**Bio 2 Final Exam Study Guide**

**Chapter 27 - Bacteria and Archaea**

**Know the following**: The characteristics of prokaryotic and eukaryotic cells. Purpose and function of capsule and endospore. Different bacterial shapes. **Difference between the cell wall structure of gram + and gram – bacteria.** Different oxygen and nutritional requirements of bacteria. Nitrogen fixation and the group that performs it. **Comparison of characteristics among the three domains of life (table).**

**Key words or terms**: Capsule, endospore, peptidoglycan, coccus, bacillus, helical, filamentous

**Chapter 28 – Protists**

**Know the following:** Characteristic(s) that unite all protists. Modes of locomotion in protists (flagella, cilia, and cytoplasmic streaming). Processes by which eukaryotes evolved (autogenesis and endosymbiosis). Distinguishing characteristics of five protist supergroups and their respective clades (Matching).

**Key words or terms**: flagella, cilia, cytoplasmic streaming, autogenesis, endosymbiosis, plastid

**Chapter 19 – Viruses**

**Know the following**: Reasons viruses are descried as non-living. Characteristics of viruses. Replicative cycles of viruses (lytic and lysogenic).

**Key words or terms**: capsid, phage, prophage

**Chapter 31 - Fungi**

**Know the following**: General characteristics of fungi. Anatomy of fungi (coenocytic or septate hyphae, mycelium, chitin). Mycorrhizae (arbuscular and ectomycorrhizal). Steps and structures in the sexual reproduction of fungi and asexual structures of fungi. Characteristics of the five major fungi classes (Matching). Groups (protists, bacteria, fungi) that form the symbiotic relationship in lichens and what each group provides in the relationship.

**Key words or terms**: coenocytic hyphae, septate hyphae, mycelium, chitin, mycorrhizae, arbuscular, ectomycorrhizal, plasogamy, heterokaryon, karyogamy, zoospores, zygosporangium, sporangia, conidia, conidiophore, asci, ascocarps, basidia, basidiocarps, soridia,

**Chapters 24, 25 and 26 – Evolution and Phylogeny**

**Know the following**: Microevolution, macroevolution, and speciation. **Difference between homologous and analogous structures.** Convergent evolution. Different modes of speciation (allopatric and sympatric). Taxonomic order (D,K,P,C,O,F,G,S). Know how to interpret phylogenetic trees and know how synapomorphies are shown on phylogenetic trees.

**Key words or terms**: microevolution, macroevolution, speciation, homologious structures, analogous structures, convergent evolution, allopatric speciation, sympatric speciation, ecological niche, adaptive radiation, exaptation, synapomorphy,

**Chapter 29 – Plant Diversity 1**

**Know the following**: Characteristics of plants. The derived traits of land plants. Difference between gametophyte and sporophyte. Alteration of generation process. Adaptations for terrestrial life. Types of vascular tissue. **Phylogeny of plants identifying origin of stomata, cuticle, vascular tissue, seeds, and flowers.** Characteristics of the different non-vascular and vascular seedless plant phyla, including presence or absences of true leaves, stems and roots, vascular tissue, type of sporangia, types of leaves and modes of reproduction (Matching). General life cycle of bryophytes.

**Key words or terms**: sporangia, gametophyte, sporophyte, microphylls, megaphylls, sporophylls, strobili, sori, prothallus. Plasogamy. Karyogamy

**Chapter 30 – Plant Diversity II**

**Know the following**: What is a seed and what are the functions of its parts. Differences between monecious and dioecious plants. Characteristics of the four gymnosperm phyla and Anthophyta (Matching). Parts of the flower and their function. **Differences between monocots and dicots.**

**Key words or terms**: sepal, petals, carpel, stamen

**Chapter 35 – Plant Structure and Growth**

**Know the following:** Cells and tissues in that make up the vascular tissue system and their function, including xylem (tracheids, vessel elements) and phloem (sieve-tube elements and companion cells). Know the function of the vascular cell types and if they are alive or dead at maturity. Differences between monocot and dicot stems.

**Key words and terms:** stele, xylem, phloem, tracheids, vessel elements, sieve-tube elements, companion cells,

**Chapter 36 – Resource Acquisition and Transport in Plants**

**Know the following:** How the solute and pressure potentials change within a cell depending on the environmental conditions. Be able to predict the direction of water movement given the solute and pressure potentials inside of a cell and in the environment surrounding the cell. Know the difference between turgid, flaccid and plasmolyzed. The difference between the apoplastic and symplastic routes. Be able to describe the two routes that water and minerals enter the roots and the areas where the solutes are screened along each route. How transpiration works (negative pressure), the cohesion-tension hypothesis, and the difference between pushing and pulling of xylem sap.

**Key words and terms:** tonicity, hypertonic, isotonic, hypotonic, turgid, flaccid, plasmolyzed, apoplastic, symplastic, transpiration, cohesion-tension hypothesis

**Chapter 39 – Response to Signals in Plants**

**Know the following:** The five major hormones in plants (auxin, cytokinins, gibberellins, abscisic acid, and ethylene), and the major functions. Know the two types of plant responses to pathogens (hypersensitive, and systemic-acquired) and how they differ.

**Key words and terms:** senescence, Pathogen-associated molecular patterns (PAMPs), hypersensitive response, systemic acquired response

**Chapter 37 – Soil and Plant Nutrition**

**Know the following:** Different types of mycorrhizae.

**Key words and terms:** nodules, ectomycorrhizae, arbuscular mycorrhizae, arbuscules,

**Chapter 32: Animal Diversity and Physiology**

**Know the following**: Characteristics of animals. Know the differences between Protostomes and Deuterostomes (cleavage, coelom formation, and fate of blastopore). Differences between acoelomates, pseudocoelomates and coelomates. Different types of skeletons and which phyla have each type of skeleton. Know which phyla are segmented. Know the different circulatory systems and which phyla have each type of system. **Compare and contrast the open and closed circulatory system.** Know the different digestive systems and which phyla have each type of system. Know the different thermoregulatory strategies and which animals use each type of strategy. The different types of heat exchange with the environment. The different adaptations for thermoregulation.

**Key words or terms**: diploblastic, triploblastic, acoelomates, pseudocoelomates, coelomates, hemolymph, endotherm, ectotherm, poikilotherm, homeotherm, torpor, estivation, hibernation

**Chapter 33: Invertebrates 1**

**Know the following**: Know the general characteristics of all invertebrate phyla (organization, symmetry, tissue layers, circulatory system, and digestive system) (Matching). What are protonephridia? Know the characteristics of molluscs and the characteristics of each class of molluscs (Matching).

**Key words or terms**: Choanocytes, cnidocytes, nematocysts, polyp, medusa, protonephridia, radula

**Chapter 33: Invertebrates II**

**Know the following**: Know the general characteristics of all invertebrate phyla (organization, symmetry, tissue layers, circulatory system, and digestive system) (Matching). What animals have metanepheridia? Know the characteristics of the Arthropod and the subphylums, classes, and groups of Arthropods. Know the function of Malpighian tubules.

**Key words or terms**: metanepheriduium,

**Chapter 33, 34, and 42: Deuterostomes and Circulation**

**Know the following**: Characteristics of Vertebrates. **Know the key adaptations in vertebrate evolution and how they changed the course of vertebrate evolution. Also know where these adaptations arose during the course of vertebrate evolution (Be able to write in the adaptations on a phylogeny)**. Know the heart anatomy and circulatory system of the different vertebrate groups (number of chambers, circuits). **Know the path of blood through the heart and body (pulmonary and systemic circuits).** Phases of the cardiac cycle (diastolic and systolic). Differences between arteries, capillaries and veins.

**Key words or terms**, diastole, systole

**Chapters 40 and 49: Animal Structure and Muscle Function**

**Know the following**: The function of the different types of animal tissues. Know the location and function of the different epithelial tissues. Know the location (when provided) and function of the different connective tissues. Know the types of cells that form muscles, bone, and cartilage. Be able to describe how a muscle contracts including the role of calcium ions, tropomyosin, and the troponin complex.

**Key words or terms**: simple, stratified, pseudostratified, cuboidal, columnar, squamous, tropomyosin, troponin complex,

**Chapter 34: Diversity of fishes**

**Know the following**: Know which vertebrates have pronephros, mesonephros,and metanephros. Characteristics of fish in superclass Agnatha, class Chondrichthyes, class Sarcopterygii, class Actinopterygii, and the superorders within Teleosti. (Matching)

**Key words or terms**:

**Chapter 34: Origin of Tetrapods, Amphibians and Reptiles.**

**Know the following:** Characteristics of amphibians and the differences among the three amphibian orders (Matching). Function of the different parts of the amniotic egg. Know which vertebrates have an anapsid, synapsid and diapsid skull. Know the characteristics of the different reptiles orders (classes?) (Matching).

**Key words and terms:**

**Chapter 43: Immune System**

**Know the following**: Differences between a pathogen, antigen, epitope and antibody. Two types of immunity involved in the adaptive immune response (cell-mediated and humoral immunity) and where B and T-cells mature. Two types of B-cells and their function.

**Key words or terms**: Pathogen. Antigen. Epitope. Antibody. Phagocytes.

**Chapters 48, 49 and 50: Nervous System**

**Know the following:** What is the membrane potential and how is it maintained? Role of the sodium potassium pump. Know how an action potential is transmitted, including the stages of an action potential, the gated ion channels involved and when they are open or closed, the depolarization of the neuron, and the ions involved in the depolarization. What is the function of the myelin sheath?Function of inhibitory and excitatory neurotransmitters. Different regions of the brain and their function. Types of sensory receptors and the senses that use each type of receptor.

**Key words and terms:** Dendrites. Axon. Synaptic terminals.Nerve. Nodes of Ranvier. Membrane potential. Gated ion channels. Depolarization. Action potential. Synapse. Synaptic cleft. Neurotransmitter. Ligand-gated ion channel. Thermoreceptors. Mechanoreceptors. Chemoreceptors. Photoreceptors. Electromagnetic receptors. Tympanic membrane. Malleus. Incus. Stapes.

**Chapter 34: Birds**

**Know the following:** Characteristics of birds. Key adaptations for flight. **Differences between reptiles, birds and mammals** **including the jaw bones, ear bones, heart, red blood cells, thermoregulation and reproduction (Table).** Anatomy of birds and the fusion of the different bones.

Thermoregulatory strategies in birds. Different types of bird development.

**Key words and terms:** Altericial. Precocial.

**Chapter 34: Mammals**

**Know the following**: Synapomorphies of mammals. **Differences between monotremes, marsupials and eutherians, including body temperature, mode of nourishment (egg, yolk-sac placenta, or placenta), presence of nipples, number of vagina and uteri, neocortex development and presence of a corpus callosum.** Different orders of mammals and their distinguishing characteristics.

**Key words or terms:**

**Chapters 34, 41 and 44: Human Evolution, Excretion and Digestion**

**Know the following**: Characteristics of *Homo sapiens*. When homo sapien characteristics first appeared in the different hominin lineages. Two theories for origin of modern human races. Parts of the nephron and their function. Location where most reabsorption takes place. **Be able to describe the process of reabsorption through the nephron including the major parts of the nephron, what is being filtered out at each section of the nephron, and if molecules are filtered by active or passive transport. Locations where the osmolarity of the filtrate is greatest.** Initial and primary sites of digestion of carbohydrates, lipids, and protein.

**What carries carbohydrates, lipids, and proteins away from the small intestine and where does it go? Be able to describe the process of emulsification of lipids**.

**Key words and terms**: Metanephros. Glomerulus. Proximal tubule. Loop of Henle, Distal tubule. Hepatic portal vein. Bile salts. Lipase. Monoglycerides. Fatty acids. Triglycerides. Chylomicron.

**Desert Field Trip**

**Know the following:** Definition of a desert. What causes evaporation? Three different ways a desert can form and the cause of our local deserts. Relatives of hyenas. Fastest land animal in North America and the reason for its speed.

**Estuary and Intertidal Field Trip**

**Know the following**: What percentage of wetlands have disappeared in southern California? Why is an estuary like an egg beater? Sponge? Hotel? Strainer? Know the challenges to life in the intertidal zone and the adaptations that organisms have to cope with these challenges.Know all the phyla that we saw in the intertidal zone.

**Key words or terms**: Estuary, desiccation