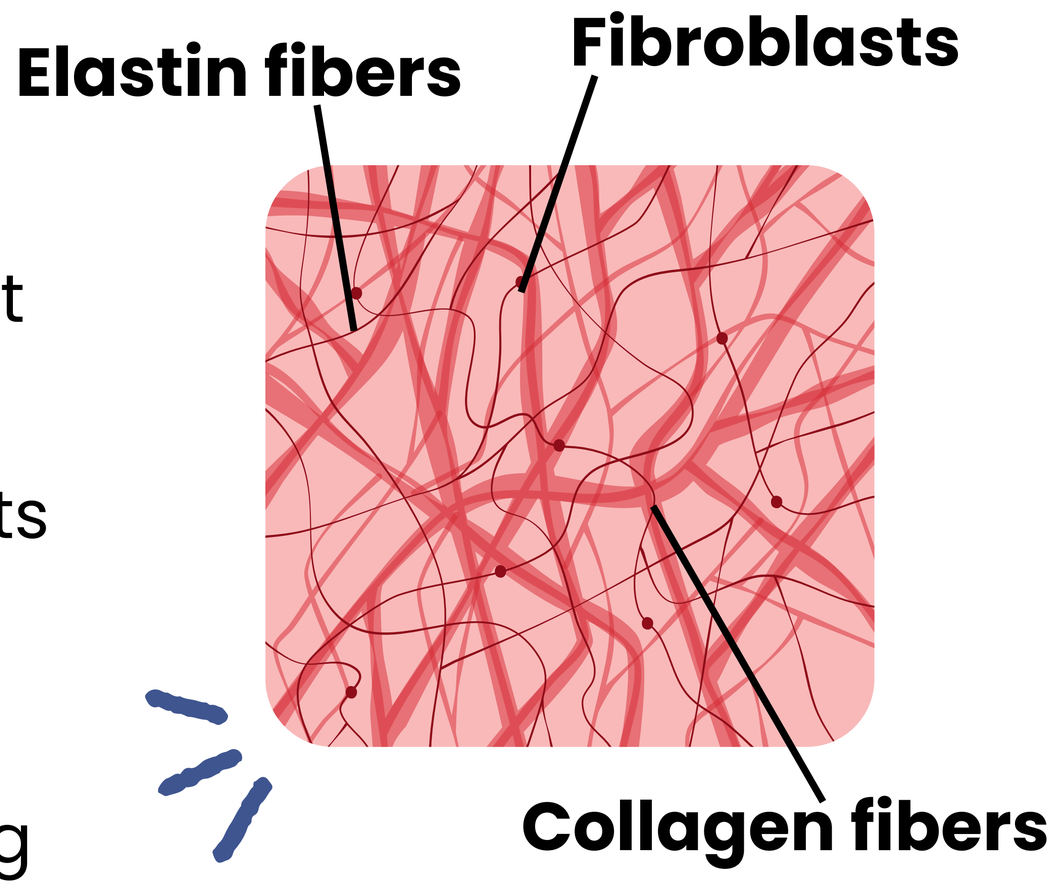
Connective TISSUE

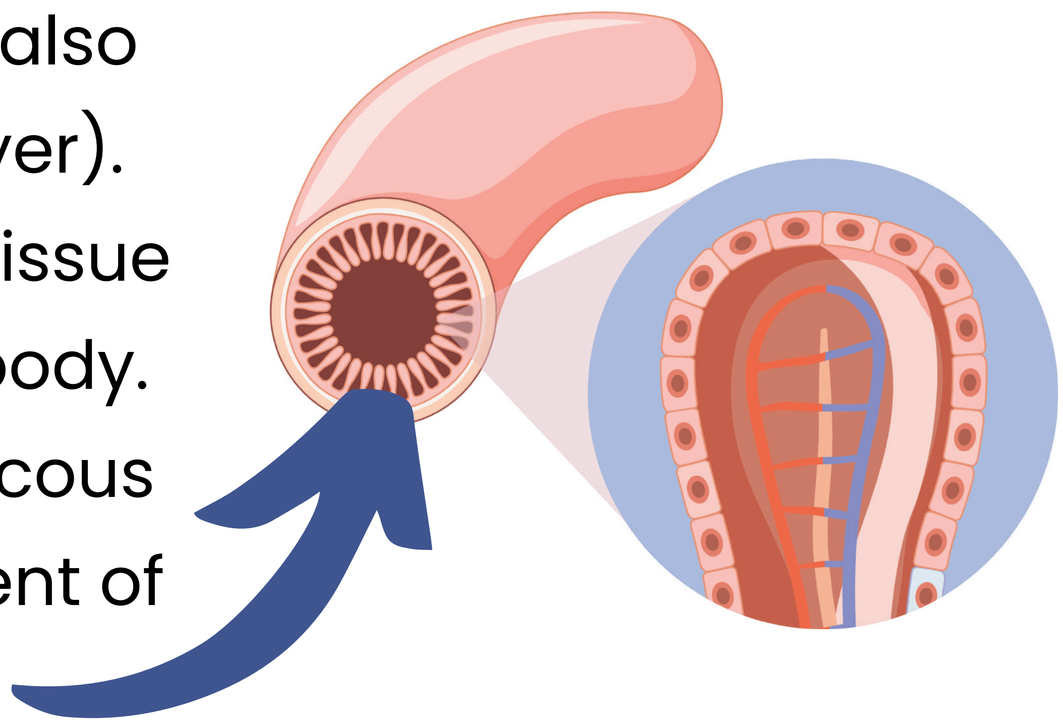
- Connective tissue provides support, protection, structure, storage, communication, and movement in the body.
- It is made up of extracellular protein fibers, specialized cells (such as fibroblasts, macrophages, adipocytes, etc.), and ground substance.
- Extracellular protein fibers provide stability and support.
  - Reticular fibers give support to soft tissues. They support the liver, bone marrow, and the lymphatic system.
  - Collagen fibers help form fibroblasts in your dermis and assist in making scars.
  - Elastic fibers provide stretch and recoil, as seen in the alveoli of the lungs.

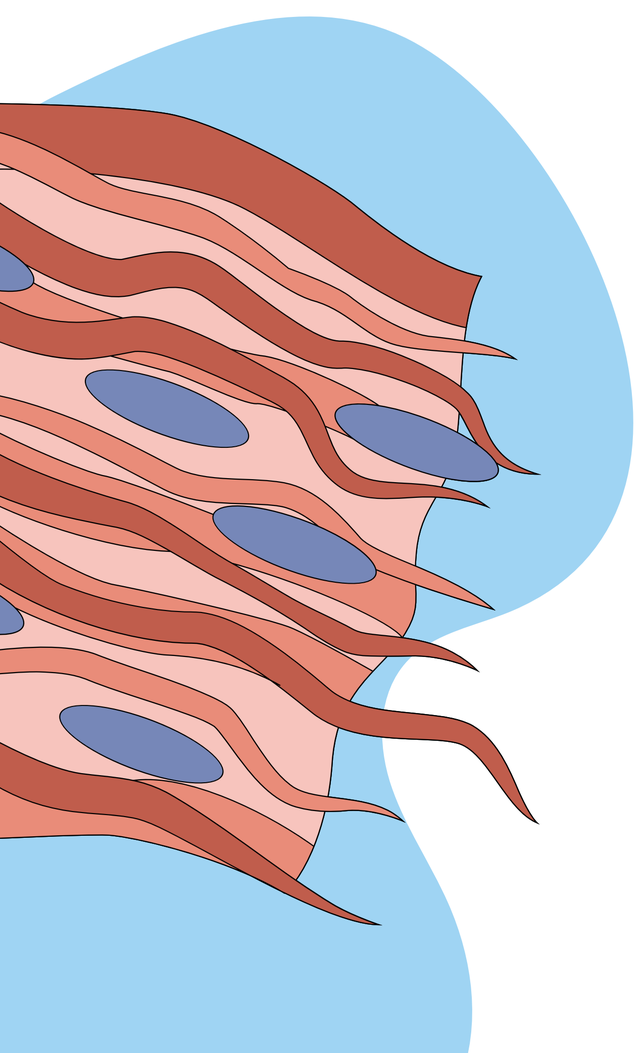
- Ground substance is a jello-like material that fills the gaps.
- It is a viscous substance due to the presence of proteoglycans and glycoproteins.
- It provides lubrication for collagen fibers.
- It also makes up a lot of the liquid tissue such as plasma.

Connective Tissue

- **Loose connective tissue**, also called areolar tissue, is made with reticular and elastic fibers and a good amount of ground substance.
  - They help with diffusion of nutrients and metabolic wastes between cells.
  - Areolar tissue is found surrounding the dermis layer of the skin, specifically in the hypodermis (also known as the subcutaneous layer). It also surrounds the epithelial tissue at all external openings of the body. This tissue, in the context of mucous membranes, is also a component of the lamina propria.



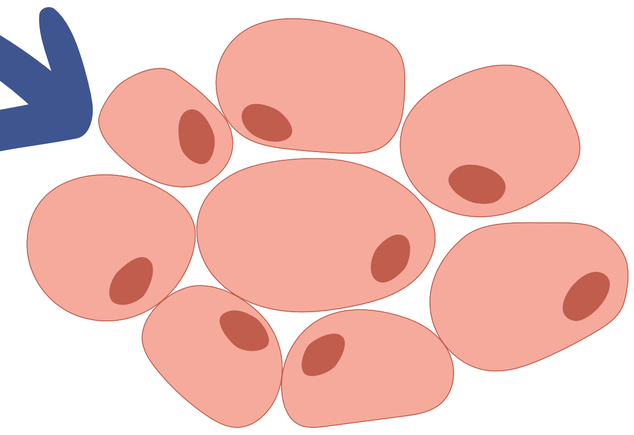


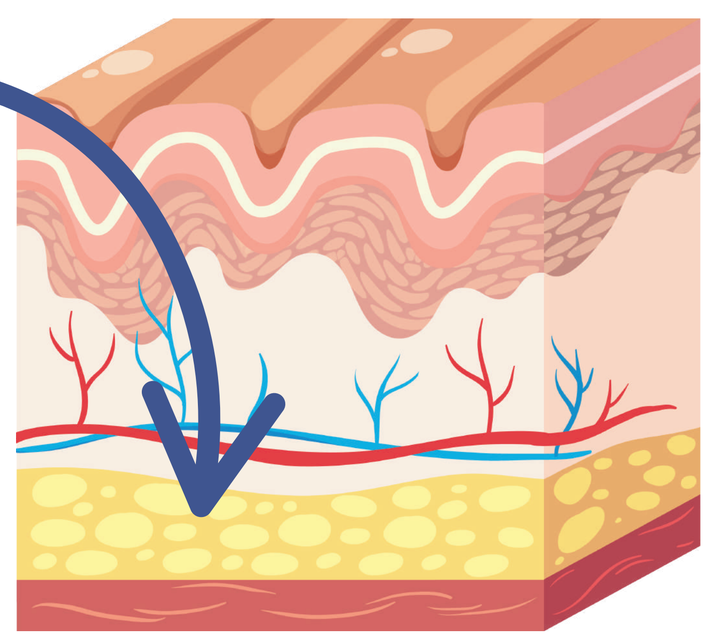


- **Elastic connective tissue** is made up of bundles of parallel elastic and collagen fibers. It also has fibroblasts.
  - Elastic fibers are made out of elastin and fibrillin. These components contain microfibrils.
    - Microfibrils provide lots of elasticity and resilience to the tissues.
  - This allows stretch and recoil, which is important in the larger arteries, lungs, skin, and penis.

Connective TISSUE

- **Adipose tissue**, also known as fat, stores leftover energy and releases it when needed.
  - It stores energy and helps insulate your body.
    - Fat is a huge help when regulating body temperature.
  - It also helps cushion your body. This protects your organs and softer/more delicate tissues.
  - Adipose tissue is found throughout the body and makes up the subcutaneous layer of tissue (a layer of fat in the hyperdermis).
  - Adipose tissue has small nuclei and large amounts of cytoplasm for storing energy.
  - Adipose tissue is made when specialized cells develop into adipocytes from the mesenchymal stem cells.
    - This happens during fetal development.
  - A thick layer of subcutaneous fat is due to an unhealthy lifestyle.



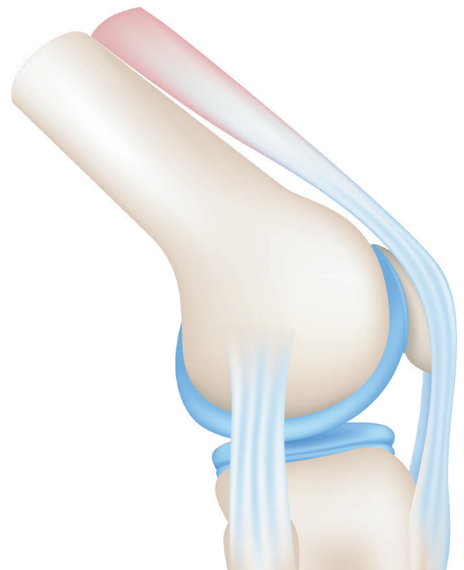


Connective TISSUE

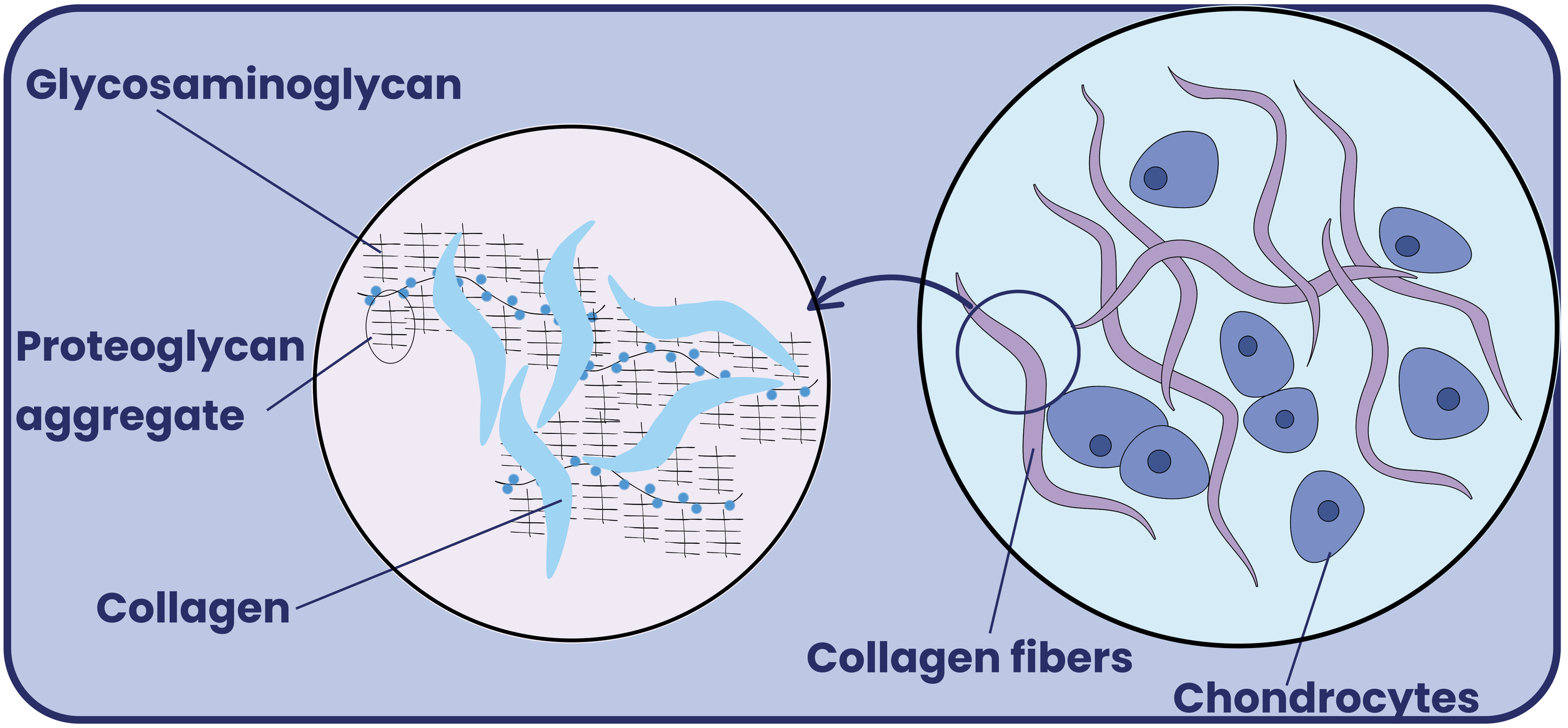
- **Dense fibrous connective tissue** is a type of connective tissue that is made with lots of collagen fibers.
  - The adjective “dense” in the name indicates that the fibers are bound so tightly together that there is no space between them.
  - It is important that these fibers be strong because dense fibrous tissue makes up the tendons, ligaments, and sclera (the connective tissue that encompasses the eyeball to maintain its structure and protects it).
  - This tissue is everywhere. It supports and protects lots of tissues and muscles.
  - It also makes up the reticular layer of the skin.
    - This is a very deep layer that makes up a lot of the dermis.
      - This gives the skin a lot of durability.

Connective TISSUE

- **Cartilage** protects your joints and bones from constant friction, wear and tear, and disintegration. The connective tissue in the cartilage acts as a shock absorber, allowing you to move without agonizing pain.



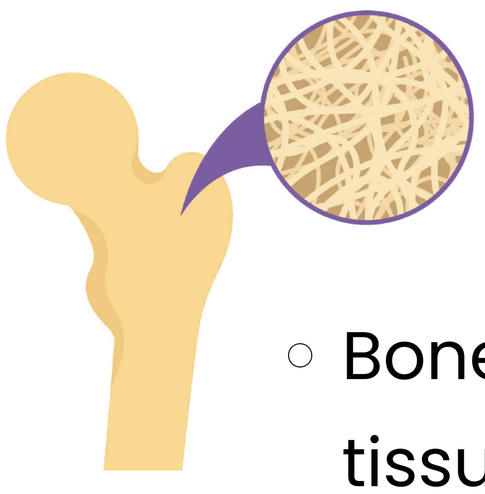
  - Cartilage provides a lot of structure. There is a lot in the spine and nose. This allows flexibility and movement.
  - This kind of connective tissue has a dense extracellular matrix composed primarily of water, collagen, and proteoglycans. Proteoglycans are a protein linked to a glycosaminoglycan group that is in connective tissue.



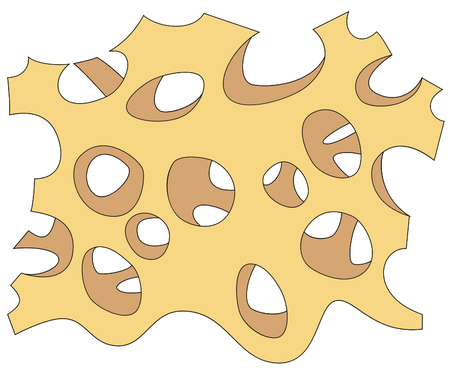
Connective Tissue

- **Osseous tissue** is another name for bone tissue, which is a type of connective tissue.
  - It is a solid mineral tissue that makes the bones as hard as they are.
  - It is also made up of collagen and calcium phosphate.
    - The cells that make up bone are osteoblasts, osteocytes, and bone lining cells.
    - Osteoclasts break down bone so that old cells can be remade.
      - This is part of why bones can grow back together after they are broken.

Compact bone



  - Bones are made up of two types of osseous tissue: compact bone and spongy bone.
    - The spongy bone is known as cancellous bone.
      - Cancellous bone is in the middle of the bone.
  - Compact osseous tissue is on the outside of the bone.
    - It is hard and has no openings.



Spongy Bone

- **Blood** is a connective tissue that transports oxygen, nutrients, carbon dioxide, and any wastes.
  - Blood is made up of an extracellular matrix that is called plasma.
    - There are cells such as RBCs and platelets suspended in this substance.
  - Blood is unique compared to the other connective tissues because it isn't made up of any fibers. (such as reticular, collagen, and elastic)