Lecture 6

Nutrition
HEAL 101: Health and Lifestyle

Kevin Petti, Ph.D.
Department of Natural Sciences,
Health, Exercise Science and Nutrition
San Diego Miramar College

Objectives

- Discuss the digestive process
- Examine relationship between diet and disease
- Identify components of diet: energy producing and non-energy producing
- Distinguish among forms of vegetarianism
- Discuss the food pyramid & food labels
- Determine where calories are coming from in a meal
- Discuss food safety

Is Diet Linked to Disease?

- Can you identify diseases linked to dietary choices?
  - Heart Disease
  - Cancer
  - Stroke
  - Hypertension
  - Diabetes
  - Anemia
  - Vitamin Deficiencies
  - Osteoporosis
  - Obesity
  - Other?

- Should we take our meals more seriously?

The Digestive Process

- Mouth
- Esophagus
- Stomach
- Small intestine
- Large intestine
- Other Organs
  - Teeth
  - Liver
  - Gall bladder
  - Pancreas
Nutrition Terms

- Nutrition: science investigating the relationship between physiology and consumed food
- Nutrients: constituents of food that sustain us physiologically: proteins, carbohydrates, fats, vitamins, minerals, and water
- Hunger: physiological need to eat
- Appetite: psychological desire to eat

Calories ~ Energy Producing Component of Food

- Calorie (c)
  - Amount of energy required to raise the temperature of 1 gram of water 1˚C

- Kilocalorie (C)
  - Amount of energy required to raise the temperature of 1 kilogram of water 1˚C
  - Food calories are Kilocalories

Calories

- How many calories should we consume in a day?
- What is this dependent upon?
- Where in our diet do calories come from?

Components of Diet

- Protein
- Carbohydrates
- Fats
- Vitamins
- Minerals
- Fiber
- Water
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- Water

Proteins - 4 Calories per Gram

- Most abundant substance in body after water
- Cells are “protein factories”
- Hormones, antibodies, cell structure, hemoglobin
- Composed of amino acids (20)
- Essential amino acids (9) are obtained from food
- Others are produced by the body
- Complete: food containing 9 essential amino acids
- Incomplete: missing some of the essential amino acids
- Proteins should be about 10-15% of calories

Complementary Proteins

Selecting from two or more of these columns will help you use a process known as mutual supplementation, combining two protein-rich foods to form complementary proteins with all of the essential amino acids. These combinations make complete proteins and help avoid possible protein deficiencies.

- Barley, Bulgar, Cornmeal, Cuts, Rice
- Whole-grain beans, Enriched pasta, Dried beans, Dried lentils, Dried peas, Soy products
- Sesame seeds, Sunflower seeds, Walnuts, Cashews, Other nuts, Fruits, Berries
- Leafy greens, Broccoli, Others

Grains, Legumes, Seeds and Nuts, Vegetables

Vegetarianism

- Vegans – vegetables only
- Ovo-vegans – eggs and vegetables
- Lacto-ovo-vegetarians – dairy, eggs and vegetables
- Pesco-vegetarians – fish, dairy, eggs and vegetables
- Semivegetarians – chicken, fish, dairy, eggs and vegetables
- Non-red meat eaters
Advantages and Disadvantages of Vegetarianism

- Advantages: lower weights, better cholesterol levels, regular bowel movements, lower risk of heart disease, possible reduced risk for colon and breast cancer

- Disadvantages: must be careful to select foods that ensure proper nutrient intake, combine foods for complete proteins - especially in strict vegans

Carbohydrates - 4 Calories per Gram

- Excellent source of energy - especially athletes
- Simple Sugars
  - Monosaccharides - glucose, fructose
  - Disaccharides - sucrose, lactose

- Complex Sugars
  - Polysaccharides - starch, fiber
- Body utilizes the simple sugar glucose
- Glucose can be stored as glycogen in liver and muscle
- Carbohydrates should be about 55-60% of calories

Fats - 9 Calories per Gram

- Very important & dense source of energy
- Triglycerides – most common fats in blood, serve as energy and insulation
- Cholesterol – in cell membranes and steroid hormones, found only in animal products
  - High density lipoproteins - good guys
  - Low density lipoproteins - high levels risk CVD
- Saturated fats – hydrogenated, mostly animal sources, solid at room temperature
- Polyunsaturated and monounsaturated fats - plant sources mostly, liquid at room temperature
- Fats should be <30% of total calories
Common Vegetable Oils

Which choice is best?
- Monounsaturated fats may be the best choice
- Olive oil
- Canola oil

Fatty Acids

- Trans-fatty acids
  - Formed via hydrogenation of polyunsaturated oils as in margarines
  - Increase cholesterol similar to saturated (animal) fats
  - Margarine versus butter?
- Omega-3 and Omega-6 fatty acids
  - Eskimos with high fat in diet have low CVD rates
  - Their diets are high in cold water fish
  - Also found in: soybeans, peanuts, corn, sunflower seeds, canola oil, sardines, green leafy vegetables, walnuts, wheat germ

Vitamins

- Organic compounds for growth and maintenance
- Fat soluble – A, D, E, K
- Water soluble – B Complex and C
- Are vitamin deficiency diseases common?
- Is vitamin supplementation necessary for health?
- Can vitamin supplementation be dangerous?

Minerals

- Macrominerals – needed in fairly large amounts:
  - Sodium, calcium, phosphorus, magnesium, potassium, sulfur, chloride
- Trace minerals – needed in minute amounts:
  - iron, zinc, manganese, copper, iodine, cobalt
- Dietary issues:
  - Too much sodium, not enough calcium and iron
  - How do we control these issues?
Fiber

- Indigestible portion of plants - cellulose
- Fiber absorbs water, keeps stools soft and moving
- Protects against: colon cancer, breast cancer?, constipation, diverticulosis, heart disease, diabetes, obesity
- Eat more beans, fruits and vegetables, eat the skins, drink plenty of liquids

Water: A Crucial Nutrient

- The most important component of diet
- How long can you go with out water compared to the other dietary components?
- 50% - 60% of total body weight is water
- Water is major component of blood and other body tissues
- We need to drink freely throughout the day
Double Quarter Pounder

730 calories

FAT = 40 grams
40 x 9 cal/gram = 360 cals

CHO = 46 grams
46 x 4 cal/gram = 184 cals

PRO = 47 grams
47 x 4 cal/gram = 188 cals

Total Calories:
FAT: 360/730 ≈ 50%
CHO: 184/730 ≈ 25%
PRO: 188/730 ≈ 25%

Bacon Ultimate Cheeseburger:

1025 Calories

FAT = 70g

CHO = 53g

PRO = 46g
Food Safety

- Food-borne illnesses and symptoms
- Avoid risks by:
  - Confirming freshness, cooking properly, washing hands, utensils and surfaces, not cross contaminating food, store properly keep hot foods hot and cold foods cold
- Can be partly controlled via food irradiation
  - How safe is it? Very safe
- Is organic any safer or healthier? Probably not

Dietary Guidelines

- Choose a diet with plenty of grain products, vegetables, and fruits.
- Choose a diet low in fat, saturated fat, and cholesterol.
- Eat a variety of foods.
- If you drink alcoholic beverages, do so in moderation.
- Choose a diet moderate in salt and sodium.
- Balance the food you eat with physical activity to maintain or improve your weight.

Common Food-Borne Illnesses

<table>
<thead>
<tr>
<th>Illness</th>
<th>Symptoms/Related Problems</th>
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<tbody>
<tr>
<td>Campylobacteriosis</td>
<td>Most common bacterial cause of diarrhea in the United States, affecting over 3 million people a year. Ranges from a mild illness to severe abdominal pain, fever, diarrhea (sometimes bloody), sometimes accompanied by vomiting, usually lasting 2–5 days, and illness usually lasts 2–3 days. Usually mild, but deaths have been reported among the very young, the very old, or the immunocompromised.</td>
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<tr>
<td>Clostridium perfringens</td>
<td>Typically occurs 6–24 hours after ingestion of food that has been improperly heated or cooked. Usually mild gastrointestinal illness lasting a day or so. Deaths are uncommon.</td>
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<tr>
<td>Escherichia coli O157:H7</td>
<td>Usually a mild gastrointestinal illness that occurs 3–4 days after eating contaminated foods. Severe complications, however, can arise. Hemorrhagic colitis is distinguished by the sudden onset of severe abdominal pain, bloody or black stools, and diarrhea that may become markedly bloody. Fever is 3–5 percent lower than in hemorrhagic coli (HEC), a severe, life-threatening illness in which not blood cells are destroyed, kidneys fail, and neurological basis wires and limbs occur.</td>
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<tr>
<td>Listeria monocytogenes</td>
<td>Listed may be either mild or severe. Most cases are characterized by sudden onset of fever, severe headache, vomiting, and other flu-like symptoms. Listeriosis may appear mild in healthy adults and more severe in children, the elderly, pregnant women, and those with weakened immune systems. Women infected during pregnancy may transmit infection to the baby, resulting in premature birth or stillbirths with mental retardation. Over 2,100 people become seriously ill each year, leading to 300 deaths.</td>
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<tr>
<td>Salmonella</td>
<td>Usually occurs 6–24 hours after eating contaminated foods and lasts 1–5 days. Fever, diarrhea, stomach pain and vomiting are the predominant symptoms. There are over 40,000 reported cases each year (the actual incidence may be 20 times higher) and about 1,500 deaths.</td>
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<tr>
<td>Staphylococcus aureus</td>
<td>Usually occurs within 1–6 hours following consumption of the foods produced by the bacteria. Both men and women can become infected. Although the illness generally lasts less than 1–2 days, more serious symptoms may require hospitalization.</td>
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<tr>
<td>Toxoplasmosis</td>
<td>AIDS, malnutrition, or drug use. Undercooked meat is often the cause. Pregnant women may be stillborn or born with birth defects ranging from hearing or visual impairments to mental retardation.</td>
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