

Quiz Topic List

Quiz Date: Thursday, 4 April 2019 (periods 4, 6, & 8) and Friday, 5 April 2019 (period 7)

Major topics: DNA structure & history, DNA replication, and protein synthesis

Terms (know all terms below except those with an **(H)** beside them, those are only mandatory for honors students)

DNA History

Barbara Chase & Alfred Hershey
Erwin Chargaff
Rosalind Franklin
James Watson & Francis Crick
Chargaff's Rules
Photo 51
X-ray crystallography
Chargaff's calculations **(H)**

DNA Structure

Monomer
Nucleotide
Nitrogen base
Deoxyribose sugar
Pentose sugar
Phosphate group
Purine
Adenine & Guanine
Pyrimidine
Thymine & cytosine
Hydrogen bond
Phosphodiester bond **(H)**
Glycosidic bond **(H)**
Complementary base pairing
Double helix
Anti-parallel
3' vs 5' labeling of backbone ends

DNA Replication

Replication fork
Replication bubble
Helicase
Topoisomerase
Single-stranded binding protein (SSBP)
DNA polymerase III
RNA primase
DNA polymerase I
DNA ligase
Leading strand
Lagging strand
Okazaki fragment
Nucleotide
Nucleoside triphosphate **(H)**
Primer **(H)**
Exonuclease **(H)**
Initiation **(H)**
Elongation **(H)**
Termination **(H)**
Semi-conservative replication

Protein Synthesis

DNA vs. RNA comparison
Nitrogenous bases differences
Central dogma of molecular biology **(H)**
RNA polymerase
Coding strand

Template strand
Messenger RNA (mRNA)
Ribosome
Large subunit **(H)**
Small subunit **(H)**
Transport RNA (tRNA)
Transcription
Nucleus
Nuclear pores **(H)**
Translation
Cytoplasm
Amino acid
Codon
Anti-codon **(H)**
Peptide (2-10 AA's) **(H)**
Polypeptide (11-50 AA's) **(H)**
Protein (51+ AA's) **(H)**
Codon wheel

Mutations & Protein Synthesis

Mutation
Point mutation
Substitution
Insertion
Deletion
Chromosome mutation **(H)**
Insertion **(H)**
Deletion **(H)**
Duplication **(H)**
Translocation **(H)**
Missense mutation
Nonsense mutation
Silent mutation

Major Concepts to Know:

1. Contributions to the discovery of the structure of DNA and HOW they furthered the cause.
2. Determine nitrogen base identities from # of hydrogen bonds.
3. Be comfortable with the “anatomy” of DNA regardless of where you are on it.
4. Ratio of purines-to-pyrimidines and how this supports Chargaff's Rules **(H)**
5. Roles of enzymes in the copying of parent DNA molecule into two daughter DNA molecules.
6. What is meant by semi-conservative replication?
7. How does replication differ between leading and lagging strands?
8. Direction new strands are synthesized and how the parent strands are read during DNA replication **(H)**
9. Major differences between DNA & RNA and the different roles they have in cells.
10. Describe the Central Dogma of molecular biology using protein synthesis to do so **(H)**
11. Differences between transcription and translation, where they occur and what the products of each are.
12. How ribosomes, mRNA, tRNA, and amino acids are coordinated in the cytoplasm to form amino acid chains.
13. Go from a DNA molecule to a protein given nothing more than a DNA molecule and a codon wheel.

14. Describe how to use and be able to use a codon wheel.

Material at your disposal:

Keychain model

Crash Course video link

Tri-fold DNA replication poster

Chargaff's data packet

Protein synthesis practice

Insulin synthesis activity **(H)**

DNA replication "*Riddle Me This...*"

Protein synthesis diagram lecture

DNA history & structure lecture