Fitness and Food

By: Sara Zook, RD-CD
1. Why should we exercise?
2. What is metabolism?
   - Define BMR
   - How to calculate your BMR
3. Nutrition Recommendations
   - Eating pre- and post-exercise
   - Protein Intake
   - Hydration
   - 80/20 Hypothesis
Exercise & Health

- From about age 40-50 and on - we lose 1-2% of our muscle every year.
- If you don’t use it, you’ll lose it - it’s quite true.
- What happens when we are not active?
  - Too little muscle
  - Low metabolic rate (fewer calories burned)
  - Too much body fat (more calories stored here)
- Exercise can prevent diabetes?
  - Skeletal muscle is the biggest consumer of sugar in your blood
  - When muscle is healthy, it chews up blood sugar all the time
  - When it’s not, it is leaving the sugar in the blood
What is Metabolism?

Your metabolism is influenced by:

✓ your age
  ▶ metabolism slows about 5% per decade after age 40

✓ your sex
  ▶ men generally burn more calories at rest than women

✓ proportion of lean body mass
  ▶ the more muscle you have, the higher your metabolic rate tends to be

And YES, heredity makes a difference.
BMR (Basal Metabolic Rate)

Women:
655 + (4.35 x weight in pounds) + (4.7 x height in inches) - (4.7 x age in years)

Men:
66 + (6.23 x weight in pounds) + (12.7 x height in inches) - (6.8 x age in years)


BMR calculatesRESTING metabolic rate (sleeping, eating, etc).

<table>
<thead>
<tr>
<th>Age/Height/Weight</th>
<th>BMR (basal metabolic rate)</th>
<th>Light Daily Activity</th>
<th>Purposeful Exercise</th>
<th>Calories to Maintain Weight</th>
<th>Calories to Lose Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Female - 40 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5’4” 150#</td>
<td>1300 calories per day</td>
<td>-400</td>
<td>-300</td>
<td>2000</td>
<td>1600</td>
</tr>
<tr>
<td><strong>Male - 40 years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6’0” 200#</td>
<td>1800 calories per day</td>
<td>-600</td>
<td>-400</td>
<td>2700</td>
<td>2200</td>
</tr>
</tbody>
</table>
What Affects BMR?

- BMR omits the factor of lean body mass and thus the ratio of muscle-to-fat a body has.

- Leaner bodies need more calories than less lean ones.
  - Therefore, this equation will be very accurate in all but the very muscular (will underestimate calorie needs) and the obese (will over-estimate calorie needs).

- BMR decreases as you age

- Depriving yourself of food in hopes of losing weight also decreases your BMR, a foil to your intentions.

- A regular routine of cardiovascular exercise can increase your BMR, improving your health and fitness when your body’s ability to burn energy gradually slows down.
Muscle Matters

Aim for:

1. aerobic workouts = burn more calories in the short term
2. weight training = build the muscles that will boost your metabolism LONGER

Muscle burns more calories than fat -- even while at rest.
1# of muscle - burns 35 calories a day
1# of body fat - burns just 2 calories a day
What Do We Burn During Exercise?

- When you’re inactive or moving slowly, your body gets energy mostly from burning fat (assuming you haven’t just eaten).
- For more intense activity (brisk walking, running, cycling, etc.), you can’t burn fat fast enough to get all the energy you need.
- So if you’re running for several hours, your body is going to rely more on carbs for the *extra* energy it needs.
- For recovery from endurance exercise, you’re generally trying to restore muscle glycogen.
Gycogen is essentially a long chain of glucose (blood sugar).

The body converts glucose to glycogen in order to store the glucose in muscles and in the liver.

But we don’t have much glycogen, especially compared to our vast stores of fat.

So during an intense, prolonged activity, you can run out of glycogen.

That’s what marathoners are talking about when they say they “hit the wall.”

In more seriously trained athletes, (triathlete), they might do a run in the morning and a bike workout later in the day, so it becomes crucial for them to restore their glycogen reserves quickly.
How Duration Affects Fuel
Timing of Food - Before Exercise

Exercising on “empty” does not mean you will burn more body fat. Burning body fat differs from losing body fat.

Exercising on “empty” is not fun!

*Treat your body the way you would treat your car. Don’t start on empty if at all possible.*

- **What to eat before you work out:**  
  - Consume a carbohydrate rich meal or snack  
  - Include small amounts of protein  
    - Can reduce post-exercise muscle soreness  
  - Choose foods low in fat and fiber to ensure optimal digestion
PRE-Exercise Eating

- If you are physically active first thing in the morning, eat a 100-200 calorie snack at least 30 minutes prior.
- Snack ideas:
  - pineapple, apricots, banana, mango, watermelon (1-2 servings)
  - pretzels (one ounce) or ½ bagel
  - energy bar (low-fat, 3-5g protein)

- 3-5 HOURS PRE-EXERCISE:
  - PB & honey on toast
  - Fruit and yogurt smoothie
  - Oatmeal and almonds, skim milk
  - Low-fat cottage cheese, crackers and grapes
  - Turkey and cheese tortilla wrap
  - Tuna sandwich and fruit
  - Hard boiled egg or 2 egg whites, whole wheat toast and fruit
  - Low-fat string cheese (1-2 sticks) with crackers or fruit
Fatigue Prevention=

✓ A diet low in carbs rapidly decreases muscle and liver glycogen.

✓ Low carb levels affect anaerobic capacity and high-intensity exercise.

✓ When carbs are low, intensity of exercise decreases to a level determined by how well your body mobilizes and uses fat.

➤ If you exercise daily - you need to replenish glycogen stores daily - and need to eat enough carbs.
Timing of Food - During Exercise

IF you are exercising > 60 minutes, eating a small amount of CHO:

1. Improves endurance
2. Maintains blood glucose level
3. Spares liver glycogen
4. Affects motor skills and central nervous system (mental)

*Key - to avoid GI discomfort, however

Try energy bar, sport gel, jelly beans

Sport drink is ok, though also contributes fluid
Eating for Recovery

What to eat after you work out:

- Replace muscle and liver fuel (glycogen/carbohydrate) used during the workout, add in fiber
- Provide enough protein to repair muscle tissue used and to stimulate new lean body mass
  - CHO + protein after exercise results in greater glycogen replenishment (as compared to CHO alone)

- The ideal time to eat is 30 minutes to 2 hours after a workout, when your body is ready and waiting to top off its fuel tanks to prepare for your next workout.
POST - Exercise Eating

**Snack Ideas:**
- smoothie with yogurt and fruit (and/or protein powder replacement)
- graham crackers with peanut butter and banana
- low-fat cottage cheese or string cheese with high fiber cracker and fruit

**Meal Ideas:**
- chicken salad on whole wheat bread with fruit
- whole wheat pita sandwich with turkey and vegetables with milk
- beans, cheese, or avocado over brown rice
- stir-fry with lean steak, broccoli, carrots over brown rice
Protein Intake

How much protein do you need each day?

About 0.4 grams per pound of body weight

50 year old, 5’5”, 160 lb. woman

-needs minimum 64 grams of protein per day

-BMR of about 1380 calories
Protein Intake

How Much Protein?

- The AMDR for protein is 10-35% of daily calorie intake
- To estimate recommended protein intake, multiply your weight (lbs) by the number that matches your activity level or goals:

<table>
<thead>
<tr>
<th>Activity Level/Goals</th>
<th>Protein Intake (150 lb Athlete)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational exercise: 0.5-0.7 grams*</td>
<td>75-105 grams/day</td>
</tr>
<tr>
<td>Endurance athletes: 0.5-0.8 grams*</td>
<td>75-120 grams/day</td>
</tr>
<tr>
<td>Strength training: 0.5-0.8 grams*</td>
<td>75-120 grams/day</td>
</tr>
<tr>
<td>Weight loss/calorie restriction: 0.8-0.9 grams*</td>
<td>120-135 grams/day</td>
</tr>
</tbody>
</table>

*Per pound body weight/day
Protein Intake and Balance

Why is protein and weight-training so important?
➢ Studies show that adults in their 50’s and beyond who were exercising need at least 25% more protein than the standard amount for age just to maintain their current muscle mass.

Spread out your protein intake between meals!
➢ 30 grams of high-quality protein at each meal may be optimal to maintain healthy muscles & bones in adults

<table>
<thead>
<tr>
<th>Amount to get 30 grams of protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4 cup chicken breast 175 calories</td>
</tr>
<tr>
<td>1.5 cups 0% Greek yogurt 200 calories</td>
</tr>
<tr>
<td>2 cups black beans 450 calories</td>
</tr>
<tr>
<td>1/2 cup peanut butter 750 calories</td>
</tr>
</tbody>
</table>
What is Leucine?

- Leucine helps protein synthesis by replenishing skeletal muscle.
- Your meal plan must have enough to build or maintain muscle protein.

<table>
<thead>
<tr>
<th>Food</th>
<th>Portion</th>
<th>Leucine grams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beef</td>
<td>3 oz, cooked</td>
<td>2.15</td>
</tr>
<tr>
<td>Chicken</td>
<td>3 oz, cooked</td>
<td>2.00</td>
</tr>
<tr>
<td>Pork Chop</td>
<td>3 oz, cooked</td>
<td>1.75</td>
</tr>
<tr>
<td>Tuna</td>
<td>3 oz</td>
<td>1.75</td>
</tr>
<tr>
<td>Salami</td>
<td>3 oz</td>
<td>1.45</td>
</tr>
<tr>
<td>Milk</td>
<td>8 oz</td>
<td>0.85</td>
</tr>
<tr>
<td>Peanuts</td>
<td>1/3 cup</td>
<td>0.75</td>
</tr>
<tr>
<td>Lentils</td>
<td>½ cup</td>
<td>0.65</td>
</tr>
<tr>
<td>Egg</td>
<td>1 large</td>
<td>0.60</td>
</tr>
<tr>
<td>Almonds</td>
<td>1/3 cup</td>
<td>0.40</td>
</tr>
</tbody>
</table>
Hydration

• Why is hydration so important?
  – Maintains blood volume
  – Regulates body temperature
  – Prevents heat illness
  – Improves performance

- When you wake up: 1-2 cups of water
- 2-3 hours prior: ~16-24 oz (500 mL)
- 30-60 minutes before exercise: 1 cup water
- During exercise: 4 ounces every 15 minutes
- After exercise: drink to rehydrate, go for
  - high water content foods like fruits
Check Your Hydration

Don’t wait until you are thirsty!

### Daily Water Chart

<table>
<thead>
<tr>
<th>Water Composition</th>
<th>Daily Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 %</td>
<td>1 cup</td>
</tr>
<tr>
<td>70 %</td>
<td>4 cups (1/4 gallon or 1 quart)</td>
</tr>
<tr>
<td>0 %</td>
<td>8 cups (1/2 gallon)</td>
</tr>
<tr>
<td></td>
<td>12 cups (3/4 gallon)</td>
</tr>
<tr>
<td></td>
<td>16 cups (1 gallon or 4 quarts)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight</th>
<th>Water</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 lbs</td>
<td>8 oz.</td>
<td>1 cup</td>
</tr>
<tr>
<td>40 lbs</td>
<td>16 oz.</td>
<td>4 cups (1/4 gallon or 1 quart)</td>
</tr>
<tr>
<td>60 lbs</td>
<td>24 oz.</td>
<td>8 cups (1/2 gallon)</td>
</tr>
<tr>
<td>80 lbs</td>
<td>32 oz.</td>
<td>12 cups (3/4 gallon)</td>
</tr>
<tr>
<td>100 lbs</td>
<td>40 oz.</td>
<td>16 cups (1 gallon or 4 quarts)</td>
</tr>
<tr>
<td>120 lbs</td>
<td>48 oz.</td>
<td></td>
</tr>
<tr>
<td>140 lbs</td>
<td>54 oz.</td>
<td></td>
</tr>
<tr>
<td>160 lbs</td>
<td>64 oz.</td>
<td></td>
</tr>
<tr>
<td>180 lbs</td>
<td>72 oz.</td>
<td></td>
</tr>
<tr>
<td>200 lbs</td>
<td>80 oz.</td>
<td></td>
</tr>
<tr>
<td>220 lbs</td>
<td>88 oz.</td>
<td></td>
</tr>
<tr>
<td>240 lbs</td>
<td>96 oz.</td>
<td></td>
</tr>
<tr>
<td>260 lbs</td>
<td>104 oz.</td>
<td></td>
</tr>
<tr>
<td>280 lbs</td>
<td>112 oz.</td>
<td></td>
</tr>
<tr>
<td>300 lbs</td>
<td>120 oz.</td>
<td></td>
</tr>
<tr>
<td>320 lbs</td>
<td>128 oz.</td>
<td></td>
</tr>
</tbody>
</table>

- **Doing ok. You’re probably well hydrated. Drink water as normal.**
- **You’re just fine. You could stand to drink a little water now, maybe a small glass of water.**
- **Drink about 1/2 bottle of water (250 ml) within the hour, or drink a whole bottle (500 ml) of water if you’re outside and/or sweating.**
- **Drink about 1/2 bottle of water (250 ml) right now, or drink a whole bottle (500 ml) of water if you’re outside and/or sweating.**
- **Drink 2 bottles of water right now (1,000 ml). If your urine is darker than this and/or red or brown, then dehydration may not be your problem. See a doctor.**
Fuel By Day – “Lose Weight At Night”

DO NOT:

► “Save up” your calories for later in the day
  • Those who under-ate during the day had HIGHER body fat than those who ate evenly all day long!
  • Keeping up with your appetite, will significantly help cravings and night hunger, especially on days of higher intensity exercise

► Eat too little of calories (<1000) for too long

► Be unrealistic.
  • A half-hour walk doesn’t equal a brownie.
    ● It can be easy to underestimate how many calories some foods contain
    ● It’s also easy to overestimate how many calories we burn while exercising

► What do you do after you exercise? Do you sit?

► Be mindful of all of the hours in your day - being sedentary without any other daily activity (working, moving around, fidgeting, taking opportunity to get up and move more often) - this can cost you up to 350 calories per day!
Questions?

References:
Sports Nutrition: The Power to Influence Exercise Performance – Kristine Clark, PhD, RD, FACSM, Penn State SCAN – Sports, Cardiovascular and Wellness Nutrition Practice Group – Academy of Nutrition & Dietetics
Fitness & Food Nutrition Quiz

Name: ____________________________________________

1. What happens with lack of physical activity?
   a. Less muscle mass
   b. Increased body fat (extra calorie storage)
   c. Lower metabolic rate (burn fewer calories)
   d. All of the above

2. What factors affect your metabolism?
   a. Only your genetics
   b. Age, sex, muscle mass and genetics
   c. Age and muscle mass
   d. None of the above

3. True or False.
   “Before exercise, you should consume a carbohydrate rich meal or snack, with a small amount of protein that is low in fat and fiber.”

4. True or False.
   “You do not need to replenish your glycogen stores post workout.”

5. What is the optimal amount of protein at each meal?
   a. 20 grams
   b. 30 grams
   c. 40 grams
   d. 50 grams