Week 6 Lecture 1

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1 Administrative drivel

- Nothing really.

2 Anatomy and Physiology

We're now going to cover organs and organ systems

2.1 Skeletomuscular system:

2.1.1 Skeletal system

- 2 basic parts: Axial skeleton and Appendicular skelton
  - Axial is centered around the spine and includes everything connected to the spine (spine, skull, ribcage)
    - spine keeps the body erect
    - mineral storage is in the bones, mostly calcium
    - helps move the body around
    - protects the heart and lungs
    - protects the brain (the brain is easily damaged)
  - Appendicular is limbs + pelvis
- The following bold bits are the parts of the Axial skeleton and their properties
- **skull**
  - Protects the brain
  - provides an entry for food
  - mineral storage
  - Only mamals can generate facial expressions for communication
  - In humans, speach comes from the skull
- **Spine**
  - Runs along the back of the body (dorsal)
  - provides a fairly rigid system for hanging things on
    - Lots of organs are connected to the spine to ensure they stay in position
  - Keeps the body errect
  - Helps move the body around

  - subparts: Cervical (neck), Thoracic (upper back, rib cage occurs here), Lumbar, Sacral Coxix vertebrae (The last 2 are in the pelvis, and the coxix is the tail that's been fused)
  - the thoracic cavaty of the torso is surrounded by the ribcage
  - mamalls all have 7 cervical vertebrae (including Giraffs!
  - vertebrae are seperated by discs of cartilege that allow it to flex (joints)
  - the vertebrae and discs are hollow, surrounding the spinal chord which connects the brain to the rest of the body

- **Ribcage**
  - Attached to the thoracic vertebrae by joints along the spine and sternum
  - the flexibility of the ribcage helps with breathing
  - Helps move the boy around and protects the heart and lungs
    * Muscles attach the arms to the ribcage helping with movement
    * there are 2 muscles between each pair of ribs that do the bulk of the work in breathing

- Clicker q: What's the function of the skull? Protect the brain
- The followingn bold items are the parts of the Appendicular skeleton
- **Arms and Legs**
  - Function: Helps move the body around
  - Arm includes the clavical (colar bone) and the scapula (sholder blade)
  - Legs include the pelvis
  - keeps the body erect and stores minerals as well.
- a few more boones to know:
  - 209 bones in the ebody (most in the skull)
  - The different vertebra
  - skull: cranium, maxilla (upper jaw), dentary (lower jaw), orbit (eye socket, multiple bones), zygomatic arch (cheek bone, multiple bones), foramen magnum (the hole where the spinal chord exits the brain)
  - bones of the arm: carpals, meta carpals, phalanges, radius, ulna, humerus
  - parts of the leg: femur, patella, tibia, fibula, tarsals, metatarsals, phalanges, pelvic gridle
  - ***SHOULD LOOK UP (DIAGRAM??)***
- Bones:
  - Things to know:
    * parts of a bone (in order on a long bone):
      · Articular cartiledge (allows for smooth motion)
      · spongy bone (toward the "ends" of long bone)
      · Epiphyseal line
      · Red bone marrow (in spongy bone)
      · endosteum
      · compact bone (makes up endosteum)
      · medullary cavity
      · yellow marrow (in cavity above)
      · periosteum

        - tough fibrous membrane that protects the bone, and produces new bone cells
        - nutrient artery
    * Location and function of:
        - red marrow (blood cell formation (red), millions a day, since red blood cells have a 3 month lifespan)
        - Yellow marrow (fat (lipid) storage)
        - compact vs spongy bone (outside vs within ends respectively)
        - cartilage at joints
- Bone – structure:
    * Bone has a structure that is grown and layed down peice by peice
    * Haversian system (increases diameter):
        - osteocyte – bone cells! These grow bones (ostyoblasts when growing, osteocytes when the bone is done)
        - Synthesize layers of calcium layers in rings up and down the length of the bone, much like tree rings.
        - there's a hollow cannal called the haversian canal where nerves and blood vessels run through the bone
        - spongy bone surrounded by compact bone surrounded by articular cartilage with blood vessels running throughout
- Bone – growth
    * Length occurs at the ends of the bones at te epiphysis (the ends of the bone shaft)
    * the epiphyses aren't fused to the caps till the bone is done growing
    * Rather than adding layers to the entire surface as growth occurs in trees
    * in early stages, bones are composed of collagin protein structure initially layed down, then calcium is impregnated into the collagin structure
    * so, bone is a collagin matrix with osteocytes embedid and calcium minerals are stored
- cell types:
    * Osteoclasts: break bone apart and abosrb minerals (calcium) for reuse
    * Osteoblasts deposit collagen / minerals crystallize around it (grow bones, less numerous in adults)
    * Osteoocytes: osteoblasts that are found within older bones
- rebuilding of bones:
    * called "bone remodelling
    * osteoblasts originate inn the marrow
    * growth factors are stored in bone
    * osteoblasts build new bone tissue
    * Hydroxy-appitite is the main constituant of bone
    * bone density metric used to determine bone strength
- bone repair:
    * Osteoblasts and osteoclasts work to repair fractures
    * bones are repaired in their current position, so if a fracture doesnt meet it will round off, if they meet at an offset, they'll fuse in that position
    * If you allow flexibility as it heals, the bone will form a joint!
    * repaired bones are stronger than the original bone!