

**LECTURE OUTLINE, Chapter 9: Energy Balance & Healthy Body Weight*****I Calories & Energy Balance***

A. **Definition** of a **kcalorie** (commonly called Calorie). A unit of energy (heat). It's the amount of **heat** energy needed to raise the temperature of \_\_\_ kilogram (kg, about a quart) of water \_\_\_\_\_ ° Celsius

B. Energy Balance

**Definition**- change in energy stores = energy in – energy out

If you consume \_\_\_\_\_ more calories in a week than your body needs, you could gain one pound (**positive energy balance**)

If you expend \_\_\_\_\_ more calories in a week than you take in, you could lose a pound (**negative energy balance**)

If the energy you eat in foods equals the amount of energy you expend, your weight could remain stable (**equilibrium**).

***II Three parts of Energy Expenditure***

A. BMR (Basal Metabolic Rate)

**Definition**- energy expended by the body for its involuntary activities that are necessary to sustain life. Examples include:

\_\_\_\_\_

\_\_\_\_\_

This does **NOT** include \_\_\_\_\_ or \_\_\_\_\_ activities.  
Largest component to the average person's daily energy expenditure.



Can we influence BMR? How? (Not sure? Post a question in the forum.)

B. Voluntary Activity

C. Thermic Effect of Food

**Definition**- stepped-up metabolism after eating a meal

About \_\_\_ to \_\_\_% of calories in a food are lost because that energy is used to digest and absorb the food.

When determining energy needs, the thermic effect of food is not taken into account; its effects are negligible

***III How the brain and nerves get energy during a fast:***

- A. **1st day:** Glycogen in \_\_\_\_\_. Why can't brain get energy from the glycogen in muscles?

Explain why you would lose 4-5 pounds during the first day or 2 of a fast or a low carbohydrate diet and why you would quickly gain it back once you started eating more carbohydrate.

Why is your body not happy being deprived of carbohydrate?

- B. **2nd day:** \_\_\_\_\_ in muscles & other places gets rearranged into \_\_\_\_\_.

What does this do to the amount of lean tissue in the body? \_\_\_\_\_

If this kept happening, the body could last only about \_\_\_\_\_ days.

Can body fat be rearranged into significant amounts of glucose?

In your own words, what is meant by the statement "carbohydrates spare protein"?

- C. **After 2 weeks of fasting**, the brain has learned to use \_\_\_\_\_ for about 1/2 of its energy needs, but the other half still comes from \_\_\_\_\_ in muscles & other places (unless you're eating lots of protein).

Where do ketones come from?

When are ketones made?

List examples of several situations that might lead to ketosis:

Why does the body's rate of lean tissue loss go DOWN after about 2 weeks of fasting or a very low carbohydrate diet?

### **IV Muscles during Fasting**

How the **muscles** get energy during a low carbohydrate diet (in addition to glucose):

\_\_\_\_\_

### **V Body Weight vs Body Fatness**

#### A. BMI

BMI (Body Mass Index) correlates significantly with body fatness, however it is most accurate in determining the degree of obesity, and less useful in determining nonobese people's body fatness. Two drawbacks to BMI: fail to indicate how much of the weight is \_\_\_\_\_ and \_\_\_\_\_ the fat is located.

#### B. Some ways to measure body composition:

1. DEXA scan
2. Underwater weighing. \_\_\_\_\_ floats
3. Fatfold test uses calipers.
4. Bioelectrical impedance only \_\_\_\_\_ tissue and \_\_\_\_\_ conduct electricity. The \_\_\_\_\_ does not.
5. "Bod Pod"

### **VI The Mystery of Obesity: \_\_\_\_\_side the body causes**

**Genetic:** proof that much obesity is genetically based:

if 1 parent is obese, there is \_\_\_\_\_% chance that the child will be heavy

if 2 parents are obese, there is \_\_\_\_\_% chance that the child will be heavy

#### **HOW GENES MIGHT PLAY A ROLE:**

1. Variations in **Hunger/Appetite**

**Hunger:** Physical \_\_\_\_\_ to eat

Genes in fat cells direct the making of *ghrelin*: a \_\_\_\_\_ hormone produced by \_\_\_\_\_ cells thought to increase feelings of hunger in order to stimulate eating

**Appetite:** Psychological \_\_\_\_\_ to eat Satiety: feeling \_\_\_\_\_

Genes in fat cells direct the making of *leptin*: a \_\_\_\_\_ hormone that is produced by \_\_\_\_\_ cells. It plays a role in body weight regulation by acting on the hypothalamus to suppress appetite and burn fat stored in adipose tissue.

Perhaps the brain cells of obese people \_\_\_\_\_ these hormones, just as some diabetics' cells ignore \_\_\_\_\_.

2. **Enzyme** Theory. The more your genes direct the making of lipoprotein lipase enzyme (LPL), the more easily fat cells store fat. What do lipase enzymes do during digestion?
3. Genes regulate the **Thermic Effect of Food**. \_\_\_\_\_ of this happens in obese people. If you were a hunter-gatherer who lived in a feast & famine situation, would you like to have a high TEF?

## VII *The Mystery of Obesity: \_\_\_\_\_side the body causes*

- A. Lack of Exercise
- B. TV. Nutritional problems with excess TV watching:
  - 1.
  - 2.
  - 3.
  - 4.
- C. External Cues. What does this mean?
  1. Foods high in \_\_\_\_\_ are especially tempting and take the least energy to digest.
  2. Foods high in \_\_\_\_\_ are also very tempting. They take a lot of time to digest, but they may not satisfy us because they don't take up much room in our stomach.
  3. Our bodies are meant to deal with \_\_\_\_\_ not \_\_\_\_\_.
  4. Marketing. According to the video in the lecture, the food industry has spent \$100 million to advertise junk food to kids before \_\_\_\_\_<sup>4</sup>.
- D. **Some people overeat** because of
  1. Habit
  2. Stress
  3. Because they're tired or
  4. Because they're bored

Do any of these apply to you?
- E. Alcohol can encourage \_\_\_\_\_ storage. Why?
- F. Weight Cycling- What is meant by this?
- G. Set-Point Theory. What is it?

## ***VIII Do Extra Pounds Come from Too Much Food or Do They Come From Too Little Exercise?***

Tufts University Health & Nutrition Letter, April 2003

Evidence from surveys suggests that people have more or less remained at the same level of sedentary living since 1985. But average daily calorie intake has gone up \_\_\_\_\_ calories.

### ***What about our eating habits has changed during that time?***

#### **1. INCREASED DIETARY VARIETY.**

**1973-** \_\_\_\_\_ new bakery products introduced into the marketplace

**1993-** \_\_\_\_\_ new bakery products introduced into the marketplace

#### **2. A GLUT OF LIQUID CALORIES.**

Between 1977 and 1998, soft drink consumption increased by \_\_\_\_\_%.

According to research at Purdue University in Indiana:

When you \_\_\_\_\_ 100 extra calories, you reduce your calorie consumption by almost 100 calories later in the day.

When you \_\_\_\_\_ 100 extra calories, you eat at least as much later as if you hadn't drunk anything, so you're just adding 100 calories--or more--to your total.

#### **3. GROWING PORTION SIZES.**

And research has shown that people consume more when served larger portions.

#### **4. TOO DELICIOUS.**

Good-tasting, interesting meals may induce hunger sooner than more basic meals.

#### **5. SNACKING.**

Between the 1970s and mid 1990s, we've increased the number of snacks we have by \_\_\_\_\_% AND we're choosing \_\_\_\_\_ portions and \_\_\_\_\_ calorie snacks.

#### **5. EATING OUT.**

People who ate out at least 13 times a month consumed an average of \_\_\_\_\_% more calories than those who ate out fewer than 5 times a month.

**How can you apply these findings to your own eating habits?**

### ***IX Possible Causes of Eating Disorders (especially anorexia)***

1. **Genes** (maybe brain chemistry can cause people to use starvation as a way to control \_\_\_\_\_)  
**Serotonin** is a chemical messenger in the brain made from the essential amino acid \_\_\_\_\_ and it affects emotions, behavior, and thought. Normal levels of serotonin are believed to be associated with feelings of \_\_\_\_\_. Both low and high levels of serotonin may be associated with certain mental health disorders. It has been suggested that the brain of a person with anorexia may have \_\_\_\_\_creased serotonin activity. Perhaps starvation prevents tryptophan from getting to the brain to be made into serotonin. So starvation may bring down the level of serotonin to more normal levels and decrease anxiety.
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

### ***X DO 'S FOR FAMILY MEMBERS & FRIENDS OF INDIVIDUALS WITH EATING DISORDERS***

- DO** keep mealtime a priority and a pleasant time to be together rather than a time to observe, evaluate and discuss their eating
- DO** support and accept the person.... avoid value judgments & criticism
- DO** talk to the person about it. Ask questions and listen, too.
- DO** inform yourself about the disorders and their treatment. Read the literature and talk to the person as well.
- DO** be patient.... realize there is no quick and easy solution
- DO** attend support groups. They are there for you.
- DO** encourage the person to get a professional assessment from a practitioner experienced in eating disorders.
- DO** seek life-saving treatment for anyone who is in jeopardy of endangering self or others.
- DO** express honest love by physical and verbal affection.
- DO** value the person with the disorder so that he can learn to value himself.
- DO** realize the person takes comfort in the disorder's rituals & feelings of control & may fear recovery.

- DO encourage decision-making and being responsible for those decisions.
- DO allow the person to be responsible for his routines of daily life.
- DO express your caring and interest in seeing the person get well.
- DO accept yourself.
- DO let the person know other qualities/characteristics you appreciate about him.
- DO try to do social activities which do not involve food.
- DO express your feelings honestly with the person; she probably senses how you are feeling anyway.
- DO talk about your relationship with the person with the eating disorder, ask him if there are ways you can be more helpful to him.
- DO try to imagine what their life might have been like if at any time they were a heavy person in a culture that values thinness
- DO realize that there have probably been many unsuccessful attempts at weight loss  
- *Adapted from a list I got years ago from ANRED (Anorexia Nervosa and Related Eating Disorders), founded in Eugene in the 1980s by Jean Ruble, who used to be a speaker in this class.*

**XI: Top Ten Reasons to Give Up Dieting**  
*(this list is from the Council on Size & Weight Discrimination)*

10. **DIETS DON'T WORK.** Even if you lose weight, you will probably gain it all back, and you might gain back more than you lost.
9. **DIETS ARE EXPENSIVE.** If you didn't buy special diet products, you could save enough to get new clothes, which would improve your outlook right now.
8. **DIETS ARE BORING.** People on diets talk and think about food and practically nothing else. There's a lot more to life.
7. **DIETS DON'T NECESSARILY IMPROVE YOUR HEALTH.** Like the weight loss, health improvement is temporary. Dieting can actually cause health problems.
6. **DIETS DON'T MAKE YOU BEAUTIFUL.** Very few people will ever look like models. Glamour is a look, not a size. You don't have to be thin to be attractive.
5. **DIETS ARE NOT SEXY.** If you want to be more attractive, take care of your body and your appearance. Feeling healthy makes you look your best.
4. **DIETS CAN TURN INTO EATING DISORDERS.** The obsession to be thin can lead to anorexia, bulimia, bingeing, and compulsive exercising.

3. **DIETS CAN MAKE YOU AFRAID OF FOOD.** Food nourishes and comforts us, and gives us pleasure. Dieting can make food seem like your enemy, and can deprive you of all the positive things about food.
2. **DIETS CAN ROB YOU OF ENERGY.** If you want to lead a full and active life, you need good nutrition, and enough food to meet your body's needs.

**And the number one reason to give up dieting:**

1. Learning to love and accept yourself just as you are will give you self-confidence, better health, and a sense of well-being that will last a lifetime.

**The Nondiet Approach** (from *Moving Away From Diets* by Karin Kratina, MA, RD, LD; Nancy L. King, MS, RD, CDE & Dayle Hayes, MS, RD, LD; 2002)

1. Total health enhancement and well-being, rather than weight loss or achieving a specific "ideal weight."
2. Self-acceptance and respect for the diversity of healthy, beautiful bodies, rather than the pursuit of an idealized weight at any cost.
3. The pleasure of eating well, based on internal cues of hunger and satiety, rather than on external food plans or diets.
4. The joy of movement, encouraging all physical activities rather than prescribing a specific routine of regimented exercise.

How does the Traditional approach to weight loss compare to the HAES approach?  
Which approach is more positive?