# Chapter 30 – Human Anatomy and Physiology Skin, Bones, Muscles

1. Overview
   1. Anatomy: The study of \_\_\_\_\_ of an organism and its parts.
   2. Physiology: the study of the \_\_\_\_\_ of an organism and its parts.
   3. “Structure Fits Function”
   4. The Human Body consists of a HIERARCHY of levels of organization:

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and organism.

1. Tissues
   1. Germ layers 🡪 \_\_\_\_\_
      1. Ectoderm

\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,\_\_\_\_\_, \_\_\_\_\_

* + 1. Mesoderm

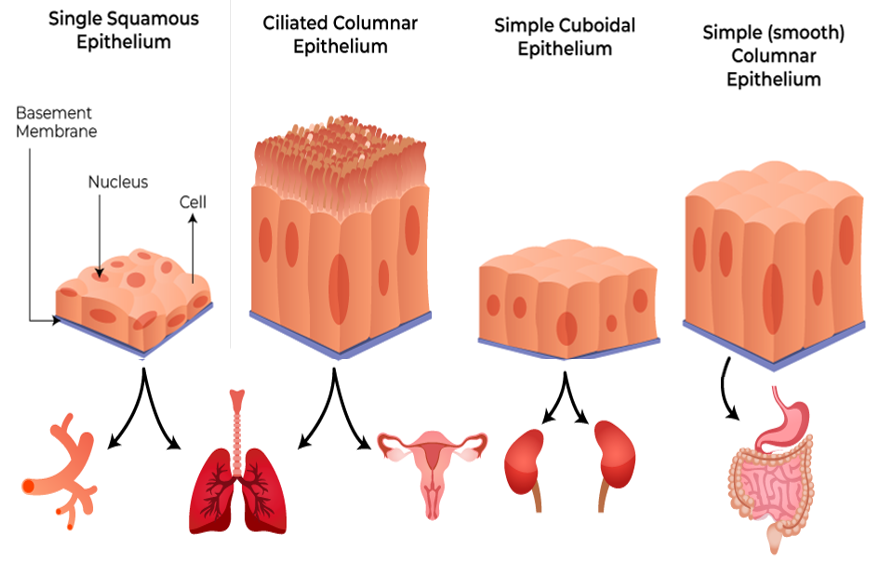
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_,\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

* + 1. endoderm

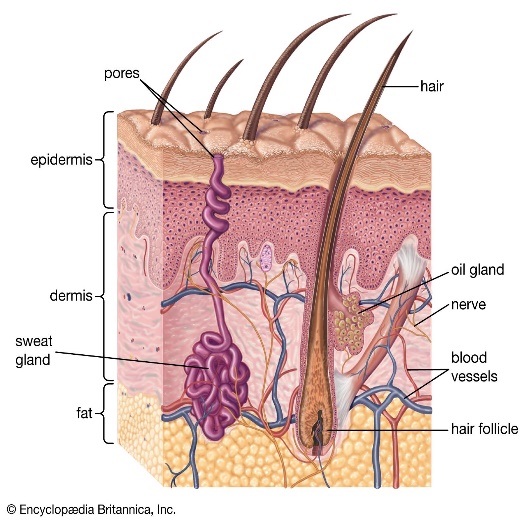
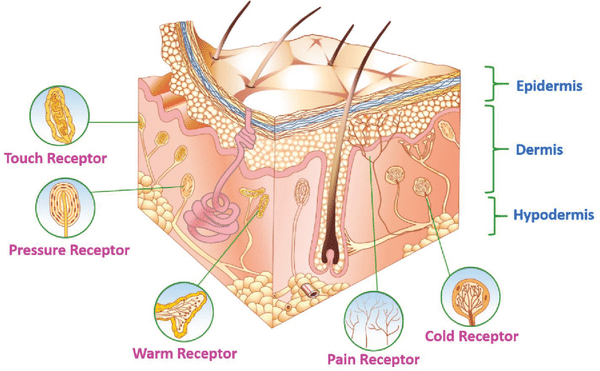
Lining of the \_\_\_\_\_ \_\_\_\_\_ and \_\_\_\_\_ tract; \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

* 1. 4 main types of tissues

3. 1. E\_\_\_\_ Tissue
4. Cover body surfaces, lining \_\_\_\_\_ organs & cavities.
   * Apical cells face the interior cavity.
5. Epithelial cells come in three shapes:
6. \_\_\_\_\_, like a fried egg.
7. \_\_\_\_\_, as tall as they are wide.
8. \_\_\_\_\_, taller than they are wide.



1. **S**\_\_\_\_\_
2. Skin \_\_\_\_\_ internal organs, regulates body \_\_\_\_\_, and \_\_\_\_\_ sweat (liquid waste).
3. Skin \_\_\_ protects from pathogens (bacteria, fungi) & hydrates the skin.
4. \_\_\_\_\_ glands control body temperature (forehead, armpits, palms, soles).
5. Skin \_\_\_\_\_ is determined by melanin.
6. \_\_\_\_\_ serves as protection (from sun), sensory input & detection, thermoregulation, communication, and beauty.
7. Special sensory cells in the \_\_\_\_\_ detect \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and touch.
8. The \_\_\_\_\_ receptors are near the \_\_\_\_\_ glands.
9. Cold and touch receptors are near the \_\_\_\_\_ follicle (“goose bumps”).
10. Pain receptors are embedded in the \_\_\_\_\_ layer.
11. Touch, pain, and cold are nearer the epidermis while pressure receptors are deeper in the dermis.

1. C\_\_\_\_\_ Tissue
2. \_\_\_\_\_ and supports other tissues
3. Six major types:
4. L\_\_\_\_\_ Connective Tissue
   * + is the most widespread.
     + consists of ropelike \_\_\_\_\_ and elastic fibers that are strong and resilient.
     + helps to join \_\_\_\_\_ to underlying tissues.
5. F\_\_\_\_\_ Connective Tissue
   * + has \_\_\_\_\_ packed collagen fibers.
     + forms Tendons that attach \_\_\_\_\_ to \_\_\_\_\_.
6. A\_\_\_\_\_ Tissue

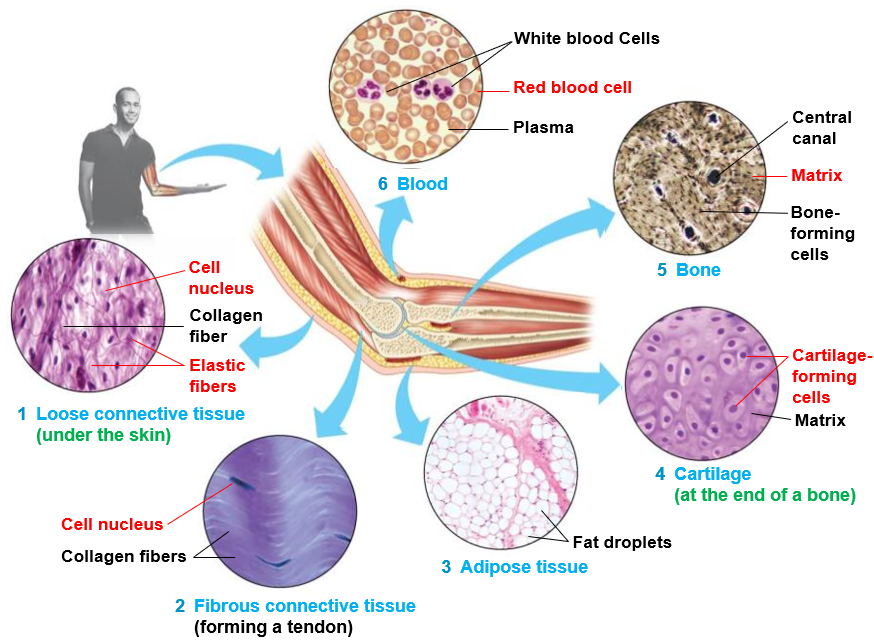
* stores \_\_\_ in large, closely packed cells held in a matrix of fibers.

1. C\_\_\_\_\_
   * + is a strong and \_\_\_\_\_ \_\_\_\_\_ material.
     + commonly surrounds the ends of bones.
2. B\_\_\_\_\_

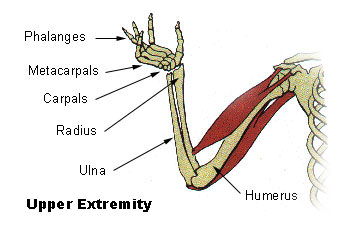
* O\_\_\_\_\_ secrete collagen fibers embedded in a hard mineral substance containing calcium, magnesium, and phosphate.

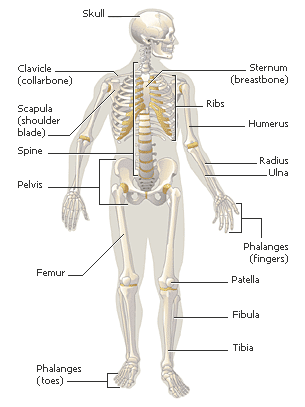
1. B\_\_\_\_\_

* \_\_\_\_\_ substances throughout the body.



1. **Skeleton**
2. P\_\_\_\_\_ – Soft, thin covering; protection.
3. \_\_\_\_\_ Bone – Touch, hard; regrows.
4. \_\_\_\_\_ Bone – Contains red marrow; red blood cells (RBC’s).
5. M\_\_\_\_\_ – Soft, inner center; blood vessels, fat.
6. \_\_\_ Bone Marrow – Red & White \_\_\_\_\_ cells, \_\_\_\_\_.
7. \_\_\_\_\_ Bone Marrow **–** \_\_\_ & mineral storage, stem cells 🡪 \_\_\_\_\_, fat, bone cells.
8. The skeletal system works as a \_\_\_\_\_ structure for the body.
9. It gives the body its \_\_\_\_\_, allows \_\_\_\_\_, makes \_\_\_\_\_ cells, provides \_\_\_\_\_ for organs and stores minerals.
10. The skeletal system is also called the musculoskeletal system.





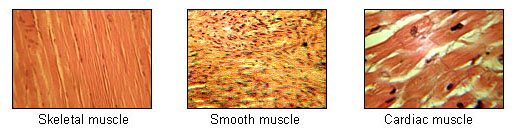
Cranium

Mandible (lower jaw)

Ilium

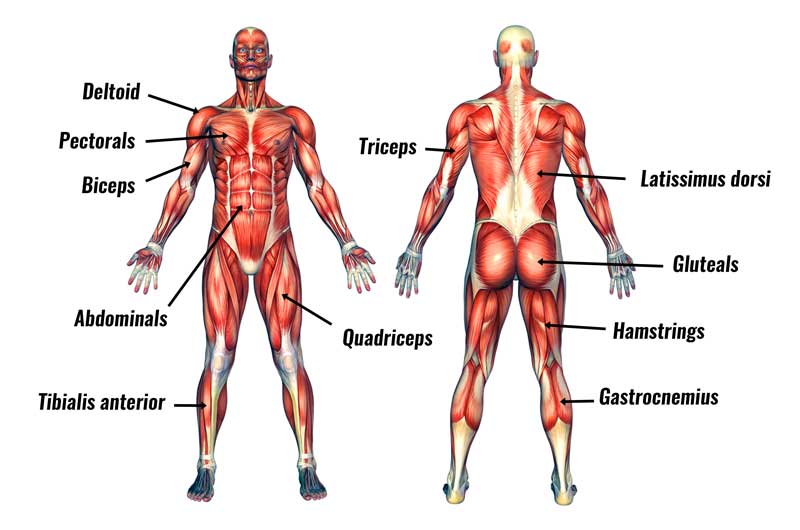
Ischium

1. Joints
2. Ball & \_\_\_\_\_ – Shoulder, hip; greatest movement
3. G\_\_\_\_\_ – Wrist; foot; bones slide over each other.
4. H\_\_\_\_\_ – Elbow, knee; one plane
5. S\_\_\_\_\_ – Thumb; middle ear; sterno-clavicle joint of thorax; heel; stability; flexibility
6. \_\_\_\_\_ bind muscle to bone; \_\_\_\_\_ bind bone to bone.
7. **Muscle Tissue**



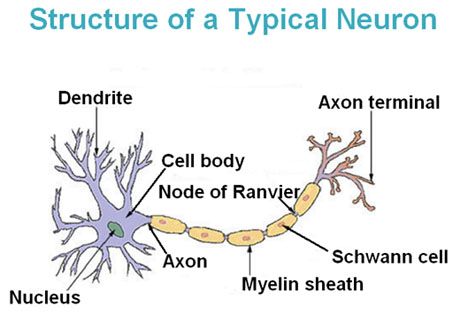
* 1. The muscular system is responsible for the \_\_\_\_\_ of the human body. There are three (3) main types of muscle tissue.
  2. Attached to the bones of the skeletal system are about 700 named muscles that make up roughly half of a person’s body weight. Each of these muscles is a discrete organ constructed of skeletal muscle tissue, blood vessels, tendons, and nerves.
  3. Muscle tissue is also found inside of the heart, digestive organs, and blood vessels. In these organs, muscles serve to move substances throughout the body.
  4. S\_\_\_\_\_ Muscle

1. Skeletal muscle is the only \_\_\_\_\_ muscle tissue in the human body — it is controlled \_\_\_\_\_.
2. Every physical action that a person consciously performs (e.g. speaking, walking, or writing) requires skeletal muscle.
3. Skeletal muscle is anchored by \_\_\_\_\_ to \_\_\_\_\_ and is used to affect [skeletal](file:///E:\wiki\Skeleton) movement such as [locomotion](file:///E:\wiki\Locomotion) and in maintaining posture.
4. Most skeletal muscles are attached to two bones across a joint.
5. An average adult male is made up of 40–50% of skeletal muscle and an average adult female is made up of 30–40%.



* 1. V\_\_\_\_\_ “\_\_\_\_\_” Muscle

1. Visceral muscle is found \_\_\_\_\_ of organs like the esophagus, \_\_\_\_\_, \_\_\_\_\_, bronchi, \_\_\_\_\_, & \_\_\_\_\_ vessels.
2. The \_\_\_\_\_ of all muscle tissues, visceral muscle makes organs contract to move substances through the organ.
3. Because visceral muscle is controlled by the \_\_\_\_\_ part of the brain, it is known as \_\_\_\_\_ muscle—it cannot be directly controlled by the conscious mind.
4. The term “smooth muscle” is often used to describe visceral muscle because it has a very smooth, uniform appearance when viewed under a microscope.
   1. C\_\_\_\_\_ Muscle
5. Found only in the \_\_\_\_\_, cardiac muscle is responsible for pumping blood throughout the body.
6. Cardiac muscle tissue cannot be controlled consciously, so it is an \_\_\_\_\_ muscle.
7. The cells of cardiac muscle tissue are \_\_\_\_\_ — that is, they appear to have light and dark stripes when viewed under a light microscope.
8. Striations indicate that a muscle cell is very strong, unlike visceral muscles.
9. N\_\_\_\_\_ Tissue
10. Communication with other tissues through \_\_\_\_\_ signals (Action Potentials).
11. \_\_\_\_\_: Basic Unit of Nervous System.



1. Organ Systems – work together to perform life’s functions.

A. The C\_\_\_\_\_ System

* + delivers \_\_\_\_\_ and \_\_\_\_\_ to body cells.
  + transports \_\_\_\_\_ \_\_\_\_\_ to the lungs.
  + carries metabolic \_\_\_\_\_ to the kidneys.

B. The \_\_\_\_\_ System

* + exchanges \_\_\_\_\_ with the environment.
  + supplying the blood with oxygen.
  + disposing of carbon dioxide.

C. The \_\_\_\_\_ System

* (outer layer of \_\_\_\_\_, nails, hair) which acts as a physical barrier, protecting against
  + physical \_\_\_\_\_.
  + \_\_\_\_\_ (bacteria, fungus).
  + excessive heat or \_\_\_\_\_.
  + \_\_\_\_\_ out.

D. The \_\_\_\_\_ System

* + supports the body.
  + protects organs such as the brain and lungs.
  + provides the framework for muscle movement.

E. The \_\_\_\_\_ System

* + moves the body.
  + maintains \_\_\_\_\_.
  + produces heat.

F. The \_\_\_\_\_ System

* + removes waste products from the blood.
  + excretes \_\_\_\_\_.
  + regulates the chemical makeup, pH, and water balance of blood.

G. The \_\_\_\_\_ System

* + ingests and \_\_\_\_\_ food.
  + absorbs nutrients.
  + eliminates undigested material.

H. The \_\_\_\_\_ System

* secretes \_\_\_\_\_ that regulate body activities.

I. The \_\_\_\_\_ and \_\_\_\_\_ Systems protect the body from \_\_\_\_\_ and cancer.

* The lymphatic system also returns excess body fluid to the circulatory system.

J. The \_\_\_\_\_ System coordinates body activities by

* + detecting \_\_\_\_\_.
  + integrating information.
  + directing responses.

K. The \_\_\_\_\_ System produces

* + gametes (\_\_\_\_\_ and \_\_\_\_\_ cells).
  + sex hormones.

L. The Female Reproductive System

* + supports a developing embryo.
  + produces \_\_\_\_\_.

IV. Regulating Internal Environment

A. H\_\_\_\_\_

1. Homeostasis is the active maintenance of a \_\_\_\_\_ state within the body.
2. External environmental conditions may fluctuate wildly.
3. Homeostatic mechanisms regulate \_\_\_\_\_ conditions.

B. Control systems

1. \_\_\_\_\_ change.
2. directs responses.

C. \_\_\_\_\_ -\_\_\_\_\_ mechanisms

1. keep internal variables steady.
2. permit only \_\_\_\_\_ fluctuations around set points.

