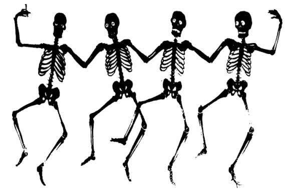
Megan Arney



Skeletal System LAB Report

PART 1

Introduction

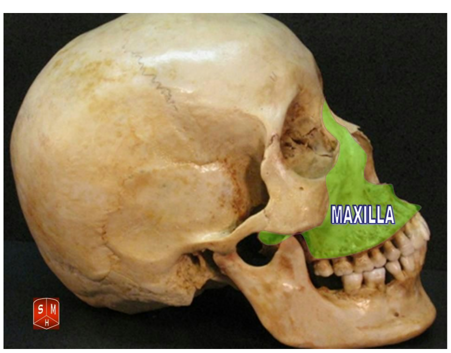
The Skeletal System consists of 206 bones. It is the framework for the body and it protects internal organs. A lot of the words we use are derived from the latin and greek language, but bones are usually Latin. There are two types of bones, descriptive and non descriptive. For example, in the ear, the auditory ossicles that's Latin for "little bones for hearing". They also used real world applications such as, The fibula, is Latin, They referenced it to a roman safety pin. The tibia, which is the neighbor to the fibula, it is also much bigger. They named it the tibia which is in reference to the frame of the pin.

Three Bones

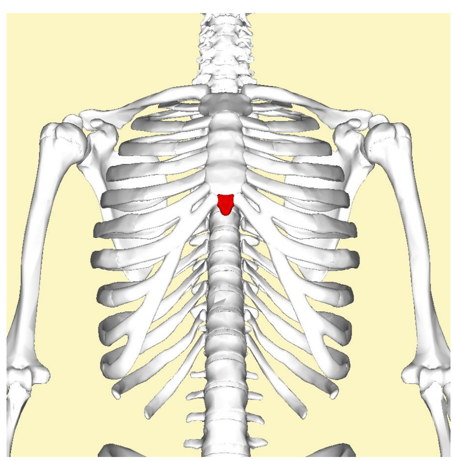
The Maxilla, Latin, is restricted to the upper jaw. It was originally used by the Romans to designate both the upper and lower jaws. It is believed that it came from the Latin word mala or cheek, or macerare meaning to chew.

The Xiphoid Process, was given to the cartilage of the sternum, because it resembles a sword like shape. Xiphoid was taken from the Greek words xiphos, a sword, and eidos, or like. Early Greek anatomists used this word.

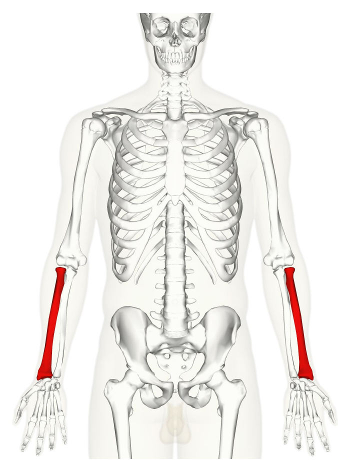
The Radius, is a latin term that means a ray. It is also taken from the Greek term the spokes of a wheel or a rod. The rod-like bone of the forearm was named for its shape, which they thought resembled a spoke of a wheel. Celsus introduced this term. The radius is located proximal to the torso.



The Maxilla



Xiphoid Process

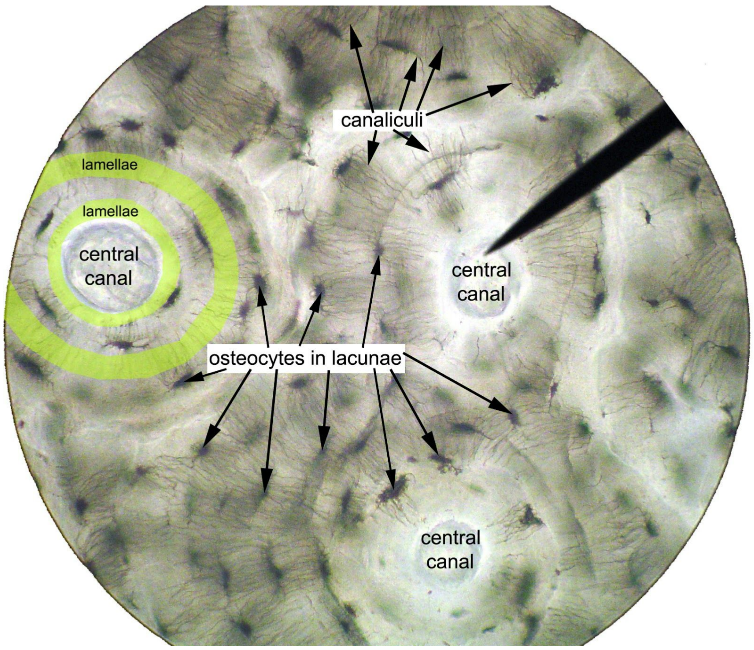


The Radius

PART 2

Bone (Tissue) Histology

Compact Bone



Canaliculi: Microscopic, canals between the lacunae of ossified bone. Osteocytes project into these canals.

Central Canal: is surrounded by concentric layers (lamellae) The haversian canal is the source that contains the bone’s blood supply.

Lamelle & Lamellae: a membrane surrounding the central canal.

osteocytes: a bone cell, formed when an osteoblast becomes embedded in the matrix it has secreted.

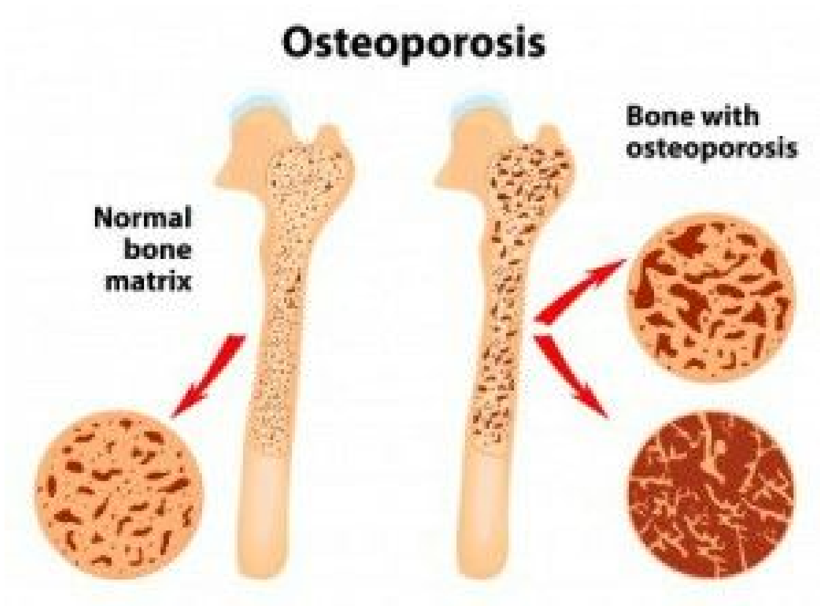
Trabecular Bone

Periosteum

PART 3

Bone Matrix

The bones are an amazing mystery of the human anatomy.They are strong, light, and can adapt to its functional demands, and also repair itself. Bones are live tissue, it can almost instantly begin its healing process. There are two major kinds of bones in our skeletal system, trabecular and cortical. Trabecular bone gives supporting strength to the ends of the weight-bearing bone. The cortical (solid) bone on the outside forms the shaft of the long bone. Their only function is not just to provide structural support, but they also serve as a mineral reservoir. The bone stores 99% of the body's calcium and 85% of the phosphorus. Components of the bone include the organic matrix is primarily composed of the protein collagen which provides flexibility. 10% of adult bone mass is collagen. The mineral component is hydroxyapatite, which is an insoluble salt of calcium and phosphorus. About 65% of adult bone mass is hydroxyapatite. There are also other mineral traces in the bone, such as magnesium, sodium, and bicarbonate. Believe it or not but 25% of bone mass is water. Collagen makes up about 90% of the matrix proteins,, which is the most abundant protein in the body. Collagen forms bones and is very strong. Collagen is formed as chains which twists into triple helices. These line up and are bonded together into ropes (fibrils). The fibrils then are arranged in layers, and mineral crystals will deposit between the layers. Other bone proteins include Fibronectin, Osteonectin, Thrombospondin, Osteocalcin, Matrix-gla-protein, Bone sialoprotein, Osteopontin, Matrix extracellular protein, and Biglycan. Bone matrix homeostasis imbalances such as, osteoporosis. Osteoporosis occurs in the elderly, Both men and women can lose bone mineral density. Osteoporosis usually occurs in women, especially caucasian women.



	Normal	Vinegar	Cooked Bone
			
Collagen Matrix	Present	Present	Not Present
Mineral Salts	Present	Not Present	Present
Disease Or Disorder	N/A		
Characteristics	Some give but still solid. Red in color.	Squishy, feeble, extremely bendable. Smelly.	Hard, dry, no bend

This data table represents the data I collected in a Lab, where the objective was to observe the bone homeostasis. The normal bone was the example of perfect bone homeostasis. The bone soaked in vinegar represented too much collagen to where the bone was to feeble, and would hold any support. The cooked bone was where the lacked collagen and the bone was hard and would break because it wouldn't bend or give any when force was applied.

PART 4

Dr. Lee’s and his team's’ primary goal for their research program is to create precisely defined, bioinspired nanomaterials that can be used for studying complex interfacial phenomena and as functional materials, devices and therapeutics. Protein-Protein Interfaces: How do proteins interact to create exquisite, hierarchical structures with diverse functions in a spatially and temporally controlled manner from simple nanofibrous building blocks? Protein-Cellular Interfaces: How can protein-based material interfaces be tuned to create physical, chemical, and mechanical structures that can direct cell behavior for regenerative medicine and therapeutics? Protein-Organic/Inorganic Interfaces: How can proteins be engineered to recognize specific target organic/inorganic molecules for the development of biosensors or to template the growth of inorganic materials? Protein-Electronic Interfaces: How can the dipole of protein sequences and structures be engineered to interchange between electronic and mechanical forces for the generation of clean protein-based piezoelectric energy?
Pretty much how bones know what they know to do, when they they need to repair and build. How DNA codinging comes into play.

PART 5

Background story, a woman wrapped her baby in linen clothes or quilted, embroidered bands, swaddling the infant, which kept their hands and feet in place. Then she placed the snug infant n a pocket with a boarded back, and cover their head and ears with a cap. Babies that were swaddled stayed warm, but were exposed to very little sunlight. Since the baby was completely protected from the sun. Vitamin and mineral deficiencies were apparent in its bones. This baby suffered from rickets, and vitamin D deficiency. Rickets is a disease commonly found in children caused by vitamin D deficiency, characterized by imperfect calcification, softening, and distortion of the bones typically resulting in bow legs.

Work Cited

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