



## Fast Nutrition Facts

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- **Training doesn't stop on the field or in the weight room**
  - Smart Food Choice is just as important during your training/practice days as it is before a game. You must always be conscious that you are “training” your body with the correct food choices.
  - **Benefits of Daily Good Nutrition:**
    - Decreased time of recovery
    - Increased energy
    - Decreased loss of muscle tissue in-season
    - Increased stamina
    - Decreased body fat percentage
    - Injury prevention
    - Improved health
- **Eat CARBS before a workout to increase your energy levels!!**
  - Toast with jelly
  - Gatorade or juice
  - High carbohydrate energy bar
  - Fruit
  - Cereal
- **Protein + CARBS = RECOVERY**
  - Be sure to EAT after a workout
  - CARBS – Restore used muscle energy stores
  - Protein – Help start repairing muscle damage and grow bigger
- **GET SLEEP!** In order for your muscles to fully recover, you must get an adequate amount of sleep. A majority of muscle tissue growth and repair occurs during a deep sleep.

# Pre-Exercise Meals: The Good and the Bad

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## ☞ Why eat prior to exercise?

- ✱ Eating breakfast prior to exercise would replenish muscle and liver glycogen stores from an overnight fast.
- ✱ Eating a meal high in carbohydrates raises blood glucose levels. Muscles can then use blood glucose rather than their own glycogen stores for energy, saving the glycogen for exercise.

## ☞ When to eat the pre-competition meal:

- ✱ A large meal should be eaten **3-4 hours prior** to the event.
  - This allows for maximum digestion, absorption, and metabolism of the nutrients.
  - Ensures that the stomach has emptied prior to the event.

## ☞ Foods to increase consumption of:

### ✱ Carbohydrates

- Digest and absorb quickly by the muscles as glucose, sparing muscle glycogen for exercise.
- Carbohydrates are the primary source of energy for anaerobic and prolonged high intensity aerobic activity.
- It costs the body less energy to digest carbohydrates than protein or fat – saves your energy for your sport.

### ✱ Fluids

- Hydrate and prevent dehydration from occurring too soon during exercise
- 17-20 fl. oz., 2-3 hours before practice/competition
- 7-10 fl. oz. after the warm-up (10-15 minutes before practice/competition)

## ☞ Foods to Reduce Consumption of:

### ☼ Protein and Fat-

- Both **digest slowly** and require a higher metabolism for digestion and absorption, the additional metabolic heat generated may impair hot weather performance.
- Too much prevents carbohydrates from quick digestion and absorption to the muscles.
- A **small amount** of **lean protein** in the pre-exercise meal will provide a small amount of energy to muscle cells, decrease the breakdown of muscle protein, increase protein synthesis in muscle after the workout, and delay hunger prior to the exercise.

### ☼ Fiber

- Too much fiber in a pre-competition meal may lead to **gastric distress** during the competition/activity.
- Fiber **decreases the absorption of glucose** and delays gastric emptying.
- Avoid raw vegetables and high bran cereal.
- ☼ **Avoid high fructose based drinks 1 hour before and during exercise.**
  - High sugar content may cause gastric distress when not given proper time to be absorbed prior to exercise
- ☼ **Limit caffeinated beverages:**
  - They may cause gastro-intestinal distress.

## ☞ Pre-competition meal:

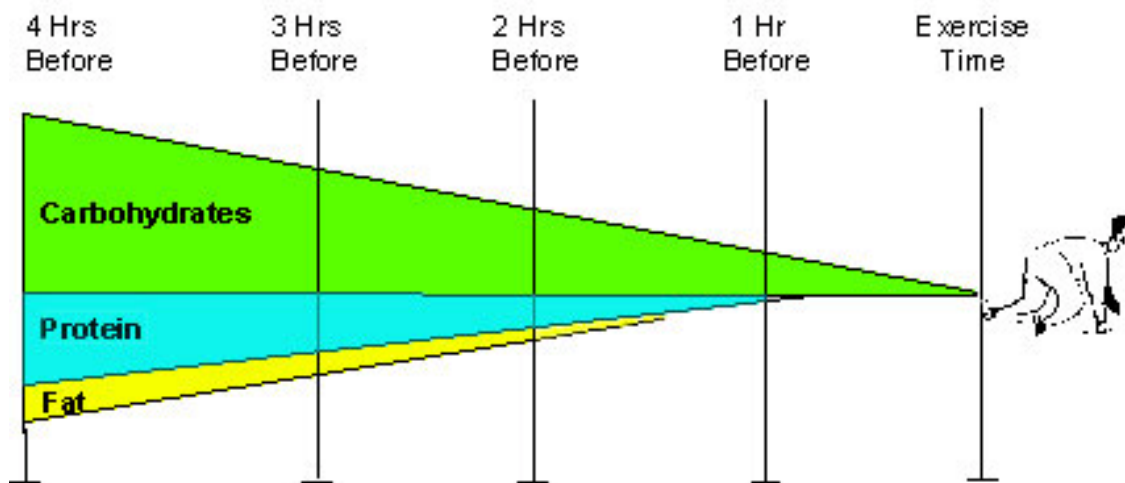
### ☼ 600-1,200 calories of carbohydrates

150-300 grams of carbohydrate

- **Complex-carbohydrates** that are easy to digest and are low to moderate in fiber content.
  - **Low glycemic index carbohydrates** may be best in order to avoid a spike in blood sugar and will then aid in fueling the body for prolonged exercise
    - Examples: spaghetti, cereal, wheat, rye or pumpernickel bread, banana, orange juice, apple, pears, grapefruit, oranges, strawberries, carrots, peas

### ☼ 2-4 oz. of lean protein: chicken, turkey, egg whites, pork, ham

- Try to avoid nuts, seeds, high-fat cuts of meat, and full-fat dairy prior to a competition or workout.
- **Low –fat, carbohydrate and protein containing foods:**
  - Chickpeas, kidney beans, lentils – eat only a small amount of these due to high fiber content
  - Low–fat dairy products: low–fat cottage cheese, skim milk, yogurt



Your pre-meal 3-4 hours before exercise can include carbohydrate with some protein and fat. As you near the time of exercise the size of the meal/snack should decrease and the selection should be primarily carbohydrates with minimal fat and protein.

# Post-Exercise Nutrition: Recovery

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## 3 Reasons to eat after exercise:

- **Refuel** for next bout of exercise
- **Rehydrate**
- **Repair Muscles**

## Who should eat after exercise?

- **Athletes that benefit MOST** from post-exercise nutrition recovery **are those who:**
  - **Engage in regular intense exercise**
  - **Play tournament competitions or multiple qualifying round sports**
  - **Involved in competitive events/sports with only 1-2 days for recovery**

## When to eat after exercise:

- **IMMEDIATELY:** “Window of Opportunity” – **first 2 hours post-exercise** is when the rate of CARB storage in muscles is the FASTEST.
- For **MAXIMUM** replacement of CARB stores (GLYCOGEN):
  - Eat **small meals** consisting mainly of CARBS and some protein **every 2-3 hours** until a maximum of 2,000 calories has been eaten depending on the level of rigorousness of the exercise
- OR**
  - Eat a **large meal** high in CARBS **within 2 hours** of exercise and a CARB and protein-rich snack a few hours later

## What to eat after exercise:

- **Carbohydrates:**
  - Replenishing your CARB stores is vital to the recovery process and necessary for optimal energy levels during future workouts.
  - **YOUR GOAL: EAT** within **first 15 minutes of ending exercise** to initiate replenishment of CARB stores (glycogen) within the muscles.
  - **Continue to eat/drink 200-300 calories from CARBS every 2 hours after exercise:** giving the body a steady stream of CARBS allows for optimal replacement of used stores.
  - **Moderate to high glycemic index CARBS replace CARB stores the FASTEST**
    1. Potatoes
    2. Carrots
    3. Honey
    4. Corn
    5. Peas
    6. Pasta
    7. Bananas or Oranges
    8. Cereal
    9. Rice (white or brown)
    10. Bread (white or wheat)

■ **Protein:**

- “Feeding” the muscle with necessary building materials helps **stimulate muscle repair** and **growth**
- Aids in replenishment of glycogen when paired with CARBS post-exercise

■ **Fluids:**

- **Gulping hydrates better** than sipping
- Drink even if you aren’t thirsty
- For every **1lb. lost** due to sweat = **drink 16 oz.** of water
  - Fluids with sodium, potassium, and magnesium help **SPEED UP** rehydration

# Glycogen and Carbohydrates

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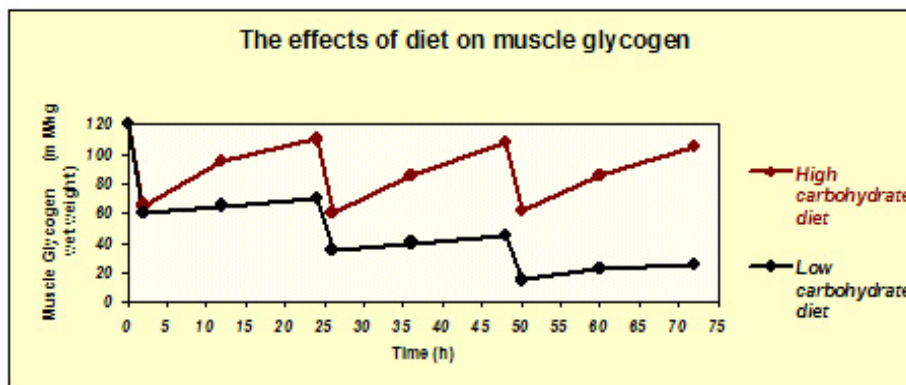
## What is it?

- The storage form of **carbohydrates** for your body
  - Stored in muscles and liver
- The **major energy source** for **exercising muscles**, especially for high-intensity exercise

## How much do we store?

- 1,600-1,800 calories or 400-500 grams in muscles
- 400 calories or 100 grams in liver

## When is it made?



Costill, D.L., Miller, J.M. Nutrition for endurance sport: Carbohydrate and fluid balance. *Int. J. Sports Med.* 1:2-14, 1980.

- Glycogen is made when there are adequate amounts of carbohydrates in the diet for both immediate energy use and for storage

## What happens when glycogen levels are low?

- When glycogen levels (carbohydrate levels) are low your body must switch to using **fat** as an energy source. This usually occurs after 2 hours of exercise.
- Exercise **performance slows up to 50%** because the rate of breakdown and delivery of fat for energy is **6% slower** than that of carbohydrates.
- At this point an athlete may begin to experience **nutrient related fatigue**

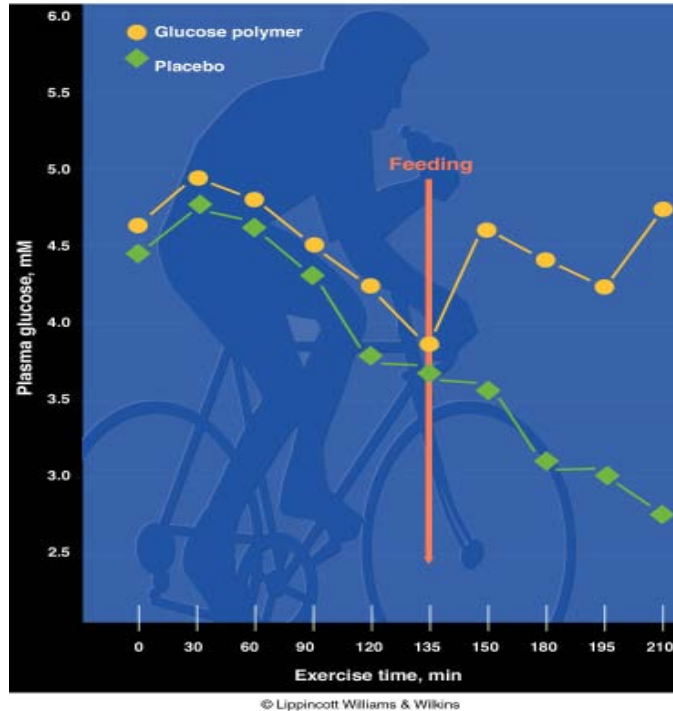
## Pre-exercise carbohydrate needs:

- **150-300 grams** (600-1,200 calories) eaten **3-4 hours** prior to exercise
- Liquid or solid carbohydrates with little fat or fiber for optimal carbohydrate absorption

- Carbohydrates in food elevate blood glucose levels and “save” glycogen stores from use until activity

### Carbohydrate needs during exercise:

7.16. Average plasma glucose concentration during prolonged high-intensity aerobic exercise...



by saving muscle glycogen.

- **60 grams (240 calories) per hour of exercise**
  - Two 20 oz. bottles of Gatorade
  - Sports gels
  - Energy bars that are high in carbohydrates and low in protein
- **Why do I need them?**
  - Carbohydrate supplements or drinks taken during exercise increase the amount of carbohydrates in the blood available to working muscles. This helps to improve mental and physical performance
  - **Saved glycogen stores = postponing fatigue.** This allows you to perform at 100% capacity from the beginning to the end of activity.
  - Fatigue can be postponed up to **30 minutes** longer and may **improve performance up to 35%** by keeping carbohydrate levels UP during competition.

### Post-exercise:

- Recovery and replenishing used glycogen is very important, especially if you have multiple competitions within a short period of time.
- **The “window of opportunity” for maximum glycogen replacement is the first 2 hours after exercise**
  - Within the first 15 minutes of exercise eat/drink 50-75 grams carbohydrate



- Every 2 hours eat/drink 50-75 grams of carbohydrates until reaching 500-700 grams total consumed
- **It takes time:**
  - At optimal carbohydrate levels glycogen stores are replaced at a rate of **5-7% per hour**
  - Full glycogen replacement can take up to **24 hours**. Giving your body a steady stream of carbohydrates after exercise allows for maximal storage.
- **A person restores glycogen faster if they are resting rather than active**
  - Resting during recovery limits the carbohydrate use for immediate energy and increases the likelihood of your body being able to store the ingested carbohydrates instead.
- **High glycemic index foods stimulate glycogen replacement at a faster rate**
  - White or wheat bread/rolls
  - Corn flakes
  - Potatoes
  - Carrots
  - Raisins
  - Corn
  - White rice
  - Pasta

# Muscle Gain Strategies

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- **Eat more calories**
  - How many?
    - **500-700 more** calories than what you are currently eating
      - **50% carbohydrates**
      - **50% protein**
    - For Example: PB&J sandwich and a glass of milk or a turkey and cheese sandwich with a banana and chocolate milk
- **Total caloric intake**
  - Need to increase the amount of calories you eat on heavy activity days.
  - If **lean muscle** is to be **increased**, the amount of calories you eat must exceed the amount of calories burned during exercise
  - You must take in enough calories to meet the physical demands of your day-to-day activities. If not, the body is forced to sacrifice lean muscle tissue for energy.
- **Nutrient dense diet:**
  - Dairy products, vegetables, fruit, beans, meat, and grains must all be a part of your diet. Eating from only a few of the food groups doesn't provide your body with all the nutrients that you need to perform at maximum capacity.
- **Post-workout snack:** Eaten within 2 hours of exercise, it should be both carbohydrate and protein rich.
  - The carbohydrate restores used muscle energy stores and the protein will stimulate muscle repair and growth.
- **Eat snacks throughout the day:**
  - Fruit, nuts, or granola.
- **Bedtime snack-** One hour before sleep, have a nutrient dense snack like a sandwich with milk or juice or a bowl of cereal
- **How long until I see results?** Muscle growth is a slow process. A half pound to a pound of muscle growth a week can occur when extra calories are combined with weight training

# Muscle Gain Foods

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- **Milk** – High in protein, carbohydrates, Vitamins D, A, and calcium and is an easy way to take in the extra calories for muscle growth. **Chocolate milk is highest in calories!**
- **Juice** – Drink juice with meals instead of water; this will keep calories and carbohydrates up.
- **Sandwiches** –
  - Peanut butter and honey sandwich for a snack
  - Add an extra piece of **cheese** to your turkey or ham sandwich for an extra **115 calories**
  - Make it a triple-decker sandwich with an extra slice of bread
- **Lean protein** –
  - Chicken, eggs, fish, pork, beans, and red meat.
- **Salad** – Pile on the vegetables and protein choices like beans, eggs, ham, and cheese
- **Pasta** – Rich in energy and when combined with meat sauce the meal would include three food groups: meat, grain and vegetable.
- **Apple sauce** – Higher in calories than a piece of fruit
- **Add a tablespoon of olive oil to your pasta or salads** – 120 extra calories!
- **Soups** – Cream based are higher in calories
- **Peanut Butter** – 2 Tablespoons = 190 calories!

# Body Fat Loss Strategies

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- **Eat fewer calories** than what you are expending every day – 1 pound = 3,500 calories
  - **500 calories** is the most you should cut back daily
  - If more than 500 calories are cut, then you could experience low energy levels during exercise.
- **Never Skip Meals – Why?**
  - Lowered energy levels for exercise
  - Muscle break down for energy
  - May lead to overeating later
- **Cut out the fat** – Cut any full fat items from your diet and replace with low-fat food choices to ensure your body uses its current fat stores.
- **Avoid processed foods and “snack foods” like chips or pretzels.**
- **Do not fry foods in oil or fat.** Bake, broil, sauté, or microwave foods instead.
- Eat plenty of **vegetables throughout the day.**
- **Increase dietary fiber** to help **satisfy** hunger by choosing whole wheat breads, fruits, and vegetables.
- **Increase your water intake** up to 1 oz per ½ lbs of body weight
- **Eat high-quality proteins that are low in fat.**
  - Lean ground meat, chicken, turkey, pork, ham, Canadian bacon, fish, eggs, skim milk
- **Eat smaller food portions:** By decreasing the amount you eat at meals by ¼, you will decrease the number of calories you eat by ¼.
- **Eat slowly:**
  - It takes time for your body to sense that it is full
  - This will help prevent overeating
- **How long until I see results?** Only lose **1-2 lbs/week** safely. This is to ensure that you maximize fat loss and minimize muscle loss.

**1 lb. = 3,500 calories:** 500 calories fewer a day for 7 days. Losing weight is a DAILY awareness of calorie intake vs. expenditure.

# Body Fat Loss Foods

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- **Choose:**
  - **Skim milk** versus whole or chocolate milk
  - **Water** instead of Gatorade or juice at meals or during the day
  - **Plain Toast** instead of Jam or butter on toast
  - **No dressing or Extra Virgin Olive Oil w/ Balsamic Vinegar** instead of full fat dressing
  - **Broth-based soup** instead of creamy
    - Soups are great because the high water content fills you up and keeps you hydrated!
- **Do eat**
  - **Fruits and vegetables** as snacks
    - **They are higher in fiber to help keep you full!**
    - **Lower in fat and calories**
    - 2 pieces of whole fruit
    - 2 cups of sliced fruit or berries
    - Eat lots of fresh, canned, or frozen vegetables
  - **Low-fat meats** like chicken or turkey instead of bacon, sausage, or pepperoni
  - **Whole grains** – they keep you full longer due to the fiber content
- **Reduce intake of:**
  - **Fried foods** such as French fries, chicken fingers, hash browns, onion rings
  - **Sweets** like cakes, cookies and ice cream

# Healthy Grocery Shopping List

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## **Grains (6-11 servings/day)**

Whole wheat bread  
Noodles/pasta  
Bagels  
English Muffins  
Pita bread  
Tortillas  
Cold or hot cereal  
Rice  
Crackers (animal and saltine)  
Rice cakes

## **Fruits (3 per day)**

Apples/applesauce  
Oranges or grapefruits  
Bananas  
Grapes  
Kiwi  
Raisins  
Peaches  
Cranberries/Craisins  
Peaches  
Plums  
Pineapple  
Canned fruit in juice  
Melons  
Berries (fresh or frozen)

## **Meats/Meat Substitute (5-8 ounces)**

Tuna fish  
Egg beaters  
Lean beef & pork  
Turkey (ground or sliced)  
Chicken (without the skin)  
Beans

Light tofu

Legumes

## **Vegetables (3 or more/day)**

Carrots  
Celery  
Broccoli  
Cauliflower  
Green/red peppers  
Tomatoes  
Brussel sprouts  
Lettuce (dark green leaves)  
Cabbage  
Onions, garlic  
Squash and zucchini  
Beans  
Water chestnuts  
Spinach  
Mushrooms, radishes  
Bean sprouts

## **Milk and Dairy (3 per day)**

Nonfat yogurt  
Skim milk/soy milk  
Mozzarella/swiss cheese  
Low-fat cottage cheese  
Non-fat sour cream  
Low-fat cheese

## **Condiments**

Olive oil  
Ketchup  
Low-fat salad dressing  
Low-fat Miracle Whip/ Cool Whip  
Reduced sugar jam/jelly  
Mustard  
Soy sauce and salsa

# Hydration Tips

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1. **2 Hours before exercise:** drink at least 2 cups (16 oz.) water
2. **5-15 minutes before:** drink 1 cup (8 oz.) water
3. **Every 10-15 minutes during:** ½ cup – 1 cup water
4. **In hot weather drink as often as possible**

## **Sport Tips:**

- COOL fluids do DOUBLE DUTY:
  - Help COOL the body
  - Leaves the stomach FASTER for better hydration
- Carry around a bottle of water during the day to keep you drinking
- Drink even if you are not thirsty – Thirst is our body's way of saying that we are already dehydrated
- Gulping down water/sports drink hydrates the body FASTER than sipping
- Sports drinks are great for long duration activities and hot weather – the CARBS keep you energized and fluid and electrolytes keep you hydrated

## **How to tell if you are dehydrated:**

1. Weight: Weight before & after exercise helps determine how much you need to drink.  
Every 1 lb. of weight lost via sweat = 16 oz. of fluids
  2. Thirst = Dehydration ... drink even if you aren't thirsty!
  3. Urine: COLOR should be light yellow and not have a strong ODOR
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# Using Nutrition to Prevent Muscle Cramping

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## What is a muscle cramp?

A painful involuntary skeletal muscle contraction that will not relax

## Why do athletes get muscle cramps?

1. **Dehydration** – large loss of water and electrolytes
2. **Lack of minerals** in food or drinks
3. **Muscle fatigue** due to inadequate training

## How you can AVOID them ...

1. Guzzle plenty of **fluids** before, during, and after exercise
2. While exercising in the heat or for longer than 30 minutes, grab an **electrolyte enhanced beverage**, like **Gatorade or PowerAde**
3. Devour **foods high in electrolytes and minerals (fruits & vegetables)**
4. **Stretch** before exercise
5. **Gradually increase intensity and duration** of exercise
6. Wear **loose fitting clothing**

## Foods high in minerals

- **Calcium:** dairy products: milk, cheese, yogurt
- **Magnesium:** nuts, green leafy vegetables, milk, meat

## Foods high in electrolytes

- **Potassium**
  - o Fruits and vegetables: bananas and potatoes
- **Sodium**
  - o Processed/canned goods: soups, canned vegetables, condiments, tomato sauce, deli meat
  - o Sports drinks or enhanced water
- **Chloride**
  - o Table salt: 60% chloride
  - o Processed foods/canned goods

## What to do if you get a cramp:

Stretch, ice, massage, and gradually begin to move it. Make an **Ice Roller HERE.**



# Foods High in Protein

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## Shortcuts:

An ounce of meat/fish = about 7 grams of protein

3 ounces of meat is about the size of a deck of cards

Protein Source	Grams of Protein
<b><u>Beef</u></b>	
Hamburger patty (4 oz.)	28
Steak (6 oz.)	42
<b><u>Chicken</u></b>	
Chicken breast (3.5 oz.)	30
Chicken thigh	10
Drumstick	11
Wing	6
Ground chicken meat (4 oz.)	35
<b><u>Fish</u></b>	
Fillet or steaks (3.5 oz.)	22
Tuna (6 oz. can)	40
<b><u>Pork</u></b>	
Pork chop	22
Loin or tenderloin (4 oz.)	29
Ham (3 oz.)	19
Ground pork (3 oz. cooked)	22
Bacon (1 slice )	3
Canadian bacon (1 slice)	5-6

<b><u>Eggs &amp; Dairy</u></b>	
<b>Egg – large</b>	7
<b>Milk – 1 cup (any kind)</b>	8
<b>Cottage cheese – ½ cup</b>	15
<b>Yogurt - 1 cup</b>	8-12 (check label)
<b>Greek yogurt -1 cup</b>	12-17
<b>Soft cheeses (mozzarella, brie, camembert) 1 oz.</b>	6
<b>Medium cheeses (cheddar, swiss, provolone) 1 oz</b>	7-8
<b>Hard cheeses (parmesan) 1 oz.</b>	10
<b><u>Beans</u></b>	
<b>Tofu 1 oz.</b>	2.3
<b>Soy milk - 1 cup</b>	6-10
<b>Most beans (black, pinto, lentils , etc) ½ cup cooked</b>	7-10
<b>Soy beans – ½ cup cooked</b>	14
<b>Split peas – ½ cup cooked</b>	8
<b><u>Nuts &amp; Seeds</u></b>	
<b>Peanut butter – 2 tablespoons</b>	7
<b>Almonds - ¼ cup</b>	8
<b>Peanuts – ¼ cup</b>	9
<b>Cashews – ¼ cup</b>	5
<b>Pecans – ¼ cup</b>	2.5
<b>Sunflower seeds – ¼ cup</b>	6
<b>Pumpkin seeds – ¼ cup</b>	19
<b>Flax seeds – ¼ cup</b>	8

# Starchy Carbohydrates

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What is a starchy carbohydrate? Cereals, grains, pasta, bread, crackers, starchy vegetables, beans, peas, and lentils are all starches

What is a typical serving?

- ½ cup cereal, grain, pasta, or starchy vegetables
- 1 slice of bread
- ¾ to 1 oz. of snack foods (most snack foods also contain added fat)

Nutrition Tips:

- Most starches are good sources of B-Vitamins
- Foods containing whole grains are good sources of fiber
- Beans and peas are good sources of protein and fiber
- Choose starches with little added fat
- Bagels and muffins can be as large as 4 oz. = 4 servings
- Most serving sizes are meant to be measured after cooking

Food	Serving Size
<b><u>Breads:</u></b>	
Bagel	½ (1 oz.)
White, wheat, rye bread	1 slice (1 oz.)
English muffin	½
Hamburger bun	½
Pita (6 inches across)	½
Tortilla (corn or flour)	1
Waffle (4 ½ inches)	1
<b><u>Cereals &amp; Grains:</u></b>	
Cereals	1 cup
Couscous	1/3 cup cooked
Granola (low fat)	¼ cup
Grits, kasha, oats, pasta , rice	½ cup cooked
<b><u>Starchy Vegetables:</u></b>	
Baked beans	1/3 cup

<b>Corn</b>	½ cup
<b>Mixed Vegetables with corn and peas</b>	1 cup
<b>Peas</b>	½ cup
<b>Potato, baked or broiled</b>	1 small (3 oz.)
<b>Yam or sweet potato</b>	½ cup
<b><u>Crackers &amp; Snacks:</u></b>	
<b>Animal crackers</b>	8
<b>Graham crackers 2 ½ inch square</b>	3
<b>Popcorn</b>	3 cups
<b>Pretzels</b>	¾ oz.
<b>Rice cakes</b>	2
<b>Saltines</b>	6
<b>Snack chips (fat free tortilla or chips)</b>	15-20 (¾ oz.)
<b><u>Dried beans, peas, lentils:</u></b>	
<b>Garbanzo, pinto, kidney, white, split, black-eyed</b>	½ cup
<b>Lima beans</b>	2/3 cup
<b><u>Other Starchy Food:</u></b>	
<b>Croutons</b>	1 cup
<b>French Fries</b>	16-25 (3 oz.)
<b>Pancake (4 inches across)</b>	2
<b>Muffin, small</b>	1 (1 ½ oz.)
<b>Sandwich crackers filled w/ cheese or peanut butter</b>	3
<b>Taco shell</b>	2

**References:**

- Sports Nutrition
  - Educational Handouts
  - Presented at the University Orthopedic Associates Fall Sports Clinic - September 20, 2010
  - Dr. Kris Clark
  - Director of Sports Nutrition, Pennsylvania State University

**Other Great Resources:**

<http://www.precisionnutrition.com/>

<http://www.hsph.harvard.edu/nutritionsource/>

**Dietary Supplement Safety:**

[http://www.nsf sport.com/listings/certified\\_products\\_results.asp](http://www.nsf sport.com/listings/certified_products_results.asp)

<http://informed-choice.org/registered-products>

