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Chapter 2

Digestion

What You Should Know About Your Body

Your body is approximately fifty-five percent (55%) **water**, twenty percent (20%) **protein**, fifteen percent (15%) **fat**, nine percent (9%) **minerals**, and one percent (1%) **carbohydrates** and **vitamins**.

These **basic components must constantly be replenished** through the foods we eat. But, **not** necessarily in the **same proportions** for each of us. Some foods enter our bodies as **fuel** and are **burned on consumption to meet energy needs**. Others become the **basic building blocks** of tissues and fluids. Still, others are vital to the delicate interactions required by the body's many functions.



You Are a “One-of-a-Kind”



Throughout your personalized program you will continually hear how **each of us is unique**. We are all **different**. This holds true for our **metabolic processes** as well. The metabolic process begins with digestion.

The digestion tract involves the **mouth, esophagus, stomach, small intestine**, and the **large intestine**. The **mechanical** and **chemical** phase of digestion occurs in these organs.

Your Body is a Sophisticated Food Processor



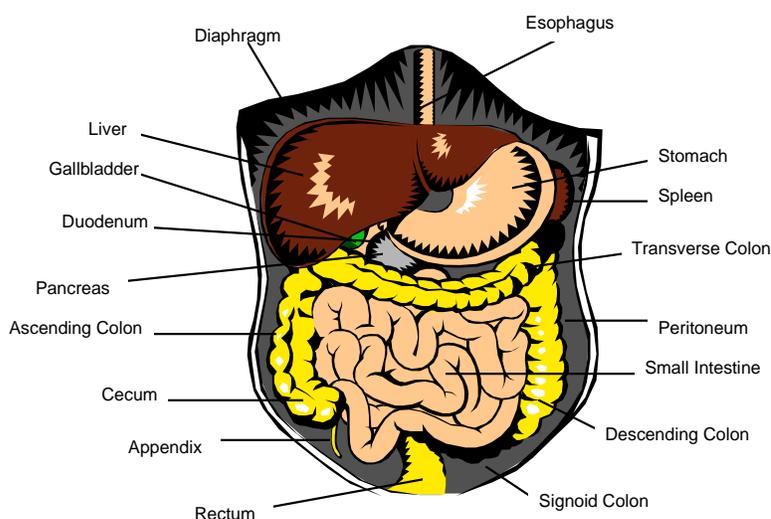
The **mechanical phase** of digestion is responsible for **sub dividing, mixing** and **propelling** of food along the digestive tract. It includes **chewing, swallowing**, and the **muscular activity of the walls of the digestive tract itself**.

The **chemical phase** of digestion is responsible for the **final breakdown of food particles**. It is brought about by **digestive enzymes**. **Enzymes** act as **catalysts** in the body. They **increase** the rate of a reaction **without becoming part of the final reaction product**. Digestive enzymes aid in the breakdown of large nutrient molecules into smaller molecules. For example,

carbohydrates are changed into **simple sugar**, **fats** into **glycerol**, and **fatty acids** and **proteins** into **amino acids**.

The Digestive Process

The **process** of digestion starts when food enters the body through the **mouth** where it is **chewed, broken into small pieces**, and **mixed with saliva**. The fluid secreted by the salivary glands contains **digestive enzymes** that act upon carbohydrates. From the mouth, food passes to the **stomach** by way of the **esophagus**.



The digestion of certain foods continues in the stomach under the influence of the **secretions** and **churning action** of the **stomach wall**.

Ordinarily, a mixed meal leaves the stomach in three to four hours.

Carbohydrates leave the stomach most rapidly, followed by **protein**. **Fats** remain in

the stomach for a longer period. Thus, the sensation of hunger will occur sooner after a meal that is high in carbohydrate than after a meal containing adequate amounts of proteins or fat.

Beyond the Stomach

After leaving the stomach, the liquefied mass, called **chyme**, passes into the **small intestine** for further absorption into the body. The small intestine is affected by secretion from its walls and from the **liver** and **pancreas**. The *undigested* food residues pass from the small intestine to the **large intestine** or **colon**. This material also contains some of the end products of digestion such as water, as well as waste materials. These waste products travel through the large intestine where they await periodic excretion from the body.

How Your Body Absorbs Nutrients

Absorption follows digestion. The function of digestion is to **prepare** the nutrients for absorption **through the walls of the digestive tract**. Most of this absorption takes place in the **small intestine**. However, **water** and small amounts of **simple sugars** and **alcohol** pass through the **mucosa** of the stomach into the bloodstream. And, various **minerals** and **water** are absorbed in the **large intestine**.

Located on the wall of the intestines and into the food canal, are finger-like projections called **villi**. They **increase the absorption surface area about 600-fold**. Each villus contains a **network of tiny vessels that drink up the nutrients as they pass along the food canal**.

There are two kinds of tiny vessels in each villus. One contains **lymph** and accepts digested fats (lymphatic vessels). The other contains **blood** and accepts all other digested nutrients (capillaries). These little vessels are the *means* by which the **absorbed nutrients are circulated to every cell throughout the body**.

Nutrients then circulate throughout the body in a manner analogous to diners at a cafeteria. As the blood flows by, **cells take what they need**. Excess nutrients may be **stored, converted to more complex compounds, or excreted**.