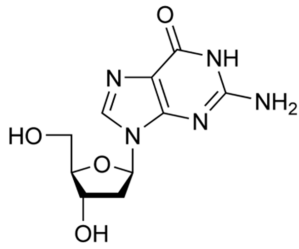
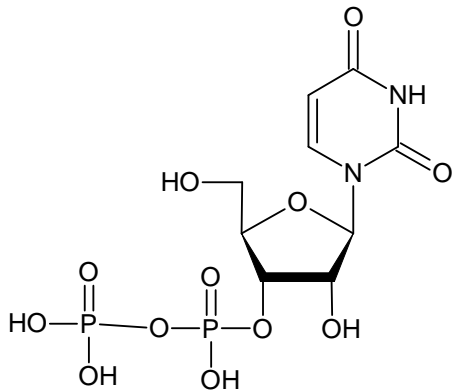


Extra Practice Answer Key
Chapter 31



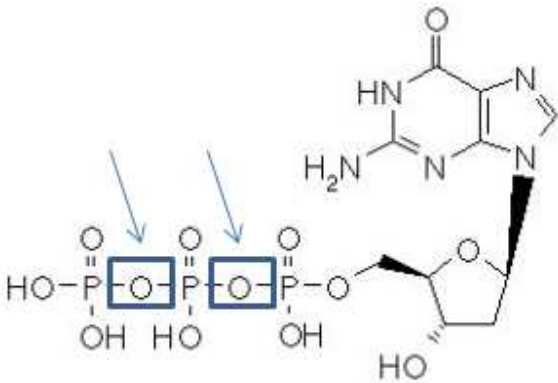
1.



2.

3. deoxyguanosine-5'-triphosphate, 5'-dGTP

4. High Energy Phosphate Anhydride bonds are one way in which the body stores energy. The negative (or OH groups in this picture) require a large amount of energy to be placed close to each other. If the bonds are broken that energy is released. There is about 35 kJ/bond



5.

- RNA - Single strand and uses base U
- RNA - Has 2'OH
- DNA - Has no 2' OH and uses base T
- DNA - Has no 2' OH

6.

- Transcription is the process by which RNA is made from DNA
- Replication is the process by which DNA is used to make new DNA
- Translation is the process by which proteins are made.

7.

- Complementary strands make error checking easy
- No 2'OH = much less reactive (more stable) than RNA

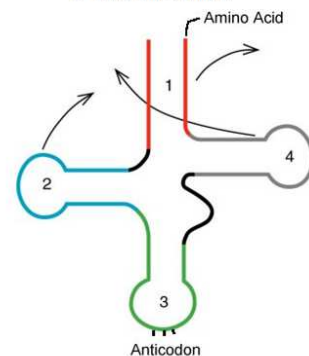
8. Cancer is the loss of cell control, often at the transcription level leading to rapid, uncontrolled growth

- Chemotherapy – use chemicals to halt replication, destroying fast growing cells
- Radiation – damage DNA to halt replication, destroying fast growing cells
- Artificial Bases – similar to chemotherapy but use analogues to bases to halt replication
- Theoretical (someday soon hopefully) – turn on tumor-suppressor genes
- Theoretical (someday soon hopefully) – drugs that induce cancer cells to commit apoptosis

9. It resembles cytosine but has 2' fluorine's that will prevent it from making DNA/RNA (more on page 867)

10. Many pictures are acceptable, but they MUST include clearly show 4 regions and be labeled

- 1 – Binds AA
- 2, 4 – Interact with Ribosome
- 3 – Forms HB with mRNA



- tRNA brings AA to the Ribosome and forms a HB with the mRNA
- The unique structure is caused by HB between base pairs (no shown)
- It is uniquely suited due to the shape allowing different parts to interact with AA, mRNA, Ribosome
 - Bind the AA
 - Form HB with mRNA
 - Interact with Ribosome

11.
 - a. Modification refers to the process by which the RNA produced in transcription is modified to perform its role.
 - b. Modifications which can occur are:
 - i. trimming the molecule to correct size
 - ii. Methylation (adding methyl groups to a base)
 - iii. Saturation of double bonds (adding H₂ across a double bond)
 - iv. Isomerization
 - c. Silly way to complicated question. Essentially add a methyl anywhere and remove a C=C double bond
12. Valine – Serine- Valine – Histidine – Glutamic Acid – Tyrosine – Aspartic Acid
13.
 - a. AUG and GUG
 - b. Any TC from cheat sheet for mRNA (UAA, UAG and UGA)
14. The book lists 3 steps, we added a 4th step in lecture – Preparation
 - a. Preparation – DNA is converted to rRNA (and forms ribosomes), tRNA (binds AA) and mRNA binds to the Ribosome
 - b. Initiation – special tRNA with a capped NH₂ end (an aldehyde C=O) is added binds to the Ribosome. This causes the formation of the protein to proceed from N-Terminal to C-Terminal end.
 - c. Elongation – the AA chain is lengthened
 - i. Next tRNA enters Ribosome, HB to mRNA
 - ii. Peptide bond is made between AA
 - iii. Free tRNA is released.
 - iv. Process repeats!
 - d. Termination – when a TC codon is reached the last tRNA-AA bond is hydrolyzed and the Ribosome separates to release the mRNA and the Protein.
15. Aldehyde (C=O)
16.
 - a. Apoptosis – Triggered self-destruction of cells when unregulated transcription occurs (p. 873)
 - b. Mutation – Traits which are the result of genetic or chromosomal changes (p. 877)
 - c. Mutagen – Processes that can cause mutations (p. 977)
 - i. Ionizing Radiation – UV, cosmic and x-rays
 - ii. Chemicals
 - iii. Radioactive decay
 - iv. Heavy metals
 - v. Viruses
 - d. Oncogenes – genes that code for proteins that control cell growth. Oncogenes that are damaged can cause uncontrolled cell growth (cancer) (p. 872)
 - e. Tumor-suppressor Genes – genes that block cancer development (by coding for proteins that only allow normal cell growth. 20 discovered, missing them increases risk of cancers (p. 872)
 - f. Codon – triplet of nucleotides that code for a specific AA (p. 871)
 - g. Mitosis – process of ordinary cell division in which DNA is duplicated and each cell gets 1 copy (p. 867)
 - h. Meiosis – process by which cells split in ½ but each cell gets only 1 copy of DNA, occurs in cells used for reproduction (sperm and egg) (p. 867)
 - i. Heredity – process by which physical and mental characteristics are passed from parent to child (p. 863)
 - j. Genome – sum of all heredity material in a cell (ie DNA) (p. 863)
 - k. Complementary – A/T and G/C are paired due to the ability to form HB between the nucleic acids (p. 861) This is responsible for the double helix of DNA and the HB formed between tRNA and mRNA
 - l. Nucleotide – Base + Sugar + Phosphate (p. 855) – tide = detergent = phosphate?
 - m. Nucleoside – Base + Sugar (p. 853)
 - n. High Energy Phosphate Bond (see question 4)