Review Guide for Semester I Physiology Final

Organization of the Body

- Be clear on the necessary life functions of a human body
- Know how homeostasis is controlled and maintained – feedback mechanisms
- Anatomical Terms:
- Body planes
- Directional terms
- Membranes in the ventral body cavity

Tissues

- **Epithelium:**
  - Know characteristics of epithelium that distinguishes it from other tissue types.
  - Know and be able to identify each of the types of epithelia, be aware of where each type is found in the body – will assist you in identifying the slides or descriptions.
    - Simple epithelia:
      - Simple squamous epithelium
      - Simple cuboidal
      - Simple columnar
      - Pseudostratified columnar
    - Stratified epithelia
      - Stratified squamous
      - Stratified columnar
      - Transitional epithelium
  - **Glandular epithelium:** Understand the difference between endocrine and exocrine glands.

- **Connective Tissue:**
  - Know what characteristics distinguish connective tissue from other types.
  - Be clear on how the following components of connective tissue interact to maintain connective tissue:
    - Ground substance/matrix,
    - Fibers (collagen, reticular, elastic)
    - Various cells (fibroblast, chondroblast, osteoblast, hematopoietic stem cells, white blood cells, plasma cells, mast cells, macrophages)
  - Types of Connective tissue – be able to identify, know the difference in appearance and function in the body
  - Loose Connective tissue:
    - Areolar
    - Adipose
  - Dense Regular Connective Tissue – ligaments and tendons
  - Dense irregular connective tissue – dermis of skin

- Cartilage – Be able to identify, know the difference between each type and where it is located in the body.
    - Elastic
    - Hyaline
    - Fibrocartilage
- Bone and Blood – be able to identify slides of these
- Muscle Tissue – be able to identify and distinguish
    - Skeletal muscle
    - Cardiac muscle
    - Smooth muscle

Integumentary System

- Epidermis
- Important cells of the epidermis:
    - keratinocytes
    - melanocytes
- Layers of the epidermis – know generally what is happening in each
    - Stratum Basale
    - Stratum Spinosum
    - Stratum Granulosum
    - Stratum Corneum
- Be able to label a cross section of epidermis

- Dermis – know what organs and structures are contained within dermis, be able to identify an image. Be clear on what sensory structures are in the dermis and epidermis.

- Pigments – know the purpose of each of these in the skin and when produced, if that applies
    - melanin, carotene, hemoglobin
    - Organs within skin – know what they are, their purpose/function and location
        - Sweat glands – apocrine and eccrine and ceruminous
        - Sebaceous glands
    - Hair follicles – know contents of a hair follicle, difference between vellus and terminal hair. Be able to label a cross section
    - Fingernails – components and structure.
    - Causes and solutions for acne
    - Know Functions of Skin
    - Types of skin cancers – be clear on the differences and their relative danger.
    - Burns – know the different degrees of burns and their relative danger.

Bone Physiology

- Know function of bones
- Bone structure
    - compact vs. spongy
    - diaphysis, epiphysis, medullary cavity, epiphyseal line, trabeculae
    - periosteum, where osteoblasts and osteoclasts are, endosteum, Sharpey's fibers
- Microscopic structure of bone
    - Haversian system – know the components of this
- Know what hormones control bone growth
- Know the bone remodeling process and hormones involved

- Wolff's law – response of bones to mechanical stress
- Bone disorders: osteomalacia, rickets, osteoporosis
- Skeleton – be able to identify bones and features in the skull, femur, tibia, fibula, humerus, ulna, radius, and the main bones in the skeleton (review the appendicular and axial bone lists)

Muscle Physiology

- Know the details of muscle structure: from muscle to actin/myosin, & membranes
- Contraction unit – know the function, and location of, and parts of a sarcomere (A and I Band, Z disc, zone, M line, actin, myosin. Be sure to know how the sarcomere fits in with the larger context of the muscle
- How does a muscle contract?
    - Know what has to happen to get the "order" or action potential from the brain to the muscle cell: be confident with what an action potential is, what a synapse is and the role of a neurotransmitter.
    - Neuromuscular junction: Know the order of events required to get the neural signal to the cell and how the T Tubules are involved.
    - Sliding Filament Theory: Know the steps that occur to get the actual sarcomeres to contract. Be sure on the role of actin, myosin, calcium ions, and ATP.
- Know the reaction of muscle to a single action potential and why it is that muscles can produce long, sustained contractions.
- Know why muscles can do both gentle contractions and powerful ones. How are motor units involved in this phenomenon?
- Muscle Metabolism: Be confident on the following chemicals and what they provide for the muscle: myoglobin, glycogen, ATP, creatine phosphate, lactic acid, and mitochondria (an organelle).
- Know the difference between anaerobic respiration, aerobic respiration, and glycolysis. Know their purpose for the muscle and when one or another would be utilized by a particular muscle.
- What is muscle fatigue and oxygen debt? What is happening here?
- Know the difference between isotonic and isometric exercises and be able to identify examples of each.
    - Know the difference between slow twitch (slow oxidative) and fast twitch (fast glycolytic) muscle fibers. Know how their size, performance, mitochondria number, glycogen amount, myoglobin amount.
- Know what is happening in the muscle when a person does resistance exercises and is getting stronger.
- Know what is happening to a person's muscles when they are engaged in endurance exercises.

Muscle Anatomy

- Mink muscles – refer to the final Mink muscle list. Mink specimens will be out and labeled for the lab practicum portion of this final.

- Human muscles – refer to the Muscle Anatomy packet for the list of muscles to be able to label and identify.

Ending Tip: Study consistently – in small chunks. Do not attempt to review all of this material in one night and feel prepared. Start your reviewing early – NOW. Use all of your old tests, review guides and homework material. Use methods that have helped you be successful on exams that cover a great deal of material as you know this one will. Good luck…. **Study, review, be confident!! Don't forget to sleep either.**