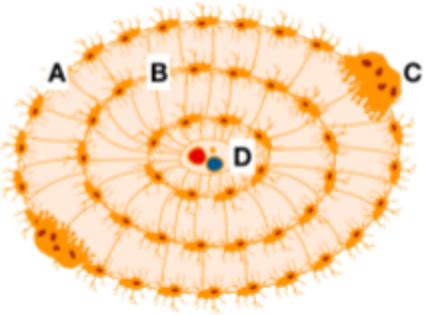
1. The hierarchy of organization in the body is that organ systems are made up of organs, organs are made up of tissues, and tissues are groups of cells. Provide examples of the organ(s), tissues, and cells in both the integumentary system and the skeletal system.
   My answer: Integumentary: The skin organ is made of tissues. Epithelial in the epidermis, loose connective in the dermis, and adipose connective in the hypodermis. Some cells in the tissues are keratinocytes in the epithelial tissue of the epidermis, fibroblasts in the connective tissue of the dermis, and adipocytes in the connective tissue of the hypodermis. The skin organ can be argued (?) to be part of the integumentary and skeletal system because it gives, though not a lot, vitamin D, an essential nutrient, to the body. Skeletal: Bones are organs made of osteon. Within the osteon are osteocytes (bone cells), osteoclast (break down the bone matrix), osteoblast (creates bone cells), blood vessels (to bring in oxygen and remove waste), nerves, and other important fluids and minerals.
   Better Answer: Integumentary system: Organ: Skin - Tissues: Epithelial, Connective - Cells: Melanocytes, Keratinocytes, Fibroblast, adipocytes the main organ of the integumentary system is the skin with appendages of hair/fir and nails/talons. The tissues are: epithelial tissue at the surface top layer, the epidermis. The cells of the epidermis are squamous (flattened) shaped and some examples are keratinocytes (produce keratin) which make up the vast majority of epidermis cells and also the melanocytes at the bottom of the epidermis, which produce melanin the pigment we see in skin. The central layer is called the dermis, it is a connective tissue made up mostly of collagen protein produced by fibroblast cells and also elastin fibers are produced by fibroblasts. There are many components of skin embedded in the dermis (sweat glands, sebaceous oil glands, hair follicles, nerves). The dermis is a connective tissue because the fibroblasts produce the gel-like matrix of sugary fluid. The bottom layer of the skin is the hypodermis (subcutaneous layer). It is also a connective tissue. The cells of the dermis are predominantly adipose (fat) cells, but there are also blood vessels. Skeletal System: Organ: Bone - Tissues: Connective - Cells: Osteocytes, Osteoblasts, Osteoclasts 206 Bones are the organs, Bone is a Connective tissue (matrix of material produced by cells), the cells are Osteoblasts which build bone and become osteocytes after they cement themselves in to the calcium & phosphorous rich matrix (forming the osteon ring structures we see), Osteoclasts are cells that breakdown bone. Bone is continuously being restructured by the opposing actions of osteoblasts and osteoclasts, building where we need more bone strength and breaking down were we require less.

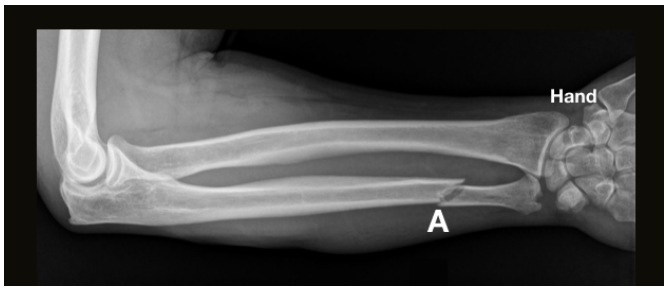
2. A family member tells you that their doctor told them they have a “slipped lumbar disc” because they picked up something heavy. Explain what the diagnosis means, including (1) where in the backbone it has occurred, (2) what a damaged disc is, and (2) how to best pick up something heavy in the future, if you have to.
   1. A slipped lumbar disc means that the disc, which is the vertebra between each vertebra that allows flexibility of the spine, has been displaced. What might have happened is that, through repeated trauma or sudden impact to the disc broke the hard exterior of the disc. This allowed the jelly-like interior of the disc to protrude out.
   2. DO NOT BEND OVER. That puts a lot of stress on the lumbar region of the back. The best way to pick anything up is to squat down to keep the spine straight and use the leg muscles to pick things up.

3. Referring to the image of an osteon below, “A” are the osteoblasts on the outside of bone. Identify cells “B” and “C” and the structures “D” running through the middle of the osteon and explain what structures A, B, C, and D are/do. Include why it is important cells “A” and “C” work opposite each other.



My answer: A. Osteoblasts: creates osteocytes | B. Osteoclast: break bone matrix so you don't have too much bone mass | C. Osteocyte: bone cells that bring blood and remove waste | used to be osteoblast that has reinforced bone around itself. | D. Osteon: a ring of osteocytes that channel vessels and contains the blood vessels within the bone | - A and C must work together to create a balance so too much or too little bone mass isn't created
Better answer: A=Osteoblasts build bone; B=Osteocytes are cemented in, osteoblasts that are ready to repair bone if it is damaged in the future; C=Osteoclast breakdown bone to help restructure it as needed; D=Haversian or Central Canal that has blood vessels to feed the living bone cells and remove wastes, lymphatic vessels, and nerves. It is important that A and C work opposite each other because we need bones to be continually restructured; increasing bone strength in areas we might need more bone and to decrease bone in areas we might need less. It takes some time but the skeleton adapts to the forces we regularly put on it. This way the skeleton is most efficiently built for your lifestyle needs, keeping its structure as light and strong as possible.

4. Identify the bones (A and B) fractured in these X-rays, and describe the steps of the healing process that occur to repair these fractures. The fractures in B are unusually visible and severe; usually foot fractures are smaller and more difficult to detect and diagnose. You can add your own experience if you have broken a bone.



My answer: A. Fibula | B. metatarsals | Healing process: First a blood clot is formed to stop blood loss. This allows the bone to start healing within a day. Fibroblast starts producing collagen to start creating a framework, called callus, for minerals to deposit over time. At this point, the bone should be realigned, otherwise, the bone will be displayed. Spongy bone is now being created by osteoblasts. That spongy bone then becomes a compact bone.
Better answer: A=Ulna, B=metatarsals. The steps of healing a fractured bone (Guide - 2a4) are: 1) a blood clot forms because blood vessels have been broken, bone is alive with a lot of blood supply, 2) fibroblast cells produce fibrous callus of cartilage a flexible but semi-ridged material, 3) Osteoblast cells build spongy bone structure, 4) Osteoblasts continue building bone and the compact bone structure is finally completed. This is a relatively quick process because the living bone organs have a large blood supply.