

## Introduction - 1

As your textbook states: "Welcome to the world of nutrition." Each day we make choices about what we eat, and how we nourish ourselves. We eat for any number of reasons, only a few of which may center on the biological needs of our cells and tissues.

We are very much aware of the incredible choices we have for nourishing ourselves. We have:

- grocery store aisles of breakfast cereal
- fruits and veggies beyond imagination
- aisles of frozen, canned, packaged, and processed foods "ready to eat"
- fast food restaurants and coffee shops at "every" corner

We make our food choices based on:

- personal preferences
- habit - we tend to eat the same things just because we do
- our cultural heritage - each cultural and ethnic group has its typical foods
- convenience, especially when we are short of time
- budgetary limitations
- information that says certain foods are good for us; many food manufacturers take advantage of this with "functional foods", those that have added ingredients that may provide health benefits.
- values or beliefs
  - Boycott foods made by corporations that have tobacco interests, etc.
  - Purchase organically grown foods or foods without added hormones, etc.

We eat because we:

- feel hungry
- have been told that it's time to eat
- are bored and the thought of food is appealing
- are at a social function where food is the focal point for socializing
- need something positive, and food is comforting
- are driving by a fast-food restaurant and it's more convenient to stop there than to think about meal planning.

We also:

- choose or avoid foods with which we have past positive or negative experiences eg, tomato soup and childhood memories
- choose or avoid foods because of the food's appearance
- make food choices which we think may help our appearance such as foods promoted to help make one slim and attractive

In reality, apart from the social and psychological aspects, food must provide two things:

- energy
- nutrients

Most of you have enrolled in this class because you have some interest in what the food you are consuming each day is doing for you and how you can improve your diet and health with the food choices you make. Many of you may be curious about how our bodies use the food we eat. How do we make the choices that will best serve our bodies' needs?

The food we eat needs to provide the appropriate level of calories for the energy we use and a balanced supply of nutrients. More and more we are learning that our diets play an important role in long-term health and fitness. Most of you have an interest in finding out how best to provide for your nutrient needs, or perhaps to validate that you are serving your body well by your dietary choices.

### **The nutrients in food and in our bodies (the cereal box list)**

We require a number of different nutrients for both energy and to maintain our cells and tissues. We obtain our nutrients from the foods we eat. Much of this course is about nutrients:

- what they are
- what they do
- how we process them
- the foods that provide them

Our nutrients include **carbohydrates**, **lipids** and **proteins** that do double duty: they provide energy as well as structural components for our body. In addition, we need a number of **vitamins** and **minerals**, and **water**. The average 150 pound adult will have about 90 pounds of water and 30 pounds of fat. The remaining 30 pounds will be mostly structural protein, carbohydrate and the minerals found in bone. Very little of our body is comprised of vitamins and the other minerals.

Some nutrients are essential – they must be provided in our diet in the forms we need for our body to function. Other non-essential nutrients can be made in our cells and tissues from foods we've consumed and digested.

We also consume non-nutrients, substances in food that may confer health benefits (or not), such as some phytochemicals, food additives and other chemicals, but these substances are not essential for body structure and functioning. An active area of research today is the field of potential health benefits of non-nutrients. For some, it will not be a surprise to find that this area of research confirms the value of whole foods and primarily plant foods.

### **So what do we do as students interested in nutrition and health? (Well, take this class and read our text.)**

1. Learn how the body works - first on our agenda in Biology 130!
2. Learn to make appropriate food choices for our individual body requirements: those that provide nutrients in proper proportion and combination and calories commensurate with energy needs.
3. Learn to distinguish good food values from advertised assertions.

To start, we will spend a bit of time looking at how nutrition guidelines are established and how governments and health agencies work to make choosing healthy foods easier. We will follow with an introduction to how our body works - a brief look at the digestive, circulatory and regulatory systems of the human body. After these introductory materials, we will turn to the specific nutrients -- what they are, what they do in our bodies, and what are appropriate food choices to obtain the nutrients. We will conclude the class with materials on health, appropriate weight, fitness and diet, and a bit on consumer concerns and food.

First, however, let's look at the features of our human body relative to the demands of living today in comparison to those who traveled our planet a million years ago. It helps to give us perspective on the impact food and lifestyle choices have on our bodies.

### **Body Design and Lifestyle**

Most indications are that the earliest humans were tropical hunter/gatherers. Our digestive tract is quite long - indicative of plant-eaters or mixed plant/animal feeders. Digestive versatility was important so that humans could eat whatever was available, which was mostly seeds, vegetables, fruits and some lean meats and seafood. Cultivation of grains increased the availability of more plant foods.

The human body was (and is) adapted to irregular food supplies

- Short-term (up to 24 hours) storage in the liver
- Long-term storage in fat cells (adipose)
- Hunger drive which led to food search response

Today we have the same storage capabilities and drive to satiate short-term hunger. But:

- It's rare in United States to have irregular food supplies.
- We respond to hunger by eating without spending energy on food searches.
- As a result, many of us have more fat cells and a possible tendency to overeat because there are fewer famine times to reduce adipose reserves
- More foods are high in fat because of how we cultivate animals, and because we have taste preferences for fatty foods.

And we are simply eating more food calories than ever before.

Some results in our population from eating more than we require:

- Obesity (including children and young adults in unprecedented numbers)
- Heart disease
- Hypertension
- Type II diabetes (Adult onset diabetes)

## **Some other generalizations about people and food**

### **Stress in our lives**

- We have adrenal glands that secrete a hormone (adrenaline or epinephrine) that stimulates the activities of the sympathetic nervous system (speeds up body)
- The biological purpose of this hormone is provide us with the means to flee harm or fight harm
- Today our adrenals are manifested in **stress** (internalizing our flight/fight) but our stress tends to be chronic and is a factor in:
  - Hypertension
  - Heart disease
  - Ulcers

### **Physical activity is greatly reduced for many people**

- We don't walk
- We don't work physically (We may jog or go to a fitness center)
- We recreate by observing (We may jog or go to a fitness center)
- Yet we eat just as much - or more, and as a result, close to one-third of our adult and child population is obese (weighing more than 20% above what is appropriate for health)

### **Handling toxins**

- All organisms have means of minimizing risks of toxic substances
- Human responses to toxins using:
  - Taste (reject bad-tasting things)
  - Stomach (vomiting)
  - Liver - detoxes (when it can)
  - Kidney - filters (when it can)

### **How can our bodies do this?**

- Liver produces enzymes (a type of protein) that can destroy some poisons  
Liver has enzymes that break down alcohol, for example
- If the liver lacks the enzyme for a specific poison - that poison can not be broken down
- Many of today's poisons are synthetic and have no enzymes for their destruction. There is a parallel in ecology: decomposers break down natural materials, yet have no enzymes to degrade many plastics, etc.
- It is likely that some cancers are a result of our exposure to levels of substances that our bodies can not process.

In spite of our lifestyles today, we don't need to go back a million years to have a healthier lifestyle. We have the tools at hand, and to begin, let's examine nutrient guidelines and learn a little about how our body works it works, so that we can better understand why we need all those nutrients, and what they are really doing for us.