

Human Body - Anatomy and Physiology

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Blood



Blood contained in blood vessels is a connective tissue in the form of a red viscous fluid. On an average, a healthy man has about 5 liters of blood in the body, while a woman has about 500 ml less than a man. Total volume of blood is said to be 60-80 ml per kg of body weight.

Constituents of Blood

There are two main constituents of blood: solid or cellular part called blood cells (35%) and the fluid part called plasma (65%). The blood cells called corpuscles are of two types:

1. **Red Blood Corpuscles (RBC):** These are disc-shaped cells without nucleus and contain a pigment called Hemoglobin, which gives the red color to the blood. Hemoglobin is an iron-containing pigment. RBC's are produced in the spleen and the bone marrow. Hemoglobin picks up oxygen in the lungs by forming a chemical compound.
2. **White Blood Corpuscles (WBC):** These are round semi-transparent cells containing a nucleus and are a little larger than RBC. The WBC are the 'soldier' of the body's defense system and their main function is to combat infection.

Blood Grouping

K. Land Steiner in 1900-1992, classified human blood into four groups, A, B, AB and O. The O group blood can be given to any of the other groups, and therefore, a person possessing the O group is known as a universal donor. Group AB is called universal recipient and can receive A, B, AB and O blood groups

Blood Group	Can Donate Blood To	Can Receive Blood From
A	A, AB	A and O
B	B, AB	B and O
AB	Only AB	AB, A, B and O

O	AB, A, B and O	Only O
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Blood Clotting

Blood clotting is a body's defense system to combat bleeding. Plasma contains fibrinogen - a soluble protein which produces the insoluble protein called fibrin essential for blood coagulation, which is produced in the liver.

- The Skeletal System (Bones)
- There are 206 bones in the skeletal system of an adult. Bones of hands and feet alone constitute 50% of the total bones in the human body.
- A newborn baby has 300 bones, out of which 94 bones fuse together as it grows.
- The largest bone of human body is the femur in the thigh which constitutes about 27.5% of a person's stature, average length of this bone is about 50 cm.
- The shortest bone in the human body is the stirrup bone in the middle ear.

Composition of Bones

Organic Matter	33.30%
Phosphate of Lime	51.04%
Carbonate of Lime	11.30%
Fluoride of Calcium	2.00%
Phosphate of Magnesia	1.16%
Soda/Chloride of Sodium	1.00%

Muscular System

Muscular are tissues attached to bones and are composed of fibers. They are capable of contracting and relaxing to effect body movement.

- *Total Number of Muscles* : There are about 630 important muscles in the human body, which normally account for 40% of the body weight.
- *Largest Muscle*: The bulkiest muscle in the body is gluteus maximus or the buttock muscle.
- *Longest Muscle*: Sartorius is the longest muscle in the body which originates in the upper part of the hip bone and is attached to the tibia bone of the leg.
- *Smallest Muscle*: Stapedius muscle in the middle ear ? it measures less then 1/20 of an inch.

Main Organs

Skin: Skin covers the muscles of the body and is said to be the largest organ of the human body. In an adult man skin cover is about 1.9 sq m (20 sq. ft) and a woman has about 1.6 sq.m (17 sq. ft) of skin.

Heart: The heart is situated in the centre of the thorax, just behind the breast the breast-bone (sternum) weight is about 340 grams in men and 225 grams in women. Contraction and relaxation mechanism of the ventricles results in a heart beat of about 70-72/min in males and 78-82 min in females. Contraction of ventricles is called systole and relaxation is called diastole. The heart regulates circulation of blood in the body.

Lungs: A pair of spongy organs consisting of elastic tissues situated in the chest cavity. There are two lungs, the right lung is larger than the left. Together they weigh between 1.18 and 1.19 kg in a healthy adult. Their main function is to purify blood and supply oxygen to it. The entire blood supply (4.5 to 5 liters) washes through the lungs about once a minute.

Liver: The liver, situated on the right side of the stomach is the largest gland in the human body. It weighs around 8812 grams. The gall bladder is attached to the liver and stores bile produced by it. The liver is responsible for the metabolism of the products of digestion and storage and release of substances (principally glucose) so as to maintain constant level in the blood.

Kidneys: The two Kidneys are situated in the upper posterior of the abdominal cavity, one on each side of the vertebral column. Each kidney is approximately 10 cm long, 5 cm wide and 2.5 cm thick. They filter nitrogenous waste of the body from the blood and throw it out in the form of urine.

Human Brain: Consists of two parts: the brain located in the skull and the spinal cord located in the vertebral column.

- The weight of the average human brain triples between birth and adulthood. The final weight of the brain in an adult male is about 1.4 kg (and 1.3 kg in the case of a woman) which averages about 3% of the body weight.
- The Brain uses about 20% of the oxygen a man breathes, 20% of calories a man takes in, and about 15% of body blood.

Central Nervous System: The brain along with spinal cord constitutes the nervous system. The brain consists of

1. Cerebrum: The largest part of the brain consisting of two hemispheres which control voluntary actions and are the seat of intelligence, memory association, imagination and will.
2. Cerebellum: The large mass having ridges and furrows attached to cerebrum which regulates muscular movement of locomotion.
3. Medula Oblongata: The lowermost part of the brain which continues as the spinal cord in the vertebral columns. It controls involuntary actions.