

FINAL REVIEW FOR BIOLOGY (Semester 2) - J. Barge

CELLULAR RESPIRATION REVIEW (Ch 7)

Cellular respiration – Purpose? General starting materials? General products? Significance of **ATP**? How is energy released? How many net ATP gained per glucose? Chemical energy? How are breathing and cellular respiration related?

Food energy - Compare and contrast burning food within your body and burning food with fire.

Glycolysis – What is it? Oxygen required? Where occur? Starting material? End-product? Net ATP gained? What happens to the NADH released?

Grooming stage – What molecule enters this stage? What happens to this molecule? End-product?

The Krebs cycle – What is it? Where occur? What molecule enters this stage? Per glucose, how many ATP gained? What happens to the CO₂, FADH₂, and NADH released?

Electron transport chain/ chemiosmosis – What is it? Where occur? Oxygen required? What molecules start the ETC? Where do these molecules come from? What is the energy released as electrons move down the ETC used for? Last electron grabber? What protein do the H⁺ ions flow back through? What does this energy cause? Final products? How many ATP?

Fermentation - From which stage is all the ATP generated from? Oxygen required?

Alcoholic – Products? Examples?

Lactic acid – Products? Examples?

CIRCULATORY & RESPIRATORY SYSTEMS (Ch 30)

Circulatory system – Functions? Primary components and their functions?

Blood vessels – Differences and similarities between different types of blood vessels? Movement of blood within body? Significance of **valves**?

Heart – **Pulmonary & systemic circuits**? Be able to follow blood through compartments and blood vessels of heart. Where is oxygenated & deoxygenated blood located? Significance of **valves**? How is heartbeat regulated? How is blood pressure measured? (**systolic & diastolic pressures**) Types of cardiovascular disease?

Blood – Components of blood and significance? How does blood clot?

Respiratory system – Functions? Be able to follow movement of oxygen and carbon dioxide through respiratory system. Differences between inhalation and exhalation (pressure differences, muscle contraction and relaxation)? How is breathing regulated? Effects of smoking on respiratory system? Emphysema?

PHOTOSYNTHESIS REVIEW (Ch 8)

Photosynthesis – Purpose? General starting materials? General products? How related to cellular respiration?

Structures

stoma (stomata), stroma, thylakoids, granum (grana), chlorophyll

Light reactions– Significance? Where occur in chloroplast? Significance of photosystems? Reactants? Products? What are these products used for? Which gas released?

Calvin cycle – Significance? Where occur in chloroplast? Reactants? Final product? 5 used for? 1 used for? How many turns to make 1 glucose molecule?

MITOSIS/MEIOSIS REVIEW (Ch 9)

Differences between asexual and sexual reproduction? Important roles of cell division?

Cell cycle

Interphase –What occurs during interphase?

Mitotic (M) phase

Mitosis – What occurs during each stage?

(**prophase, metaphase, anaphase, telophase**)

Cytokinesis – What is it? Difference between cytokinesis in plant and animal cells?

Terms

Centrosomes, spindle microtubules, chromatin, chromosome, sister chromatids, centromere

Cancer – How are **cancer** cells different from normal cells? Difference between **benign** and **malignant tumors**? Treatments?

Meiosis – Significance? Where occur? What occurs in each phase of meiosis I and meiosis II? How does meiosis contribute to genetic variation?

Terms

Homologous chromosomes, gametes, diploid, haploid, fertilization, tetrads, crossing over

**Main differences between mitosis and meiosis? Difference between end results of mitosis and meiosis?

GENETICS REVIEW (Ch 10)

Gregor Mendel – Contributions?

Terms

True-breeding, alleles, dominant, recessive, phenotype, genotype, homozygous, heterozygous, P, F₁, F₂

Testcrosses – Used for? Unknown dominant genotype crossed with what? Results expected when unknown is homozygous dominant vs. heterozygous?

Mendel's Law of Segregation

Mendel's Law of Independent Assortment

For each of the following inheritance patterns,

- *know the general characteristics*
- *explain the differences between the patterns*
- *give the expected results of various crosses (except for polygenic inheritance)*

Complete dominance

Monohybrids and dihybrids

Incomplete dominance (intermediate inheritance)

Codominance

Multiple alleles

Sex-linked traits

Polygenic inheritance

Environmental influences – Effect of environment on phenotypes. Examples of influences?

DNA/ PROTEIN SYNTHESIS (Ch 11)

Hershey & Chase, Rosalind Franklin, Watson & Crick – Contributions?

DNA – Significance? 3 parts of **nucleotide**? 4 bases and which are **complementary** to each other? Shape? ('Backbone'? 'Rungs'?)

DNA replication – Why necessary? What is the process? Importance of many **origins of replication**? End result? DNA polymerase? Given sequence of parent DNA, be able to give sequence of replicated strands.

Protein synthesis – What determines genotype and phenotype? Similarities and differences between **RNA** and DNA? Significance of RNA?

Transcription – Significance? Where occur? What is the process? What is **mRNA**? Similarities and differences between DNA replication and transcription? RNA polymerase? Given sequence of DNA strand, be able to give mRNA strand sequence.

RNA splicing – Significance? Which organisms occur in? What are **introns** and **exons**?

Translation – Significance? Where occur? What is the process? What does **genetic code** tell us? What is **start codon** and **stop codons**? Know how to use the genetic code table. What is **tRNA** and its parts? How does tRNA work with mRNA? **Anticodons**?

Ribosomes? Given sequence of DNA or mRNA strand, be able to give tRNA sequence and/or amino acids coded for using a genetic code table.

*** Significance of proteins? Specific functions of proteins? How are genes, DNA, and proteins related?

Mutations – What are they? What causes them? What are **base substitutions** and **base deletions/ insertions**? What is the usual outcome of each? Which usually causes much more drastic changes? Why? What are **silent mutations**? Why are silent mutations possible?