AP BIOLOGY

REVIEW FOR NUCLEIC ACID TEST

1. What types of nucleic acids are present in eukaryotic cells? Describe their functions.

DNA – genetic code

mRNA-transcribes the DNA code into RNA to be used in Ribosome for polypeptide assembly

rRNA – Ribosomal structure responsible for translated into amino acids/proteins

tRNA – transfer RNA is used to transport individual amino acids to ribosome for polypetide assembly

2. What does antiparallel mean?

DNA molecule has “rails” that are parallel but the run in opposite directions to one another. One is 5’ to 3’ and the parallel one is 3’ to 5’

3. What is semi conservative replication? Each new DNA molecule contains one old strand from the orginal molecule and one new strand that is replicated from template.

4. What type of organic molecules are pentoses and what is their role in nucleic acids? 5 sided Sugar. Pent=5 ose=sugar. Ribose and Deoxyribose (one less oxygen than Ribose) are the backbones (along with phosphate) of a nucleic acid.

5. What type of bonds are present between the molecules that make up the “rails” or “backbone” of the nucleic acids? Covalent Bonds

6. What type of bonds are present between the nucleic acid base pairs? Hydrogen Bonds

7. What bases are present in DNA? Cytosine and Guanine; Adenine and Thymine. RNA? Cytosine and Guanine; Adenine and Uracil

8. What are the base pairing rules in DNA? C to G and A to T RNA? C to G and A to U

9. List the differences between RNA and DNA.

DNA RNA

Double Helix Single Strand

AT and CG AU and CG

One type several types

Deoxyribose Ribose

10. What does PCR stand for and what is its purpose? Polymerase Chain Reaction, used to amplify segments of DNA for identification

11. List the Purines and Pyrimidines present in both DNA and RNA. Describe their structure and how they differ. Purines: Adenine and Guanine, Double Rings , Pyrimidines: Thymine and Cytosince, Single Rings.

12. How many bonds are present between Adenine and Thymine? 2 Guanine and Cytosine? 3 What is the evolutionary significance of the these bonds?Theorized that the simpler double bonds between Adenine and Thymine formed first then the triple bonds of Cytosine and Guanine.

13. How can DNA molecules be so diverse when they seem structurally the same? Sequence of the nucleic acids provides variation

14. What is a plasmid? Naked Rings of DNA found in Bacterium

15. What was the premise of the experiment done by Griffith? Discovered that there was a “transforming agent” present that changed the non virulent viruses. What did it show and how was it performed so that Griffith could draw conclusions from the results? Used heat killed virulent strains of Pneumonia mixed with non virulent strains and found that the non virulent live strains were transformed into virulent viruses.

16. What did Hershey and Chase prove with their experiment? They proved the transforming agent was DNA. How did they prove their theory was correct? Radioactive Sulfur and Phosporus was used to phages (bacterial viruses) and it was found that the Phosphorus was found in the replicated virus in host cell. The phosphorus was taken up in the DNA molecules as part of the “rails”. Sulfur was not taken up as it is a component of the Capsid of the virus (protein coat).

17. Who were Watson and Crick? They were given credit for discovering the double helix structure of DNA. What was so important about their discovery? No one knew prior to their discovery what DNA looked like. Who was important to their findings? Rosalind Franklin

18. In your opinion, do you think DNA or RNA developed first? It is a theory that RNA as the more simple singled stranded molecule developed first. Justify your answer. The simplicity of the molecule would make it easy to evolve and directly code for proteins instead of needed to transcribe the DNA code first before transcription takes place.

19. Provide a complimentary strand of DNA and mRNA for the following DNA. Mistake in original…

5’ATTTCGAGGGCTAGCAATAG3’

DNA

3’TAAAGCTCCCGATCGTTATC5’

RNA

3’UAAAGCUCCCGAUCGUUAUC5’