss and maintenance**

Donald K Layman, Tracy G Anthony, Blake B Rasmussen, Sean H Adams, Christopher J Lynch, Grant D Brinkworth, and Teresa A Davis

**Defining meal requirements for protein to optimize metabolic roles of amino acids**

Douglas Paddon-Jones, Wayne W Campbell, Paul F Jacques, Stephen B Kritchevsky, Lynn L Moore, Nancy R Rodriguez, and Luc JC van Loon

**Protein and healthy aging**

Stuart M Phillips, Victor L Fulgoni III, Robert P Heaney, Theresa A Nicklas, Joanne L Slavin, and Connie M Weaver

**Commonly consumed protein foods contribute to nutrient intake, diet quality, and nutrient adequacy**

Nancy R Rodriguez and Sharon L Miller

**Effective translation of current dietary guidance: understanding and communicating the concepts of minimal and optimal levels of dietary protein**
Protein will not...

- Cause you to lose bone mass
- Cause your kidneys to fail
- Give you cancer
WHAT TO DO?
ACTIVITY: for the uninitiated

• Find an activity you like such as walking, swimming, or cycling (outdoors)
• Minutes count — increase your activity level 10 minutes at a time. Every little bit helps (outdoors)
• Active time can be social time — look for group activities or classes in your community, or get family or friends to be active with you (outdoors)
• Get stronger!
• Activity in Green and Blue spaces do more for your mental wellbeing than exercise indoors!
NUTRITION: for the uninitiated

• Eat real foods
• Eat nutrient-rich sources of protein
• Eat more protein at breakfast
• Variety!
• Cook at home and eat around a table
• Enjoy food!!!
The barriers/misconceptions

• Common misconception: to reap health benefits, vigorous, intense, and ‘draining’ exercise is necessary

• An exaggerated fear, enhanced by cognitive dissonance, of the risks of physical activity? Headline: 50k people run NYC marathon, man dies of heart attack…

• Exercise is good for many aspects of health but it is NOT a vaccine!

• An overriding sense that nutritional health requires subscription to a counter-culture dietary regime that runs opposite to what we know #goscience

• Nutrition is linked to many chronic diseases, and like exercise is (for some) a modifiable risk factor, but it is more than just health…

• Food should be pleasurable
Why don’t we try and live in this kingdom?

ACTIVITY

PROTEIN FOODS

IS KING.
IS QUEEN.
PUT THEM TOGETHER &
YOU’VE GOT A KINGDOM.

- JACK LALANNE -
THANK YOU

Stuart M. Phillips, Ph.D., FACN, FACSM
Professor, McMaster University

Twitter: @mackinprof
FB: www.facebook.com/SMPPh.D
E: phillis@mcmaster.ca
Translating the Research into Practical Application

Jim White RDN, ACSM EX-P
Owner of Jim White Fitness & Nutrition Studios
Va Beach, Virginia
@Jimwhitefitness
www.facebook.com/JimWhite
E: Jim@jimwhitefit.com
“STRENGTH AND GROWTH COME ONLY THROUGH CONTINUOUS EFFORT AND STRUGGLE.”

- Napoleon Hill
After age 40, an untrained individual can lose up to 8% of their muscle mass each decade.

“If you don’t use it, you lose it”
Muscle strength begins to decline by 1-3% each year following age 50
Studies show by strength training and maintaining muscle mass you can slow down the process of muscle decline.

“It’s very hard to build muscle and easy to lose it”
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
PROTEIN’S ROLE IN A HEALTHY LIFESTYLE

Part of a Healthy Diet
Weight Mgmt
Building Muscle
Increased Energy
Keeps Me Full Longer

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

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Large Scrambled Egg</th>
<th>3 ounces Chicken Thigh Meat, Cooked</th>
<th>3 ounces Chicken Breast Meat, Cooked</th>
<th>1/2 cup Quinoa, Cooked</th>
<th>3 ounces Beef, Cooked (composite of retail cuts)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td>12%</td>
<td>42%</td>
<td>53%</td>
<td>8%</td>
<td>51%</td>
</tr>
<tr>
<td>Zinc</td>
<td>4%</td>
<td>11%</td>
<td>6%</td>
<td>7%</td>
<td>39%</td>
</tr>
<tr>
<td>Iron</td>
<td>4%</td>
<td>5%</td>
<td>5%</td>
<td>8%</td>
<td>14%</td>
</tr>
<tr>
<td>Vitamin B₁₂</td>
<td>8%</td>
<td>6%</td>
<td>5%</td>
<td>0%</td>
<td>41%</td>
</tr>
<tr>
<td>Riboflavin (B₂)</td>
<td>13%</td>
<td>11%</td>
<td>6%</td>
<td>6%</td>
<td>14%</td>
</tr>
<tr>
<td>Niacin (B₃)</td>
<td>&lt;1%</td>
<td>26%</td>
<td>59%</td>
<td>2%</td>
<td>25%</td>
</tr>
<tr>
<td>Vitamin B₆</td>
<td>4%</td>
<td>20%</td>
<td>26%</td>
<td>6%</td>
<td>24%</td>
</tr>
<tr>
<td>Selenium</td>
<td>20%</td>
<td>33%</td>
<td>34%</td>
<td>4%</td>
<td>38%</td>
</tr>
</tbody>
</table>

*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.

Leucine for the win!!!

1 scoop of whey = 2.5 g

1 cup of cottage cheese = 2.9 g

4 oz of beef = 3.2 g


PROTEIN STACKING

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

Total Protein: 34g
25-30 Grams Protein Boosting Snacks

- 1 scoop of protein powder
- 1 cup of cottage cheese
- 3 oz of beef jerky
- 3 hardboiled egg whites and 2 eggs
- 3 oz can of tuna
- Homemade 25+ g protein bar
- 1 cup of Greek yogurt and nuts
- High protein waffles with peanut butter and milk
# What Does 25 Grams of Protein Look Like?

<table>
<thead>
<tr>
<th></th>
<th>Amount</th>
<th>Calories</th>
<th>Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quinoa</td>
<td>3 cups</td>
<td>666</td>
<td>25g</td>
</tr>
<tr>
<td>Peanut Butter</td>
<td>6.5 tbsp</td>
<td>613</td>
<td>25g</td>
</tr>
<tr>
<td>Black Beans</td>
<td>1 2/3 cups</td>
<td>379</td>
<td>25g</td>
</tr>
<tr>
<td>Edamame</td>
<td>1 1/3 cups</td>
<td>249</td>
<td>25g</td>
</tr>
<tr>
<td>Beef</td>
<td>3 ounces</td>
<td>173</td>
<td>25g</td>
</tr>
</tbody>
</table>
PHYSICAL ACTIVITY FOR BUILDING STRENGTH

• Fitness tips for improved physical strength and recovery.
EXERCISE IMPROVES YOUR BODY’S USE OF PROTEIN FOR GREATER STRENGTH

Improved insulin sensitivity

Improved blood flow

Sustained muscle-building

More efficient use of protein


IMPROVED PHYSICAL STRENGTH

Physical strength is the ability of a person to exert force on physical objects using muscles.

Strength Measured by:

- 1 Rep Max/Predicted (RM) Tests
- Push up (Max) Test
- Handgrip Strength Test
- Plank Test
- Isometric Wall Squat (Timed)

http://www.unm.edu/~rrobergs/478PredictionAccuracy.pdf

TIPS FOR IMPROVED PHYSICAL STRENGTH

Resistance Exercise

• Adults should train each major muscle group two or three days a week using a variety of exercises and equipment.

• **Load:** 60-70% 1RM for novice to intermediate, 80% for advanced

• **Sets:** Two to four sets of each exercise will help adults improve strength and power.

• **Volume:** 8-12 repetitions for novice to intermediate; 1-8 repetitions for advanced

• **Rest period:** 2-3 min for higher intense exercises that use heavier loads; 1-2 minutes between the lower intense exercises with light loads

*It is recommended that a 2-10% increase in the load be applied when the individual can comfortably perform the current workload for one to two repetitions over the desired number on two consecutive training sessions.*

IMPROVED RECOVERY

Exercise recovery involves a number of post-exercise steps that are essential for any exercise regime, regardless of fitness level, the type of physical activity or the exercise intensity.

- Tissue repair
- Function restoration
- Muscle recovery
- Psychological recovery (contemplation, relaxation and rejuvenation)
TIPS ON IMPROVED RECOVERY

**Warming down after exercise**

**Warming down** involves 5–10 minutes of extra exercise after the main exercise is completed to prevent muscle stiffening.

**Post-exercise stretching** should begin within 10 minutes of finishing exercise

- Hold post-exercise stretches for at least 30 seconds per stretch;
- Stretch slowly
- Breathe out as you ease into the stretch.


TIPS ON IMPROVED RECOVERY

For optimal strength development, one to two rest days between strength training sessions

COGNITIVE AND EMOTIONAL SUPPORT FOR BUILDING AND MAINTAINING STRENGTH

- Connections with family and friends
- Sleep
- Stress

https://www.nichd.nih.gov/health/topics/sleep/conditioninfo/sleep-disorders
SOCIOECOLOGICAL MODEL (SEM)

Connections (family, friends, etc.)

1. Interpersonal
2. Community
3. Organizational
## IMPLICATIONS OF SLEEP DEPRIVATION VERSUS QUALITY SLEEP

<table>
<thead>
<tr>
<th>Sleep Deprivation:</th>
<th>Quality Sleep:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth hormone</td>
<td>Fatigue</td>
</tr>
<tr>
<td>Energy levels</td>
<td>Mood</td>
</tr>
<tr>
<td>Immune system</td>
<td>Reaction time</td>
</tr>
<tr>
<td>Testosterone</td>
<td>Regulates metabolism</td>
</tr>
<tr>
<td>Increase in cortisol</td>
<td>Anti inflammatory properties when prolactin released</td>
</tr>
<tr>
<td>Obesity</td>
<td>Muscle repair</td>
</tr>
</tbody>
</table>

https://www.ncbi.nlm.nih.gov/pubmed/21632481
STRESS REDUCTION TECHNIQUES

• Meditate
• **Get a massage**
• Yoga
• Tai Chi
• Acupuncture
• Listening to music
• Aromatherapy
• **Try deep breathing exercises**
• Stress inoculation
• Keeping a Journal

• Prayer
• Visual imagery
• Warm Epsom salt bath
• Acupressure
• Volunteer Work
• Hobbies
• **Time management**
• Playing with pets
• Shopping
• Therapy
• Behavioral modification
• Assertiveness training
COGNITIVE AND EMOTIONAL SUPPORT FOR BUILDING AND MAINTAINING STRENGTH

Case Studies
CASE STUDY

Meet Jennifer
State: Adult-Weight loss

Before

After

STATS
• Weight Loss: 75 lbs
• Timeframe: 11 months
• Muscular Strength: Pushups 20 starting, 75 ending
• Mental Stamina: Improved all her relationships at work, able to withstand long hours as an auto mechanic.
Jennifer’s Favorite High-Protein Recipe – Leftover Steak Breakfast Hash | Yields 3 servings

- 9 ounces leftover cooked steak, cut into very small pieces
- 1 sweet potato, peeled and cut into small cubes
- ½ lb brussels sprouts, cut in half and ends removed
- 1 red pepper, cut into chunks
- 1 small onion, diced
- 2 Tbsp minced garlic
- 5 washed white button mushrooms, chopped or sliced
- 1 Tbsp olive oil
- 1 tsp cayenne pepper
- 1 tsp paprika
- Salt and pepper to taste

1. In a large skillet, heat olive oil on medium-high
2. Add sweet potatoes and brussels sprouts to skillet and cover for 5 minutes. Uncover and cook, stirring frequently, for another 5 minutes.
3. Add peppers, onions, and garlic to skillet and cook uncovered for 8-10 minutes, stirring occasionally.
4. Add mushrooms and steak and cook until both are heated through.
5. Season with cayenne pepper, paprika, and salt and pepper if desired. Stir and serve.
Meet Mark
State: Special Populations, Disease State

Before

After

STATS
• **Weight Loss:** 101 lbs+
• **Timeframe:** 2 years
• **Muscular Strength:** Plank 30 second initial, 4 minute current
• **Mental Stamina:** Improved QOL, Decreased severe stress in his life, Traveled for the first time to see daughter across country.
• **Health Status:** Went off his cholesterol and blood pressure medications, off C-pap machine and no more episodes of vertigo.
CASE STUDY
Sample Meal Plan

Mark’s Meal Plan - BEFORE

• **Breakfast:** Cheese grits with butter and a muffin

• **Snacks:** Skipped

• **Lunch:** 12 inch sub with chips and 20 oz mountain dew

• **Dinner:** Lasagna with Caesar salad

• **Late night snack:** Ben and Jerry’s Ice cream, chips, cookies

• 3 beers/night

**Total: 90 grams of protein**

Mark’s Meal Plan – AFTER

• **Breakfast:** 1 cup plain nonfat Greek yogurt, ¼ cup low-sugar granola (plain), 6 almonds, ½ sliced banana

• **Snacks:** 1 cup of cottage cheese with 1 serving of pineapple or 1 smoothie with 1 scoop of whey protein, banana, 1 tbsp almond butter

• **Lunch:** Lean burger - 4 oz 96% lean beef, 1 slice alpine lace cheese, 1/8 avocado slice, lettuce, tomato with whole wheat bun and baby carrots.

• **Dinner:** 4 oz salmon, 1.5 cups cooked quinoa and 1 cup of broccoli spears

• **Late night snack:** 1 cup Halo Top chocolate ice cream

**150 grams of protein**
CASE STUDY

Meet Lynn
State: Later Years

Before

After

STATS
- **Weight Lost**: 72 lbs
- **Timeframe**: 1.5 years
- **Muscular Strength**: Is able to do step ups with 10 lbs
- **Mental Stamina**: Started dating again, more confidence, traveling, decreased depression, works out 5 days/week.
CASE STUDY

Meet Lynn
State: Later Years

“The need for many seniors to lose weight and shape up has been in the news lately. In one story, a doctor doubts “whether you’re going to see people lose 50 to 100 pounds as they’re older.” Oh, really? This senior has lost over 70 pounds since first waddling in to see a dietitian and personal trainer—with borderline diabetes — less than a year ago.

It hasn’t always been easy but my dietitian managed to change my eating habits so I don’t miss the bad old stuff; and we keep tweaking the plan so it’s something I can live with permanently. My dietitian taught me that incorporating **protein helps to build and maintain my muscle**. Not only that, but it helps continue the fight against type-2 diabetes and osteoporosis, all pesky diseases that seem to be more prominent in my mature stage of life.”
PRACTICAL APPLICATIONS/ TAKEAWAYS FOR RDS

• Exercise
  • 2-3 days of strength training per week for strength and muscle growth
  • Warm down 5-10 minutes after exercise session
  • Stretch for 10 minutes after exercise session
  • Aim for 1-2 rest days a week for muscle recovery

• Nutrition
  • Shoot for 30 grams of protein per meal
  • Protein stack your breakfast to meet your needs

• Sleep
  • Aim for 7-9 hours of sleep each night

• Connections
  • Engage in activities that build relationships and social connections
RESOURCES

- The Academy Position Paper – Nutrition and Athletic Performance
- Smart Ways to Make Physical Activity Part of Your Day
- ACSM Position Stands - Exercise and Physical Activity for Older Adults
- ACSM Position Stands - Progression Models in Resistance Training for Healthy Adults
- Strength: The Field Manual
- Farm to Gym Workout
- Strength Recipes