BIO II EXAM 1: Chapters 20,21,25,26,30 Cheat Sheet

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Phylogenies & History of Life

PHYLOGENY: hypothesis abt evolutionary relati-onships, built as trees	Molecular Clocks: estimates the absolute time iof evolutionary change based on mutation rates and fossils (limited bc mut. rates vary)
NOTE: Show patterns of desent NOT levels of advancement and similarity does not always mean close relatedness	Fossil Record: shows macroevolutionary changes in history of life and reveals extint species, transitional forms, and timing of major events
Tree Parts: Root, Node, Branch, Sister taxa	Origin of Life: earth started with little oxygen but lots of water vapor
Sister Taxa: two linages that share a more recent common ancestor	processes could make simple cells in 4 stages (hypotheses)
Basal taxon: branch diverges out from all other ones	1) RNA (RNA as genetic material and a catalyst)
Monophyletic (Clade): ancestor + all decendants	2) Synthesis of macromolecules
Paraphyletic: ancestor + some decendants	3) Protocells (with lipid membranes)
Polyphyletic: distantly related without common ancestor	4) Abiotic Synthesis

Homology: similar by shared ancestry

Analogy: similar by convergent evolution

Homoplasty: similar not due to ancestry

Orthologous Genes: speciation, different species

Paralogous Genes: gene duplication, within species

Viruses & Vaccines

Viruses: acellular infectious agents that exist between living and nonliving	Viruses Classified By: type of nucleuic acid, single vs double stranded, RNA sense (+ or -), presence of envelope
WE DON'T KNOW IF THEY ARE ALIVE	Retroviruses: single stranded RNA genome that uses reverse transcription to copy its genome into DNA called PROVIRUS
WHY NOT LIVING: cannot keep homeostatsis, cannot reproduce without host, does not grow or respond to stimuli on own	Lysogenic: dormancy without destruction
Genome: DNA or RNA (not both)	Lytic: immediate destruction
Capsid: protein coat that protects genome, built from capsomeres	Capsid Shapes: icosahedrak (sphere), helical (rod), complex (bacteriophages)
Envelope (optional): lipid bilayer from host cell membrane, viral glycoproteins	Bacteriophages: infect bacteria, elgonated head with DNA and protein tail, best understood of viruses

How vaccines work: mimics the process of antigen exposure in a safe way. antigen presenting cells take up antigens amd present immune cells, T & B cells respond

PLANTS

PLANTS (cont)

Plant Form & Physiology Plant Organs • Roots: anchor, absorb water/minerals, storage • Stems: support, transport • Leaves: photosynthesis Tissue Types • Dermal: protection (epidermis, cuticle) • Ground: photosynthesis, storage, support o Parenchyma (metabolism) o Collenchyma (flexible support) o Sclerenchyma (rigid, lignin) • Vascular: o Xylem → water/minerals (dead cells) o Phloem → sugars (living cells) Transport • Transpiration: water loss through stomata • Cohesion-tension theory: pulls water upward in xylem • Pressure-flow hypothesis: sugars move source → sink in phloem Stomata • Controlled by guard cells • Open for gas exchange, close to prevent water loss Plant Hormones • Auxin: elongation, phototropism • Gibberellin: growth, germination • Cytokinin: cell division, delays aging • Ethylene: fruit ripening • ABA: dormancy, stress response Seedless Plants General Traits • No seeds or pollen • Reproduce by spores • Require water for fertilization • Alternation of generations Bryophytes (Nonvascular) • Mosses, liverworts • No true roots/stems/leaves • Gametophyte-dominant • Small, moist habitats Seedless Vascular Plants • Ferns, horsetails • Have xylem & phloem • Sporophyte-dominant • Larger size Life Cycle • Sporophyte (2n) → spores • Gametophyte (n) → gametes • Fertilization → zygote → sporophyte Seed Plants Key Innovations • Seeds: protect embryo + food supply • Pollen: reproduction without water • Reduced gametophyte • Dominant sporophyte Gymnosperms • Naked seeds (cones) • Wind pollination • Conifers, cycads Angiosperms • Flowering plants • Seeds enclosed in fruit • Double fertilization o Zygote + endosperm Flower Parts • Sepals: protect • Petals: attract pollinators • Stamen: male • Carpel/Pistil: female Monocots vs Eudicots • Monocots: 1 cotyledon, parallel veins, flower parts in 3s • Eudicots: 2 cotyledons, net veins, flower parts in 4s/5s