

ITM International Massage school Amsterdam

The tissues of the human body



What is Human Body Tissue? - Definition, Types & Examples

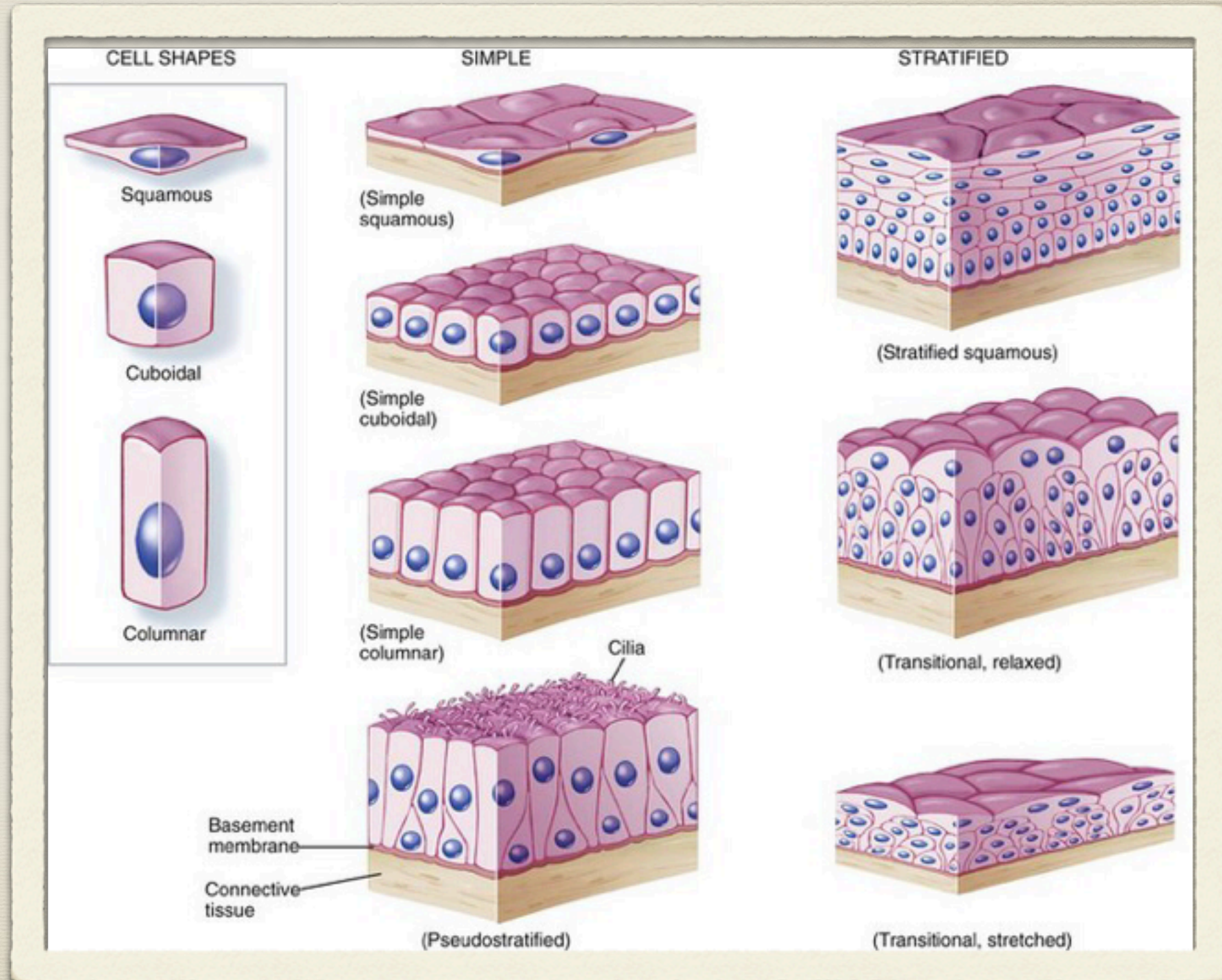
What is Human Body Tissue

If you were to try to explain to someone what your body is made of, you might say two arms, two legs, feet and hands, a head and a torso. Or, you may go to the other extreme and say that you are made up of billions of cells. Both answers would be correct. However, there is a more specific way to describe what makes up a body. We are composed of several different types of human body tissue. But what exactly does that mean?

Human body tissue is another way of describing how our cells are grouped together in a highly organized manner according to specific structure and function. These groupings of cells form tissues, which then make up organs and various parts of the body. For example, it is easy to see and feel muscle in the body. Muscle is one of the four types of human body tissue. In this lesson, learn more about the types of tissue and how each functions for a different purpose.

Epithelial Tissue

- * Epithelial tissue is made up of epithelial cells, which are vastly different from the muscle cells we just talked about. These cells can be flat, cuboidal, or columnar. They are joined tightly together, making a single or stacked continuous sheet. Like a quilt that is tightly stitched, epithelium makes an excellent protective cover for the body, in the form of skin. Epithelial tissue can also be found lining some internal cavities and organs.



Epithelial Tissue



Connective tissues

Connective tissue (CT) is one of the four types of biological tissue that supports, connects or separates different types of tissues and organs in the body. It develops from the mesoderm. The other three types are epithelial, muscle, and nervous tissue. Connective tissue is found in between other tissues everywhere in the body, including the nervous system. In the central nervous system, the three outer membranes (the meninges) that envelop the brain and spinal cord are composed of connective tissue.

All connective tissue consists of three main components: fibers (elastic and collagenous fibers), ground substance and cells. Blood and lymph lack the fiber component. All are immersed in the body water.

The cells of connective tissue include fibroblasts, adipocytes, macrophages, mast cells and leucocytes.

Connective tissue

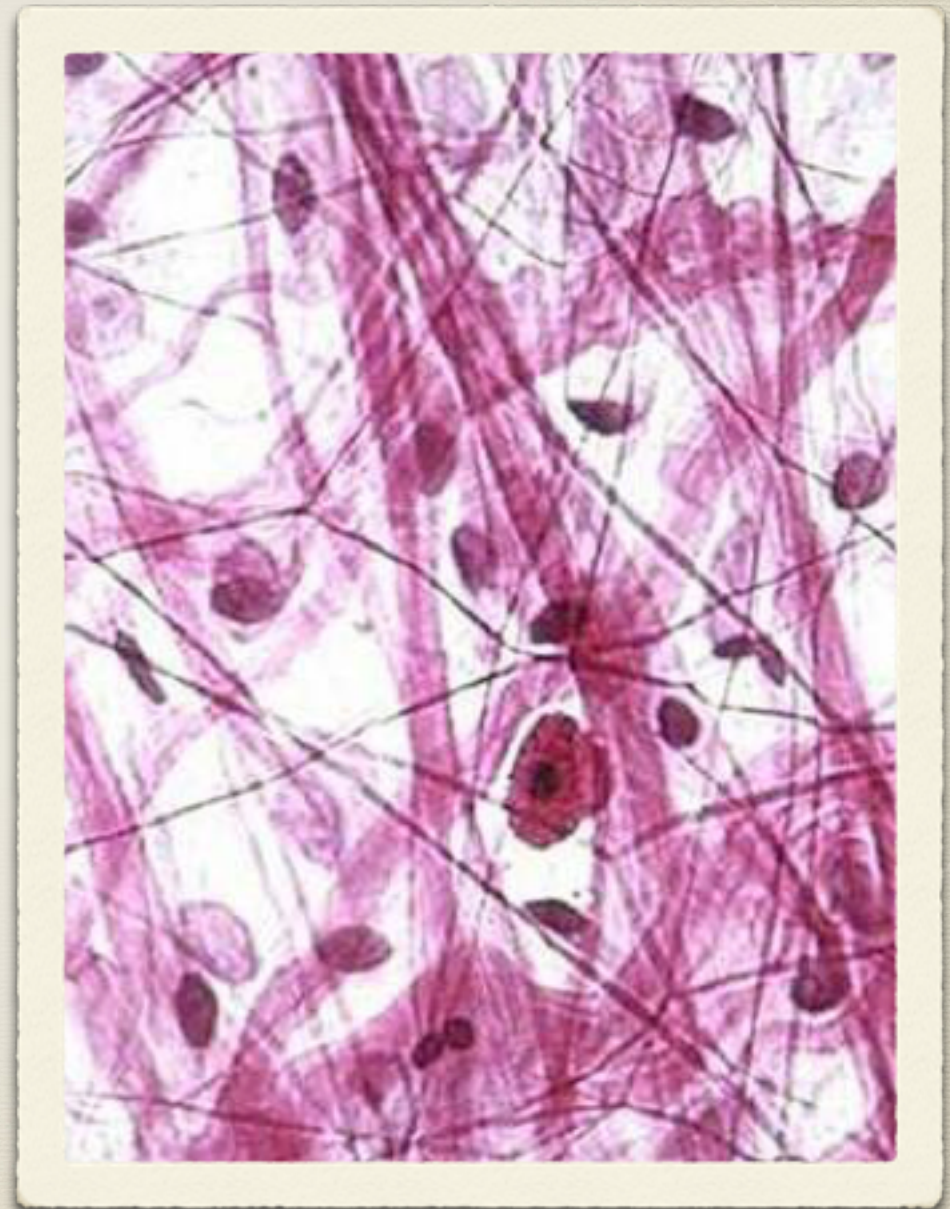
Target: I can describe the structure, location, & function of the various types of connective tissue.

Classification of Connective Tissue



Loose Connective Tissue

- * Three types of loose connective tissue are recognized. These include areolar, adipose, and reticular types. Areolar and adipose are the most abundant types and these are typically found together in most body locales where blood vessels, nerves, ducts, and other structures are passing through tissues.



Areolar Connected Tissue

- * Areolar CT is primarily composed of fibroblasts and a mix of collagen, elastin, and reticular fibers (depending on the location). Since this tissue is composed of only cells and fibers in a loose arrangement there is a lot of space to work with. Blood vessels, nerves and glands can form networks within areolar CT. This is an especially important feature to have when you find this directly under the basement membrane of epithelial CT. Remember that epithelial cells are tightly packed and have no direct blood supply so they must rely on blood from down below the basement membrane.

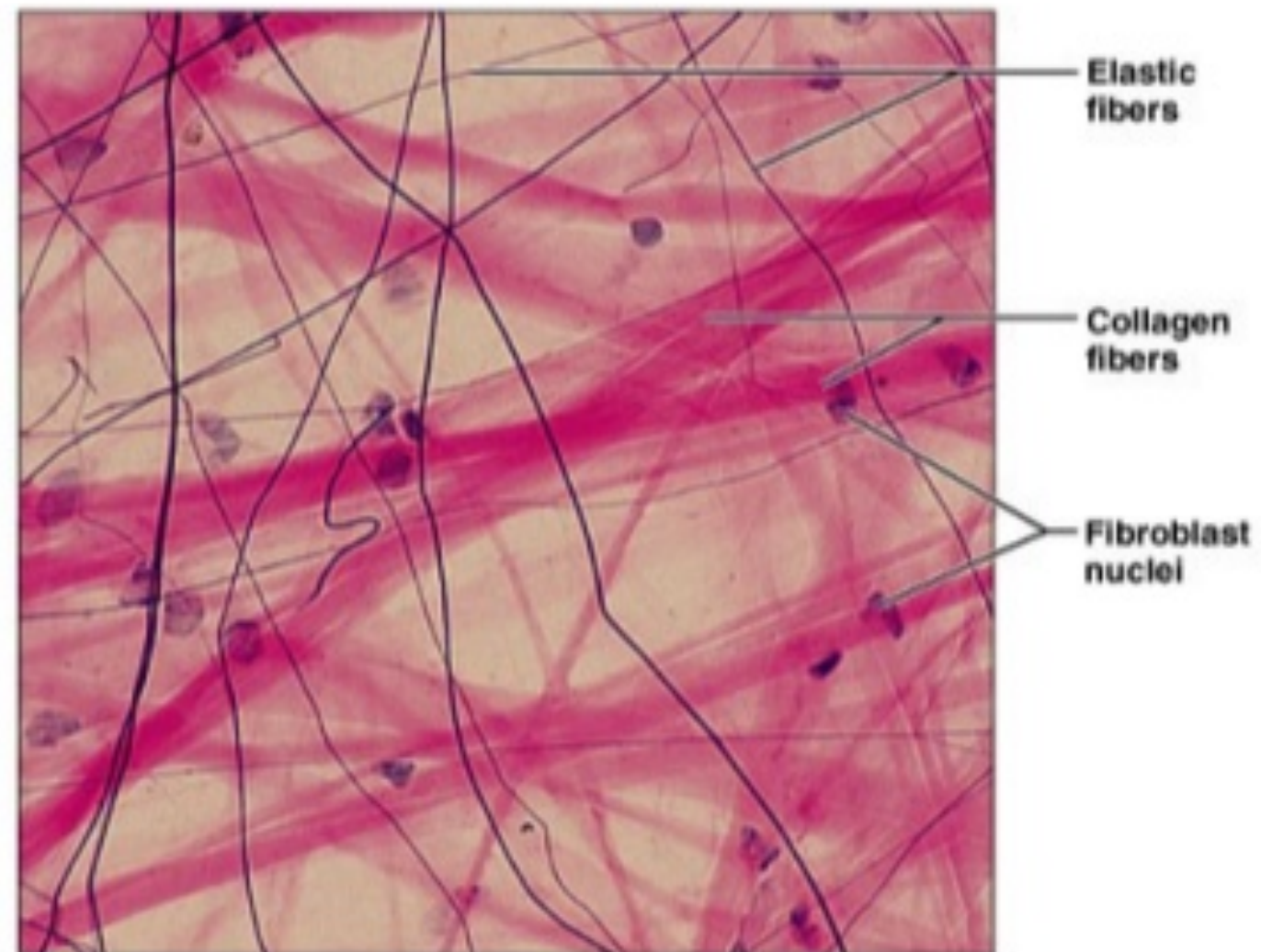
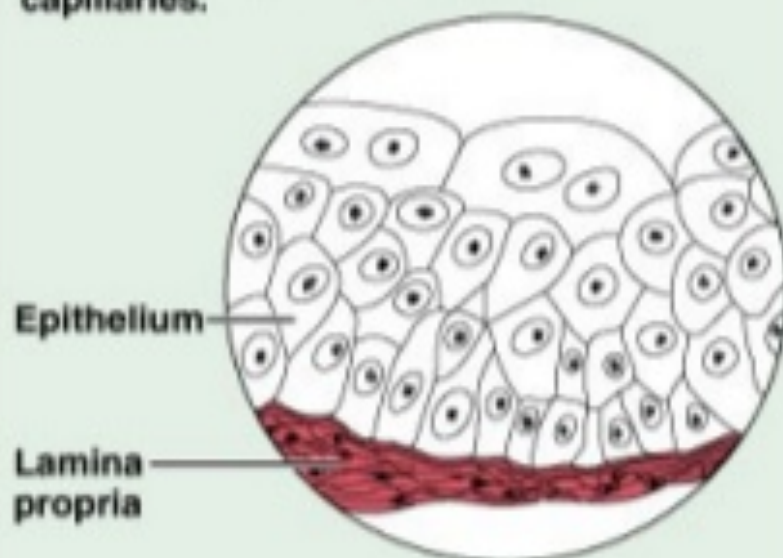
Areolar Connective Tissue

(b) Connective tissue proper: loose connective tissue, areolar

Description: Gel-like matrix with all three fiber types; cells: fibroblasts, macrophages, mast cells, and some white blood cells.

Function: Wraps and cushions organs; its macrophages phagocytize bacteria; plays important role in inflammation; holds and conveys tissue fluid.

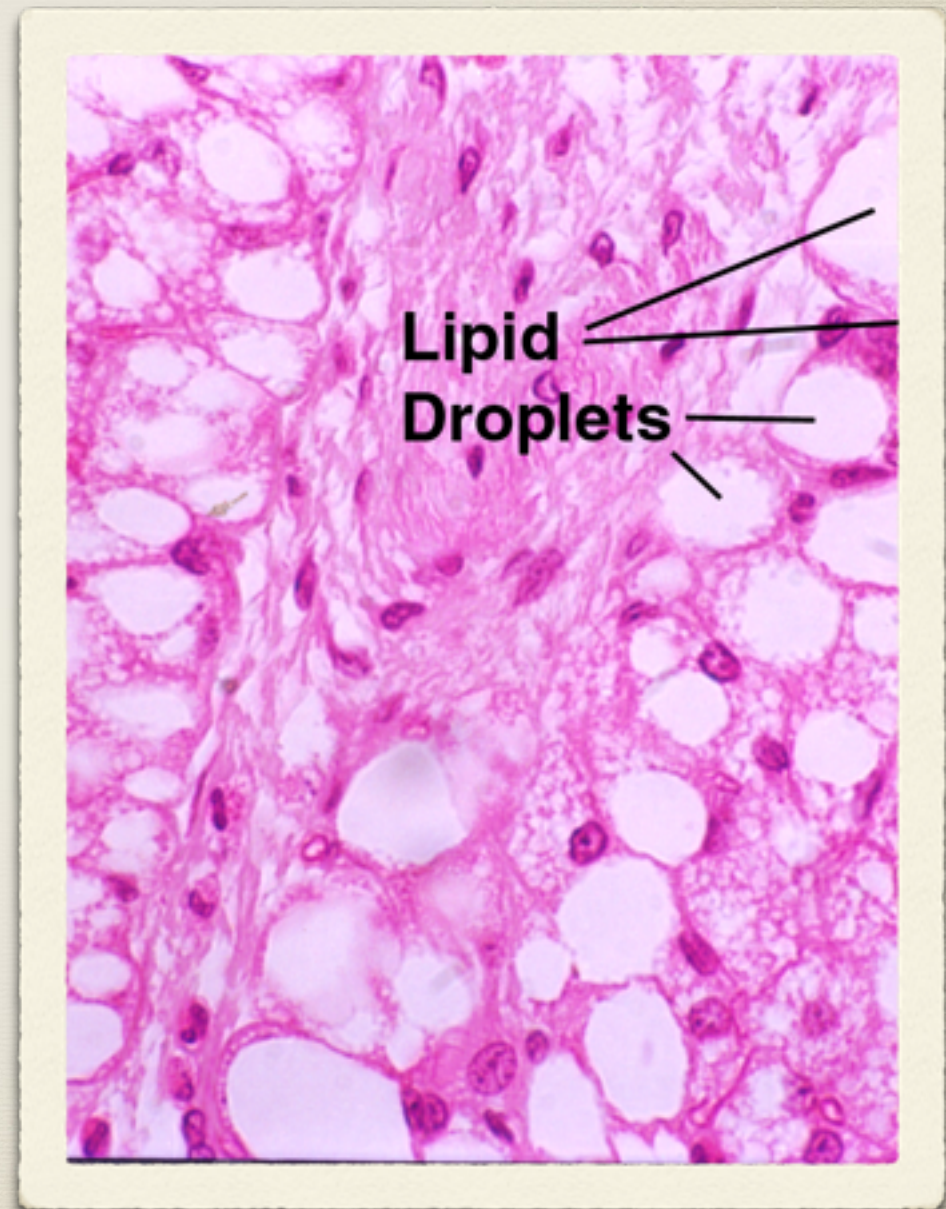
Location: Widely distributed under epithelia of body, e.g. forms lamina propria of mucous membranes; packages organs; surrounds capillaries.



Photomicrograph: Areolar connective tissue, a soft packaging tissue of the body (400 $\times$).

Adipose Connected Tissue

- * Its main role is to store energy in the form of fat, although it also cushions and insulates the body.
- * Obesity in animals, including humans, is not dependent on the amount of body weight, but on the amount of body fat - specifically adipose tissue.
- * In mammals, two types of adipose tissue exist: white adipose tissue (WAT) and brown adipose tissue (BAT).
- * Adipose tissue is primarily located beneath the skin, but is also found around internal organs.
- * In the integumentary system, which includes the skin, it accumulates in the deepest level, the subcutaneous layer, providing insulation from heat and cold.
- * Around organs, it provides protective padding.
- * It also functions as a reserve of nutrients.



Reticular Connected Tissue

- * Reticular connective tissue is named for the reticular fibers which are the main structural part of the tissue. The cells that make the reticular fibers are fibroblasts called reticular cells. Reticular connective tissue forms a scaffolding for other cells in several organs, such as lymph nodes and bone marrow. You will never see reticular connective tissue alone--there will always be other cells scattered among the reticular cells and reticular fibers.

Reticular Connective Tissue

- Reticular connective tissue supports organs.

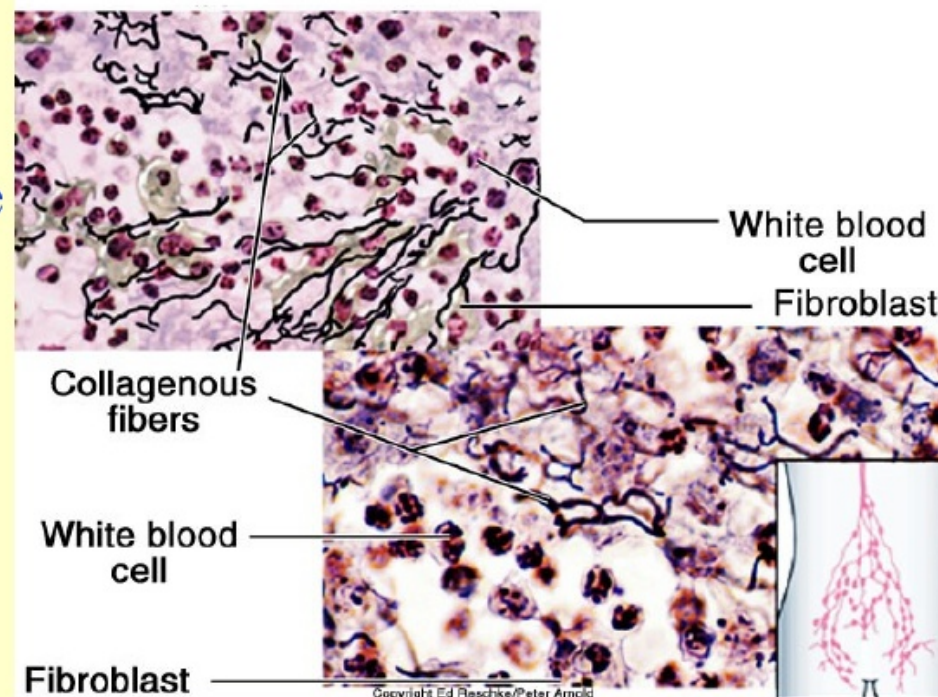
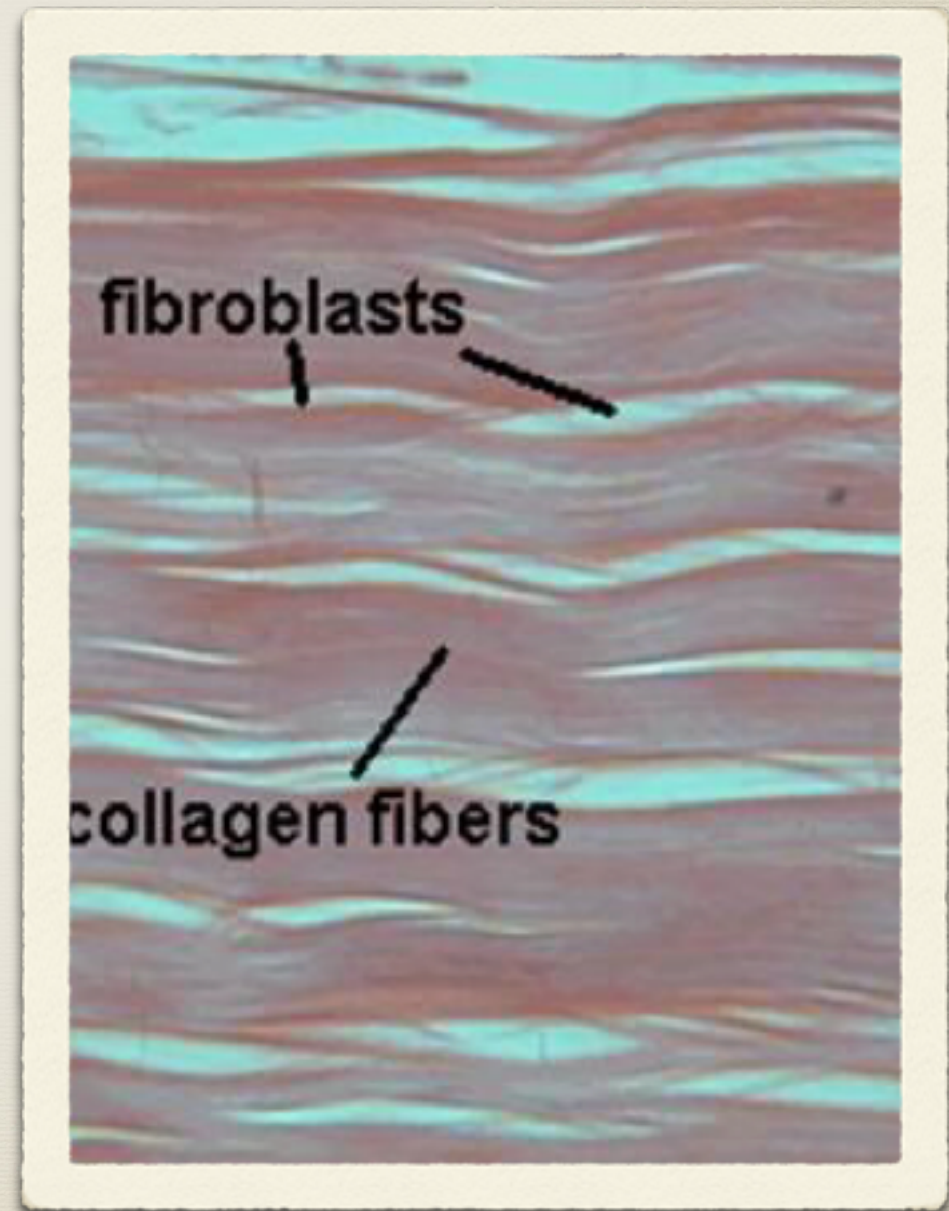


Figure 5.20

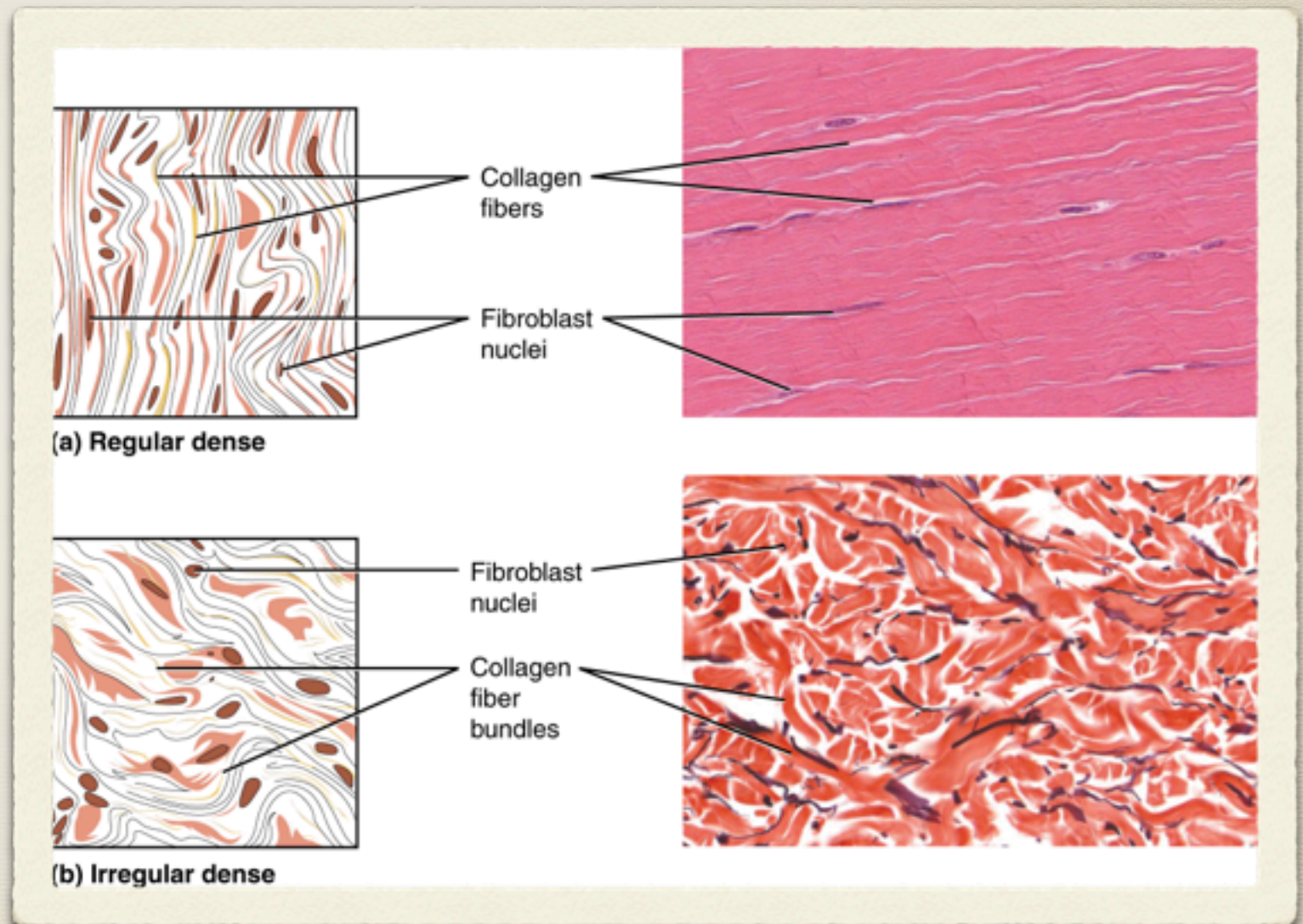
Dense Regular Connected Tissue

- * Dense regular connective tissue is an extremely important type of connective tissue that provides the structures that they bind and/or encase a great deal of protection because they are strong yet flexible. They can resist extreme pulling and stretching forces along the length of their fibers while still remaining highly pliable and flexible. You're probably most familiar with dense regular connective tissue in the form of your tendons (tissue that connects muscle to bone) and ligaments (tissue that connects bone to bone).



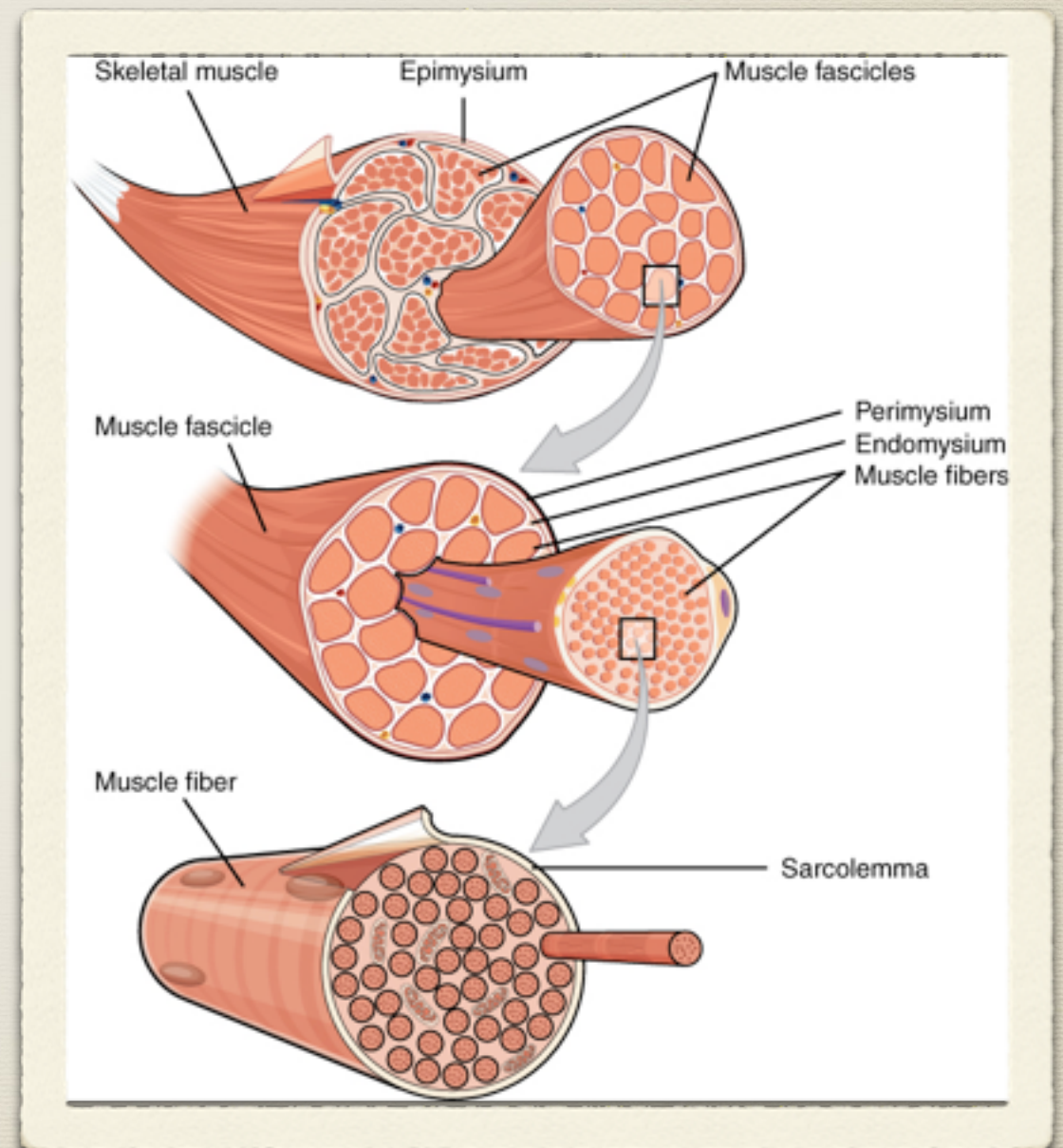
Dense irregular Connected Tissue

- * Dense irregular connective tissue has an irregular, somewhat disorderly, dense weave of thick collagen type I fibers, with bundles of fibers oriented in all directions. With its high tensile strength, dense irregular connective tissue effectively binds various tissues together to form organs and passively translates mechanical forces in all directions without tearing. Unlike loose connective tissue, it is NOT a theatre of inflammation.
- * Dense irregular connective tissue is found in several locations: the dermis of the skin, the walls of large tubular organs, such as the alimentary canal, in glandular tissue, and in organ capsules.



Muscle Tissue

- * As mentioned earlier, these different types of tissue are made of particular kinds of cells that work together. Muscle tissue is made up of excitable cells that are long and fibrous. These cells are ready for contraction, or the activation of tension in our muscles, making it possible for us to move our body parts. They are arranged in parallel lines and are bundled, making muscle tissue very strong. If you take a pile of rubber bands, line them up next to each other and attempt to stretch them, you may get the idea of the nature of the muscle tissue.



Muscle Tissue

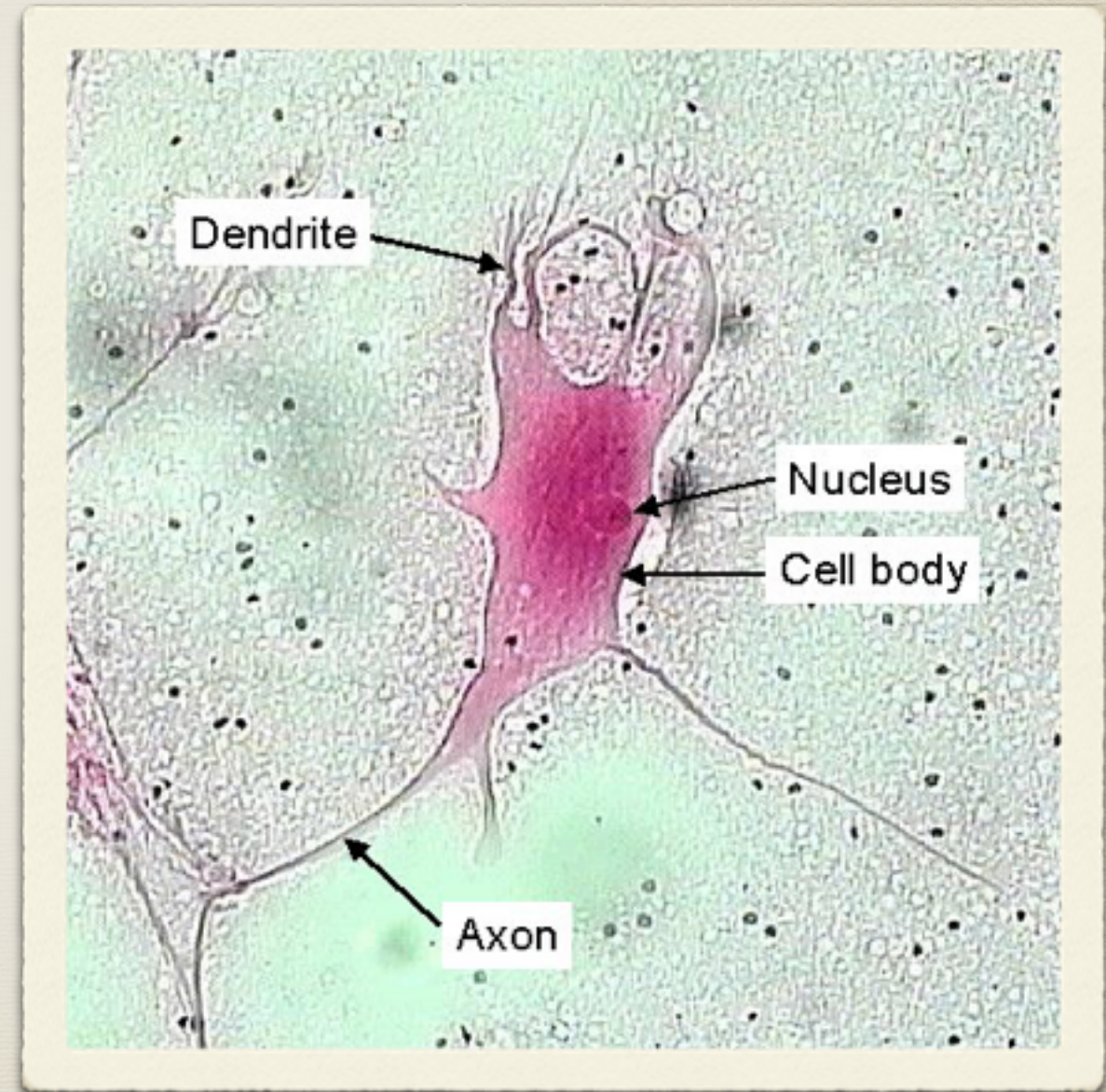


KHAN
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Presents a video by
Rishi Desai M.D.

Nervous Tissue

- * Nervous tissue or Nerve tissue is the main tissue component of the two parts of the nervous system; the brain and spinal cord of the central nervous system (CNS), and the branching peripheral nerves of the peripheral nervous system (PNS), which regulates and controls bodily functions and activity. It is composed of neurons, or nerve cells, which receive and transmit impulses, and neuroglia, also known as glial cells or more commonly as just glia (from the Greek, meaning glue), which assist the propagation of the nerve impulse as well as providing nutrients to the neuron.
- * Nervous tissue is made up of different types of nerve cells, all of which have an axon, the long stem-like part of the cell that sends action potential signals to the next cell. Bundles of axons make up the nerves.
- * Functions of the nervous system are sensory input, integration, control of muscles and glands, homeostasis, and mental activity.

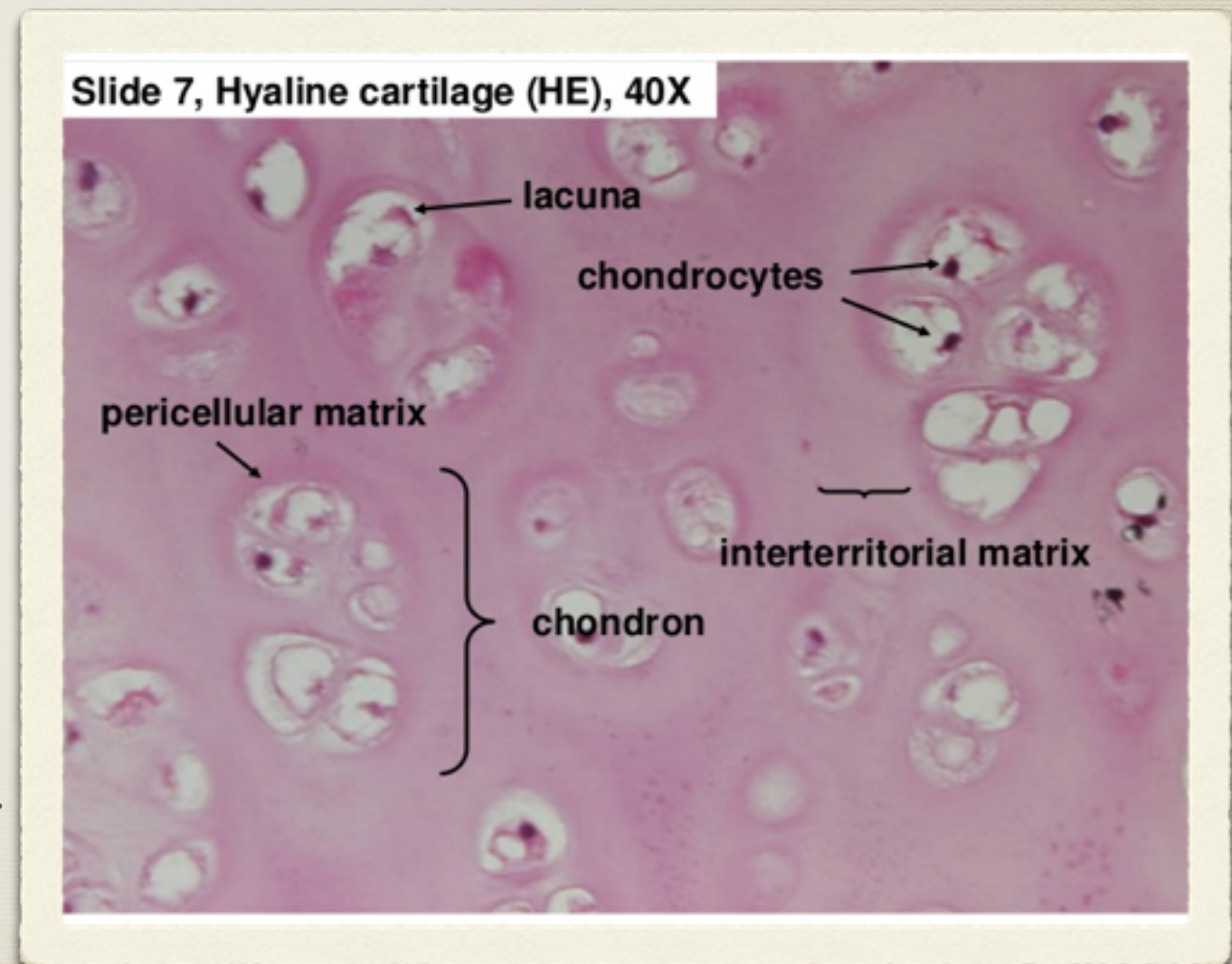


Nervous Tissue



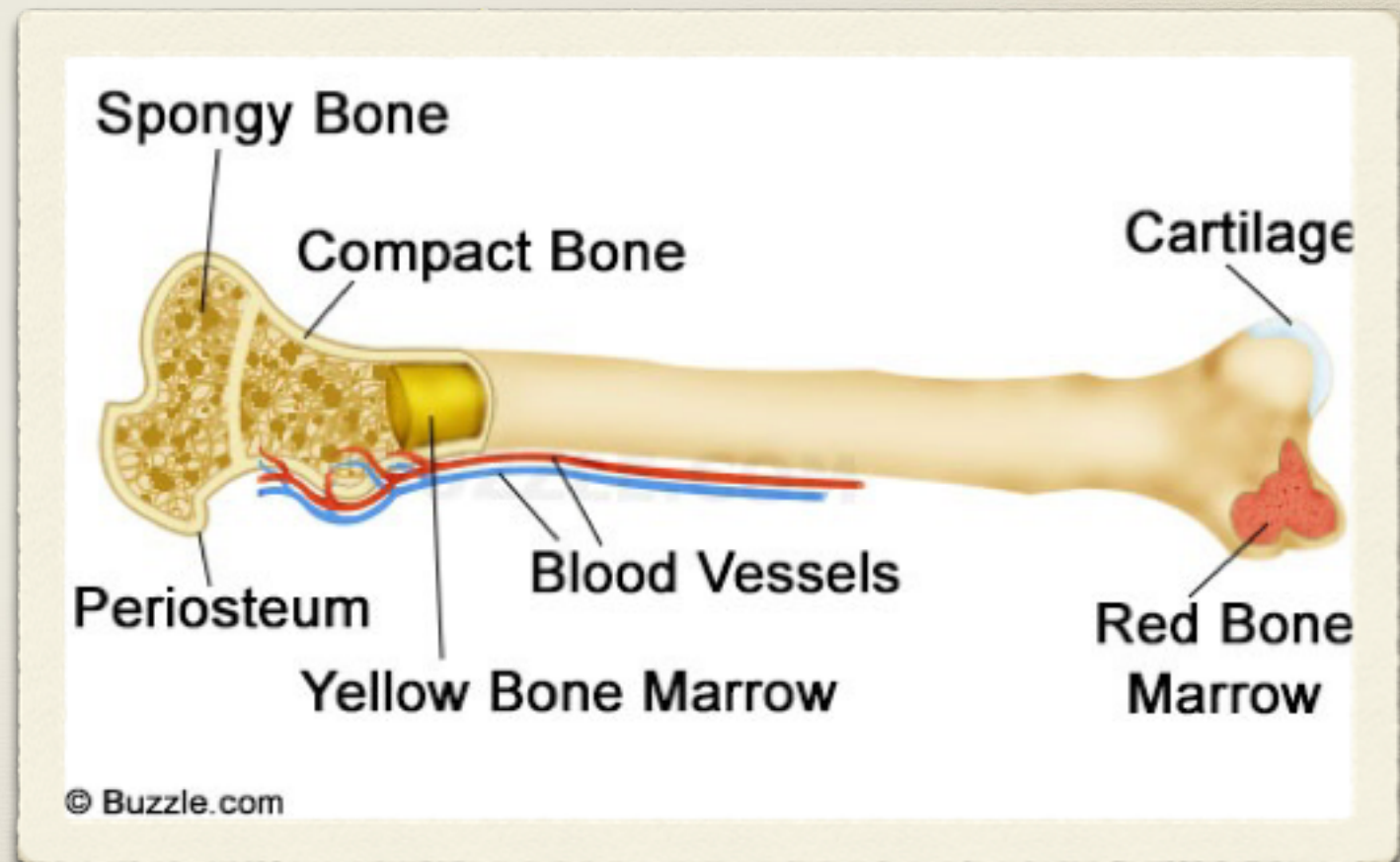
Cartilage Connective Tissue

- * The main structural components of our bodies are bone, muscle, and cartilage. Bones are rigid, while muscles bend, stretch, and are flexible. Cartilage connective tissue is the perfect halfway point between these other tissues. It is not as rigid or as hard as bone, and it is also less flexible than muscle. Therefore, we find cartilage in places where we need some support and structure, but a bit of flexibility as well. This includes places such as our joints, our ears, and our nose, as well as in between the vertebrae in our spinal column.

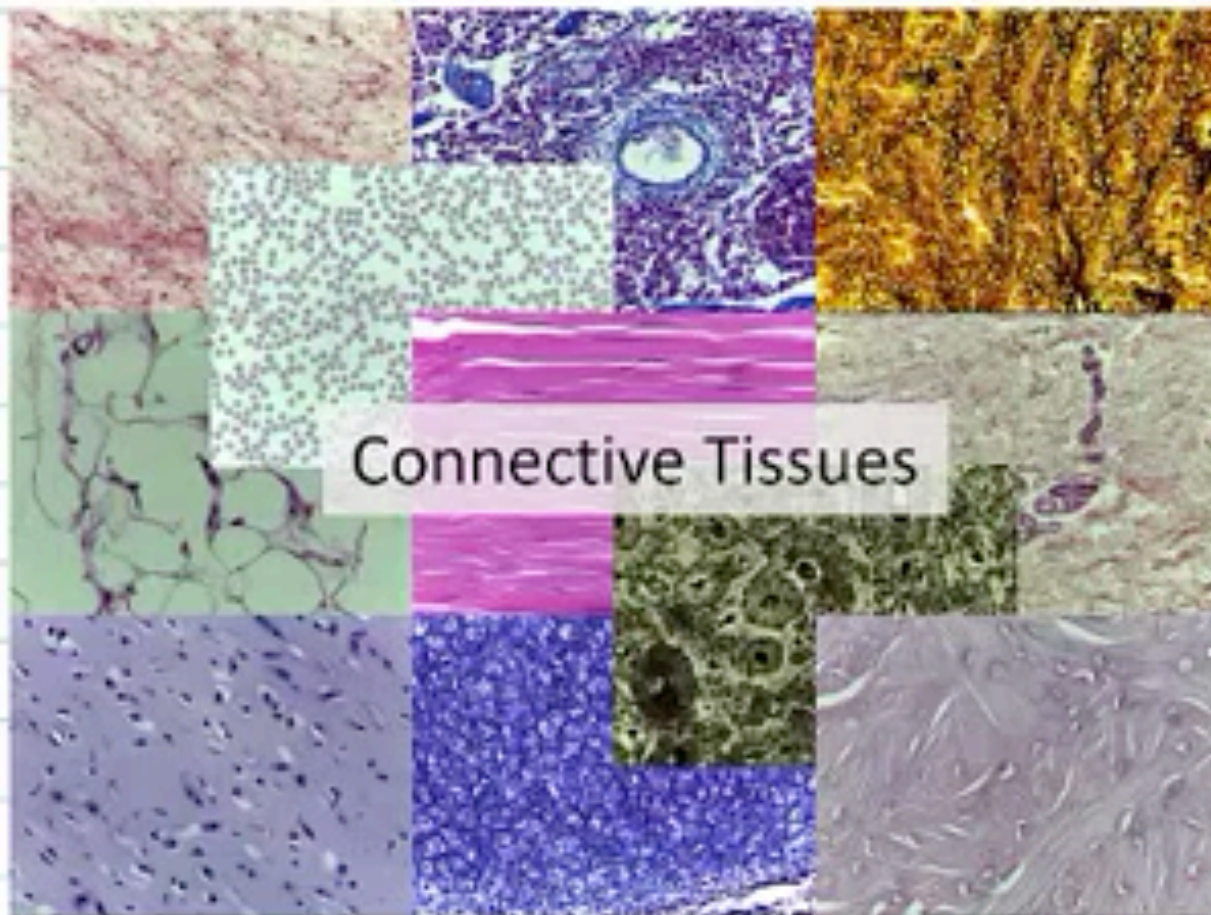


Bone Connected Tissue

- * Bone tissue is a mineralized connective tissue. It is formed by cells, called osteoblasts, that deposit a matrix of Type-I collagen and also release calcium, magnesium, and phosphate ions that ultimately combine chemically within the collagenous matrix into a crystalline mineral, known as bone mineral
- * Bone connective tissue provides structural support for other tissues such as our muscles and skin. It's a little strange to think of bone as a living tissue, but that's exactly what it is.
- * There are two main types of bone tissue, compact bone and spongy bone. Individual bones in the body can be formed from both of these types of bone tissue. The diagram on the right shows the physical structure of a typical "long bone".



Bone Connected Tissue



Blood Connected Tissue

- * Blood is a highly specialized, fluid tissue.
- * Blood is traditionally classified as a specialized form of connective tissue. To appreciate the basic unity of blood and other varieties of connective tissue, consider the following.
- * All of the several blood cell types originate in the connective tissue of bone marrow.
- * Certain white blood cells, notably lymphocytes and monocytes, move freely back and forth between blood and other connective tissues.
- * The chemical composition of plasma is very similar to that of interstitial fluid in ordinary connective tissue.
- * All connective tissue consists of cells embedded in a matrix that consists of ground substance and fibers. Blood may thus be described as connective tissue whose matrix consists of free-flowing ground substance (plasma) with no fibers.



Blood Connected Tissue

