Digestive System

Digestion

Intake and assimilation of nutrients

Elimination of waste

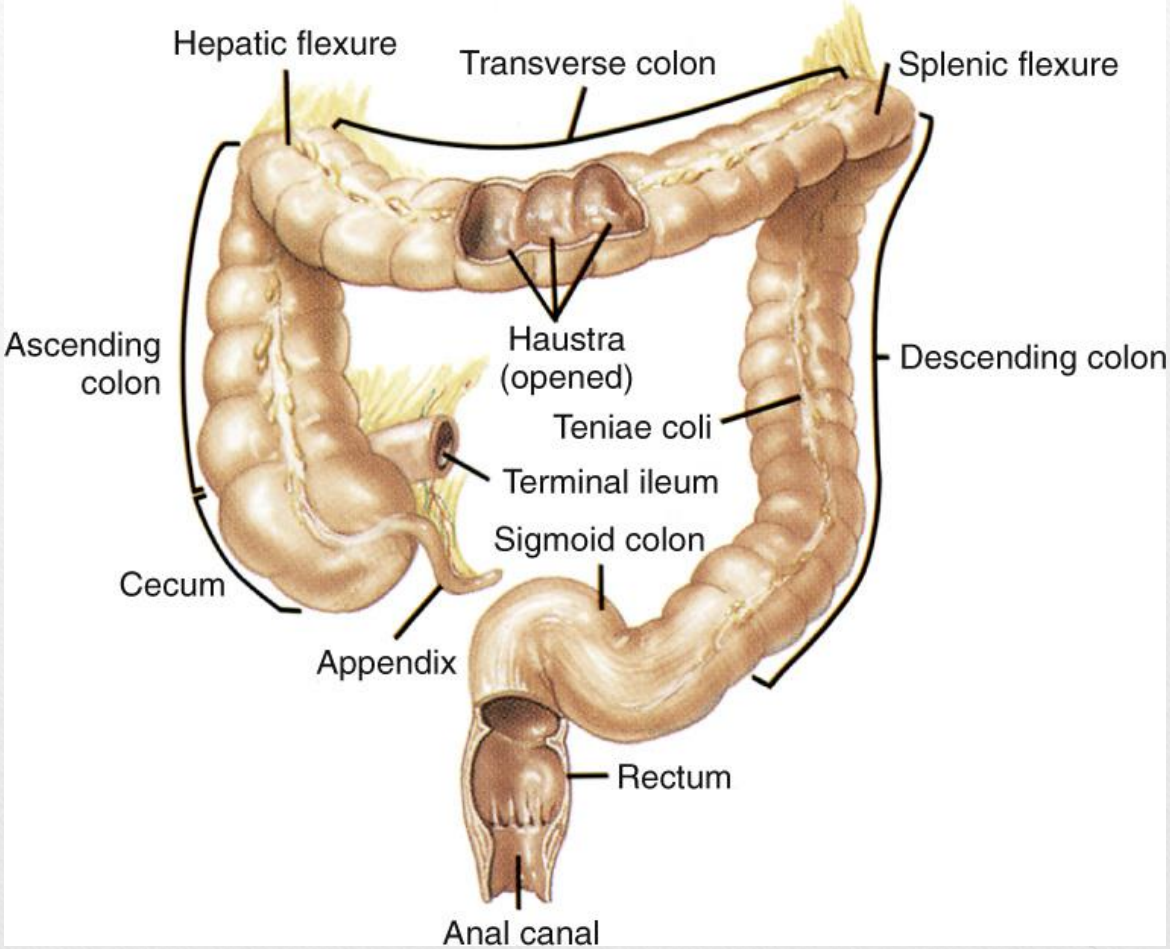
Eating

- Required physically
- Pleasurable
- Social
- Emotional

Food behaviors can become just as addictive as any other pleasurable activity.

Anatomy of the Large Intestine

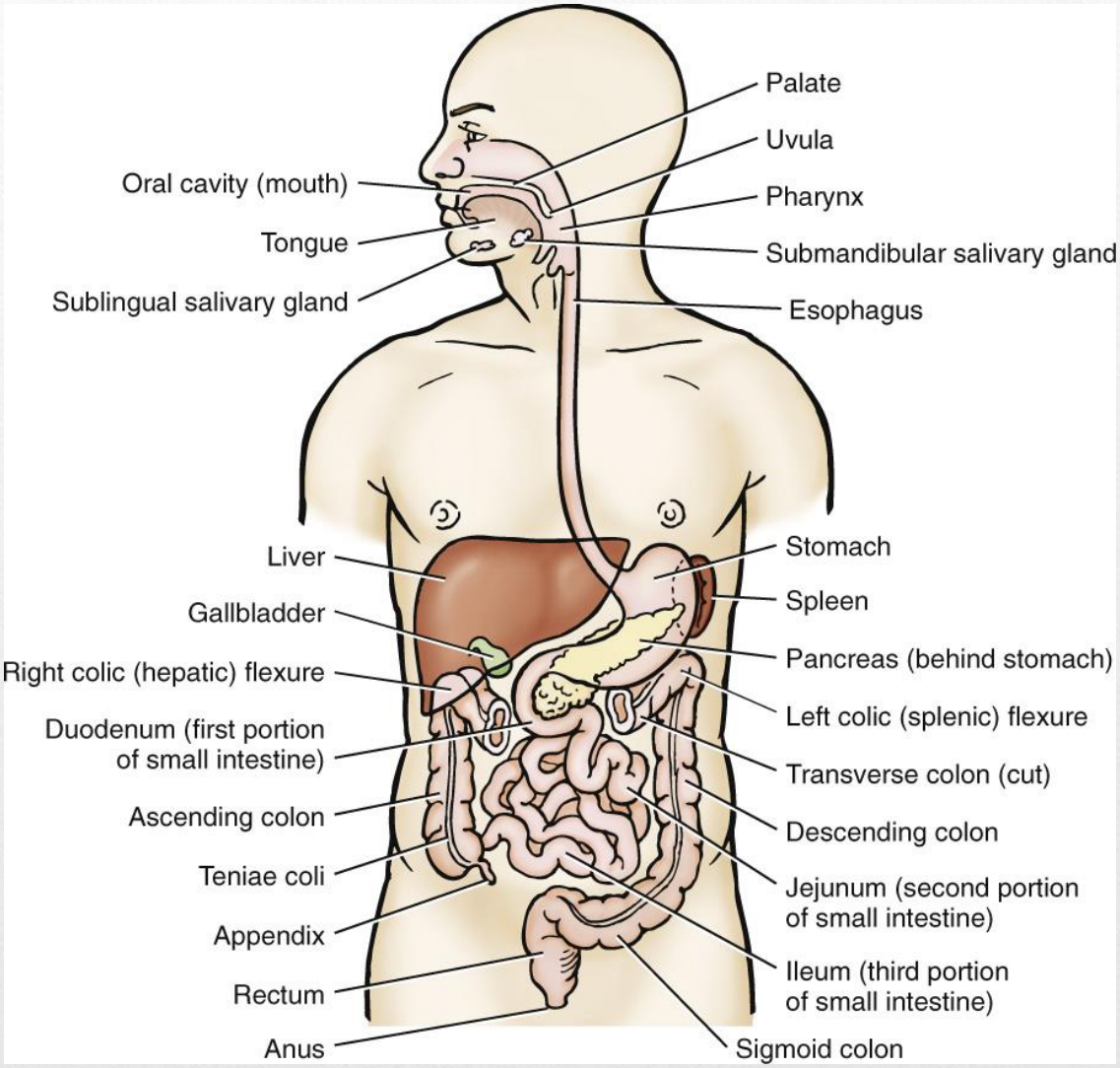
The large intestine is usually 4 to 5 feet long and 2½ inches in diameter.)



Organs of the Digestive System

The pharynx, located just behind the mouth, receives the bolus from the mouth.

Bolus is the food that has been chewed, chemically broken down, and mixed with water.



Digestive Organs

Mouth

Pharynx

Esophagus

Stomach

Small intestine

- 90% of food absorption occurs in small intestine

Pancreas

Liver

Gallbladder

Large intestine

Nerves

The liver metabolizes protein, breaks down fatty acids, and removes glucose from the blood. It also secretes bile, stores vitamins, detoxifies the blood, and destroys old blood cells.

Digestion

Ingestion

Digestion

Absorption

Elimination

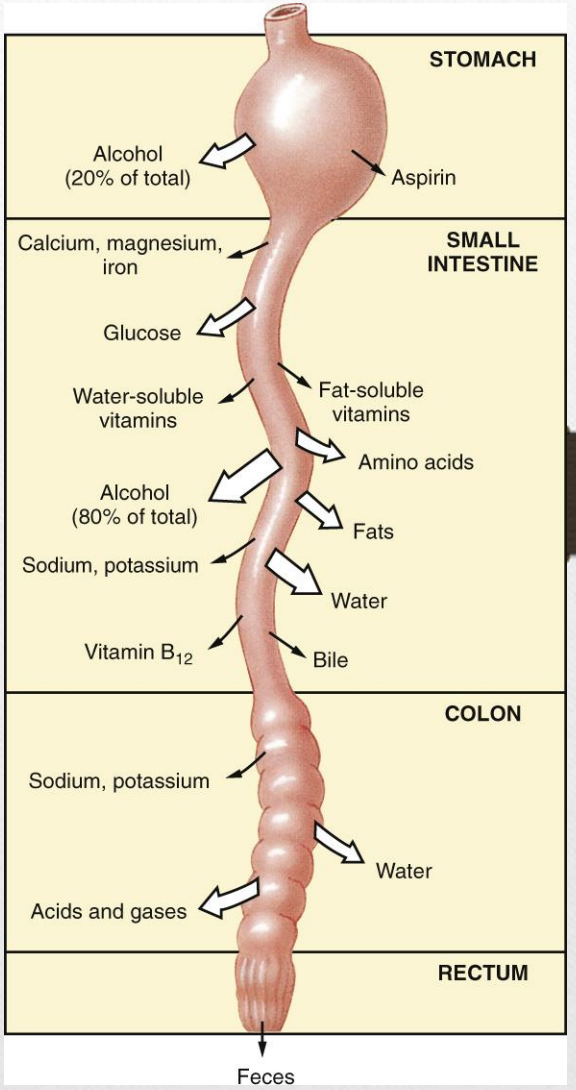
Digestive juices and enzymes

- Saliva
- Gastric juice
- Pancreatic juice
- Lipases
- Intestinal enzymes

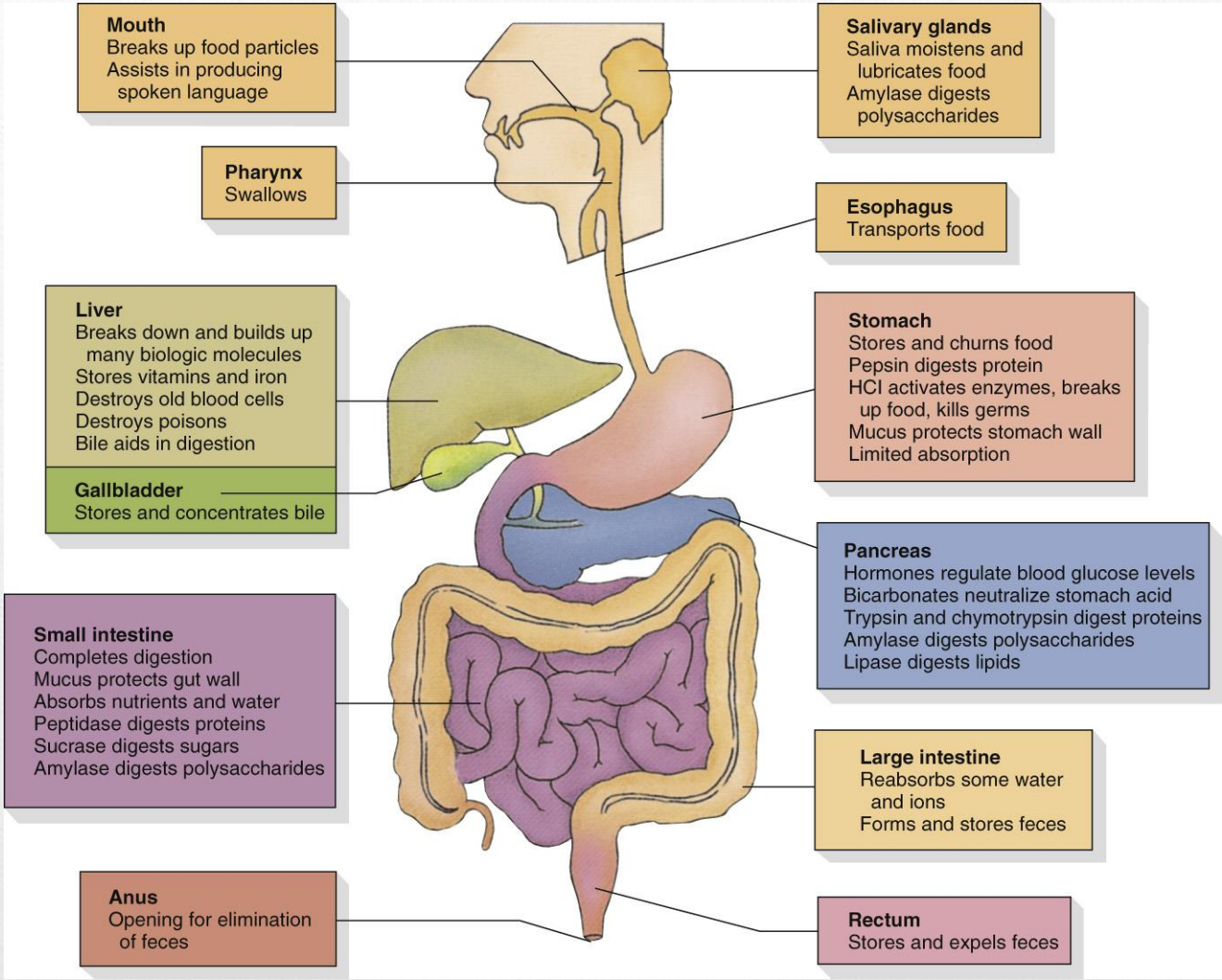
Peristalsis is the rhythmic contraction of smooth muscles that propels food through the digestive system.

Sites of Absorption

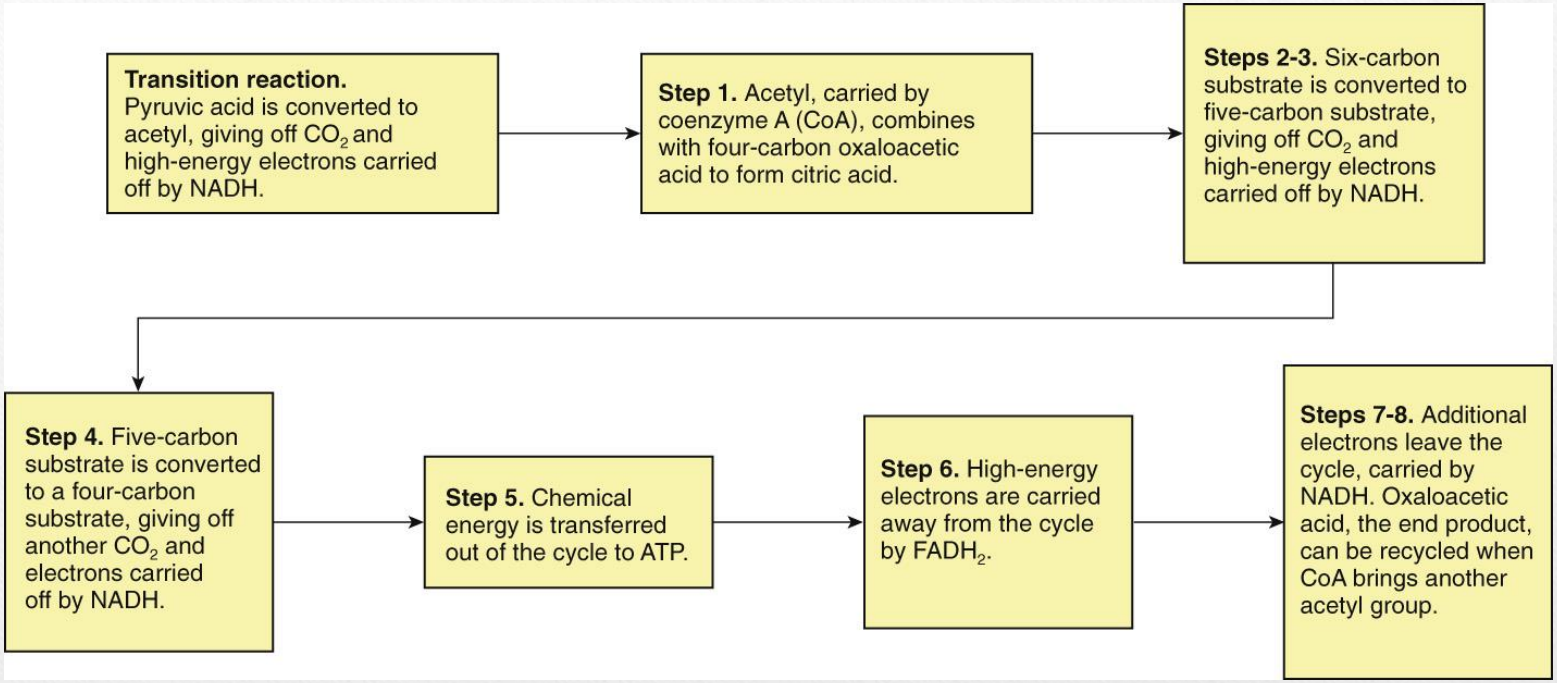
In this diagram, the size of the arrow indicates the amount of absorption of a particular substance at that site.



Summary of Digestive Function



Citric Acid Cycle



The citric acid cycle (Krebs cycle) is the main pathway by which food energy is released by cells to manufacture their own energy-rich adenosine triphosphate (ATP).

The citric acid cycle is a complex transformation process. The end result of many chemical reactions is energy for cellular function.

Nutrition

Poor nutrition: effect on general health

Good nutrition: diet high in

- Vegetables
- Grains
- Legumes
- Fruit (fresh, clean, from good soil)

Avoid excess fats and sugars.

Dietary recommendations vary according to a number of factors, including genetic predisposition, age, and health.

Main Food Groups

Proteins

Carbohydrates

Lipids

Vitamins

Minerals

Proteins break down into amino acids, which the body then absorbs.
Proteins are the chief structural components of the body.

Where can you get necessary dietary fats?
Nuts, seeds, oil, and animal products.

Metabolic Rate

Calculating BMR depends on:

- Size (height and weight)
- Sex (men have > BMR than women)
- Age (younger = > BMR)
- Thyroid hormones
- Body temperature
- Drugs (can stimulate or depress BMR)

Total metabolic rate = energy used by body in a given time

- BMR is approx 55-60% of total MR

BMR is an acronym for basal metabolic rate; it refers to the smallest amount of energy that must be expended to sustain life.

The body attempts to maintain a state of energy balance; its energy input should equal its energy output.

Pathologic Conditions

Constipation

Hemorrhoids

Gastroenteritis

Reflux esophagitis (gastroesophageal reflux)

Peptic ulcer disease

Appendicitis

Hernia

Common signs and symptoms of peptic ulcer disease

Heartburn or burning pain, vomiting brownish-black material or passing dark stools, tenderness of epigastric region, nausea, weight loss, and decreased appetite.

A hernia is a protrusion of soft tissues through a tear or weak spot in a muscle wall.

Pathologic Conditions

Malabsorption and intolerance syndromes

Irritable bowel syndrome

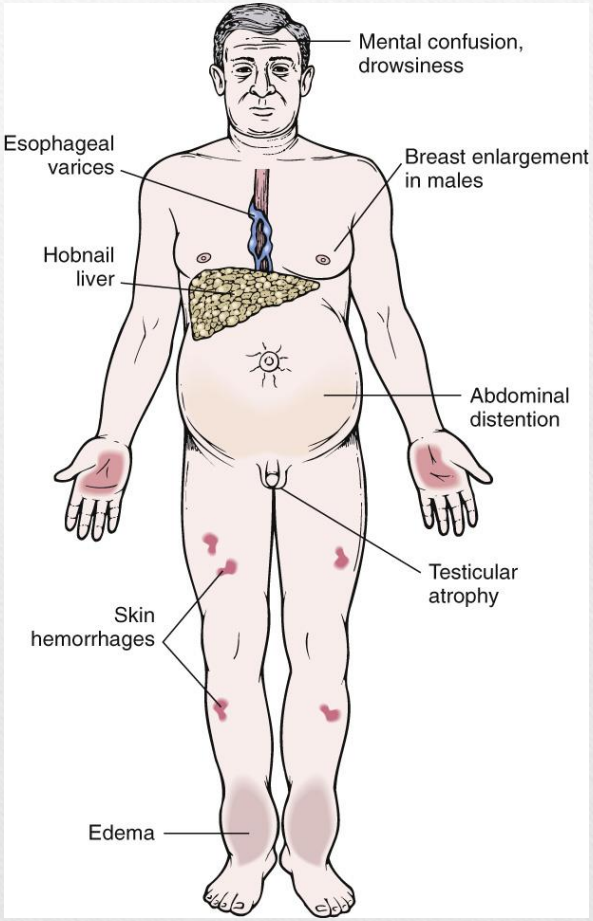
Inflammatory bowel disease

Diverticular disease

Cirrhosis

The image shown here depicts the physiologic signs and symptoms of cirrhosis.

The most common cause of cirrhosis is Alcoholism.



Pathologic Conditions

Gallbladder disease

Obstructions

May be caused by adhesion, hernia, tumors, volvulus

Cystic fibrosis

Pancreatitis

Colon cancer

Stomach cancer

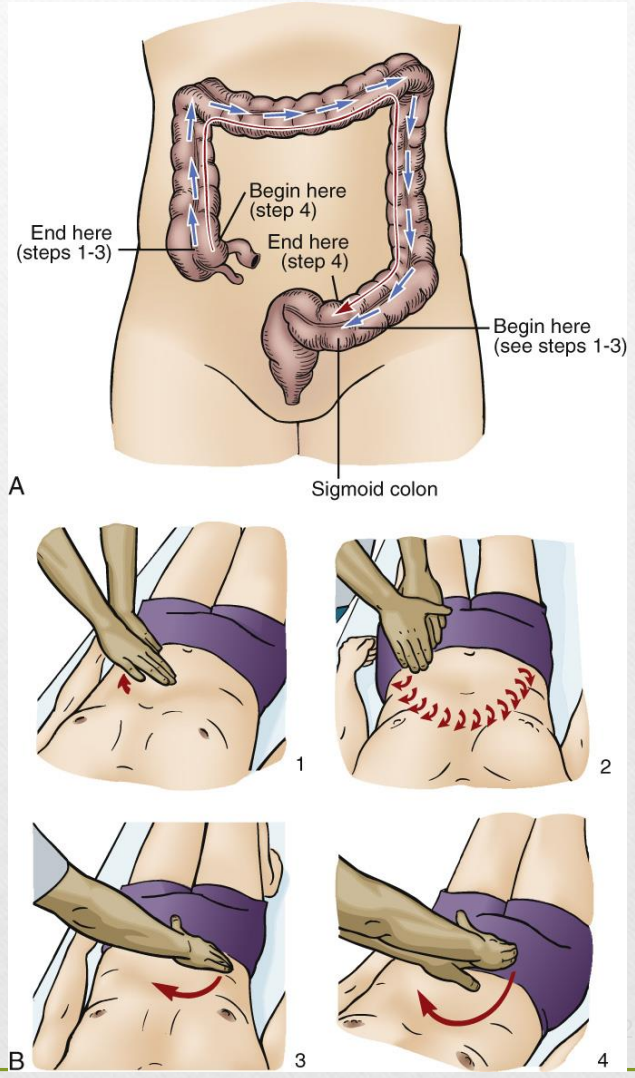
Common signs and symptoms of gallbladder disease

Pain in the right upper quadrant of the abdomen, often radiating to the right scapula or upper back, nausea and vomiting, and fever.

Colon Flow/Massage Application

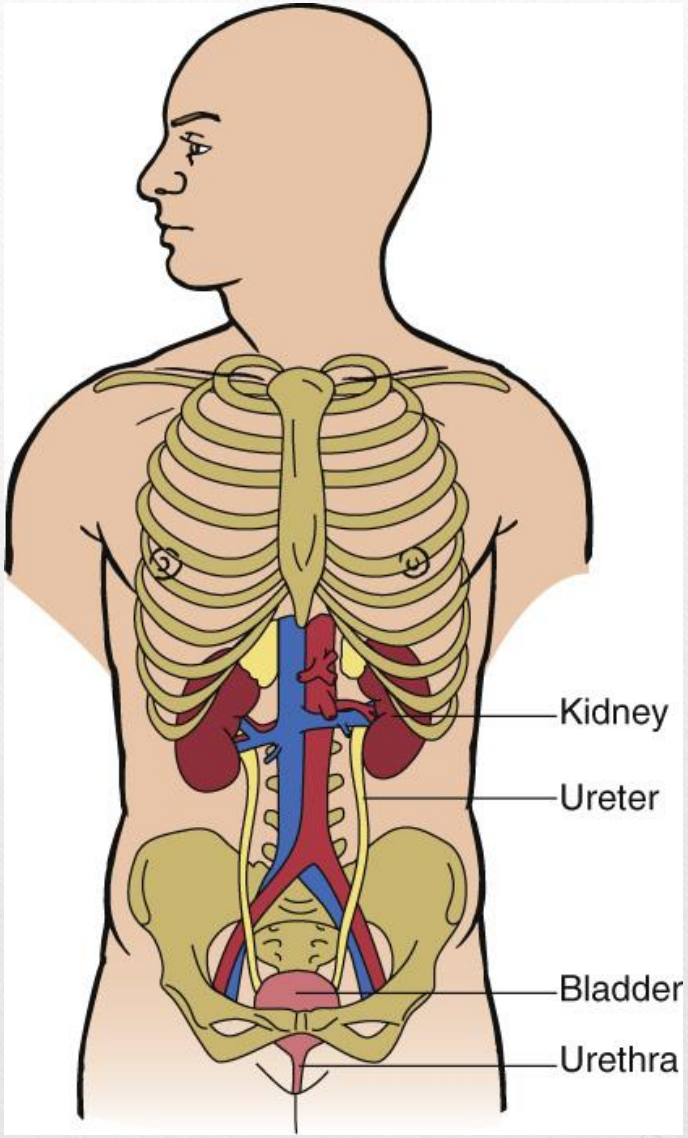
The practitioner should take appropriate precautions to maintain sanitary practice as many gastrointestinal diseases are bacterial or viral and are contagious.

All of the manipulations shown here are directed in a clockwise fashion.



Urinary System and Fluid Electrolyte Balances

Urine passes out of the kidneys through the ureters and is stored in the bladder until it is expelled through the urethra.



Functions of Urinary System

Conservation of water

Maintenance of normal electrolyte concentration

Regulation of acid-base balance

Regulation of blood pressure

Activation of vitamin D

The kidneys reabsorb about 99 percent of the filtrate, leaving about 1 percent to be excreted as urine

Organs of the Urinary System

Kidneys

Kidneys are major homeostatic device of body

Ureters

Urinary bladder

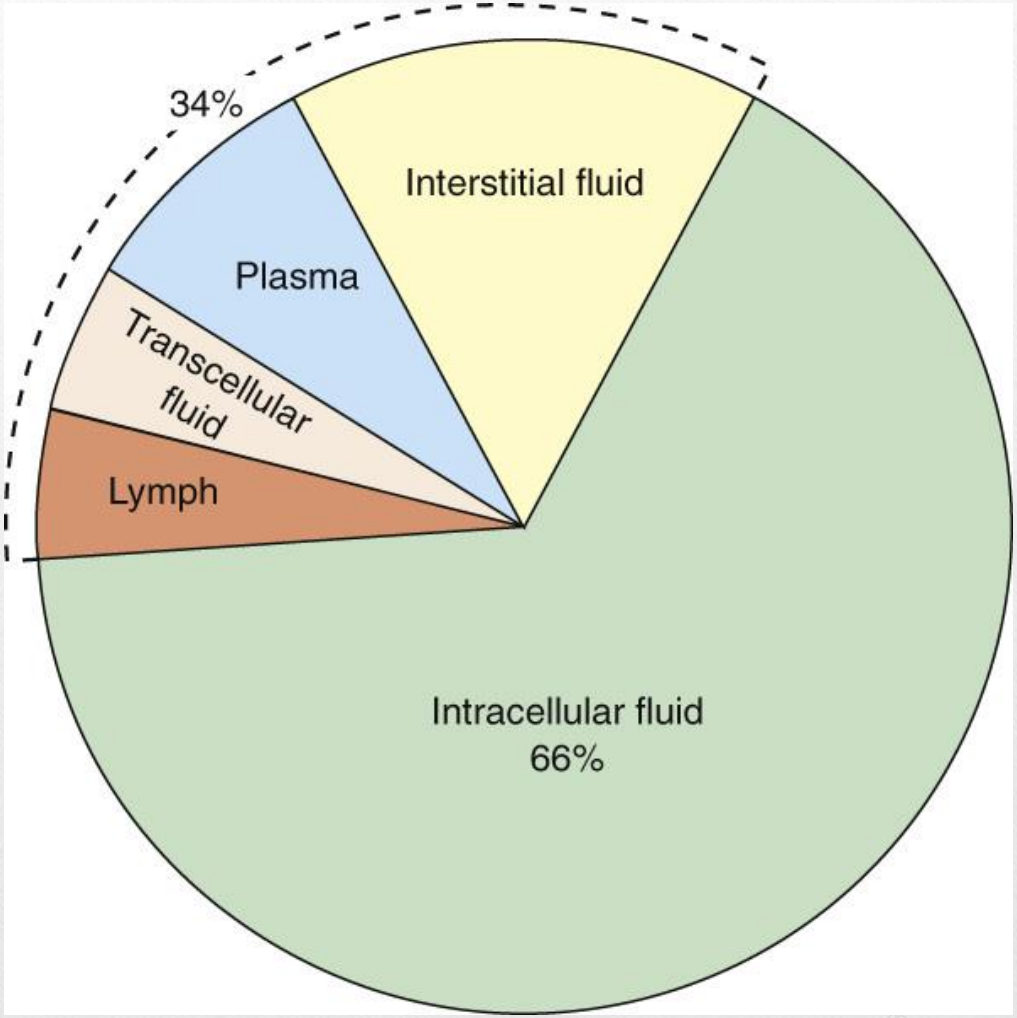
Urethra

Male urethras are longer and are used to pass semen in addition to urine. Females are predisposed to UTIs because of the close proximity of the urethra to the anus.

Urinary Function

In terms of weight, the human body ranges from 40 to 60 percent water, mostly in intercellular fluid.)

The images shown here provide the distribution of total body water and the role of coenzymes in transferring chemical energy.



Water Balance

Box 12-4 Functions of Water in Human Physiology

- Water provides a medium for chemical reactions.
- Water is crucial for the regulation of chemical and bio-electric distributions within cells.
- Water transports substances such as hormones and nutrients.
- Water aids in oxygen transport from lungs to body cells.
- Water aids in carbon dioxide transport from body cells to lungs.
- Water dilutes toxic substances and waste products and transports them to the kidneys and the liver.
- Water distributes heat around the body.

Input of water and electrolytes must be balanced by output.

Other Urinary System Factors

Hydrostatic forces

Osmotic pressure

- Antidiuretic hormone (ADH) regulates body fluid volume, extracellular osmosis, and many other areas

Osmoreceptors

- Stimulated by dehydration
- Connected to thirst response

Baroreceptors

The mechanisms that regulate body fluids are centered in the hypothalamus, which also receives input from the digestive tract that helps to control thirst.

If the body is short of fluid intake (as during sleep), the urine is concentrated, so it is darker and low in volume.

When an individual is overhydrated, the urine is diluted, so it is pale or colorless and high in volume, and ADH is absent.

Electrolyte Balance

Sodium

Potassium

Calcium

Magnesium

Chloride

Phosphate

Sulfate

Bicarbonate

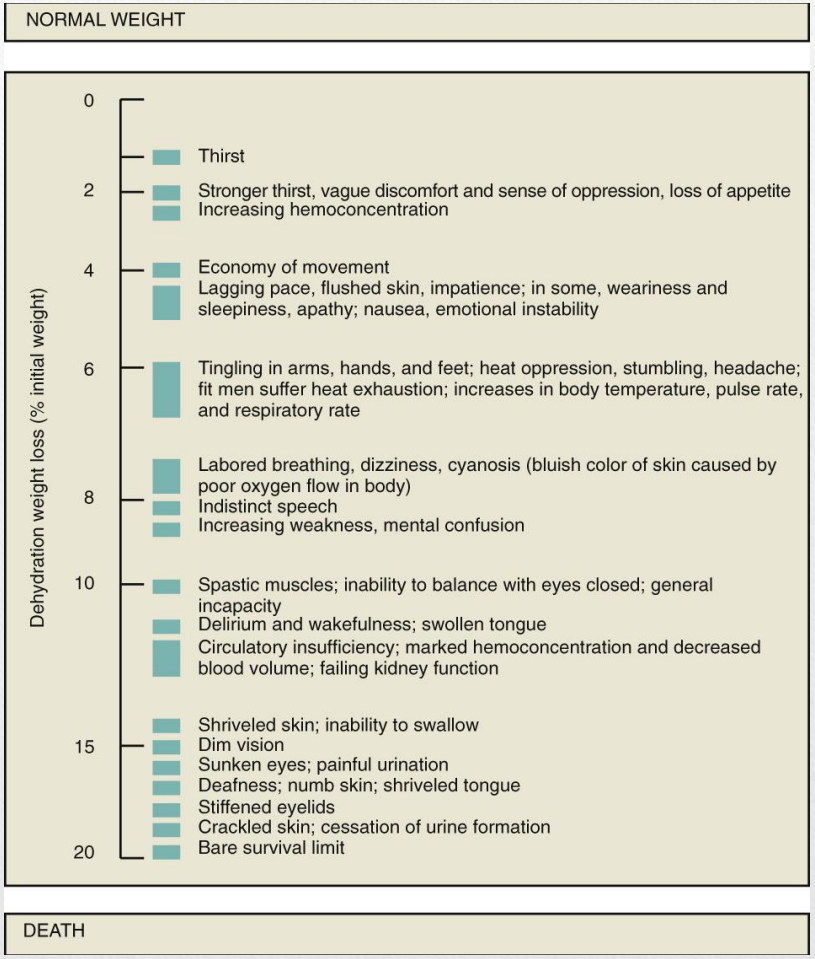
Sodium balance plays an important role in the excitability of muscles and neurons; it is also crucially important in regulating fluid balance in the body

Pathologic Conditions

Clinical problems with fluid balance: dehydration and edema

Besides not having enough water, what other conditions can dehydrate the body?

Diarrhea, severe vomiting, excessive sweating, bleeding, and surgical removal of body fluids.



Edema Test

To test for edema, apply steady pressure of the thumb to the lower leg for 10 to 20 seconds. If a depression remains, fluids are being retained.

Pathologic Conditions

Urinary tract infections

Bladder infections (cystitis)

Pyelonephritis

Incontinence

Kidney stones

Obstruction

Glomerulonephritis

Kidney failure (renal failure)

Kidney stones are small crystalline substances that develop in the kidney; most are calcium. They are brought on by dehydration.

Indications/Contraindications for Therapeutic Massage

General contraindications exist for anyone with kidney disease.

May be useful for pain and stress management, but only with medical supervision

Massage contraindicated in acute infections

Supervised massage may be used for chronic infections.

Massage useful for incontinence

Therapeutic massage tends to increase blood volume through the kidneys by way of mechanical and reflexive processes.

In healthy individuals, massage therapy supports the filtration process.

To Test

Access Code: 42DCK

Please write down code. You will be asked for it

Once you have successfully passed the test (70% correct), please email Kim Jackson at kim_hotschool@yahoo.com. We will email you your CE certificate within 7 business days.