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1. Who described the structure of DNA double helix?
a) Peter Mitchell
b) Andre Jagendorf
c) Ernest Uribe
d) Watson and Crick
View Answer

Answer: d
Explanation: DNA double helix was first described in 1953 by Watson and Crick using X-ray diffraction. DNA fibers were obtained by Franklin and Wilkins. Watson, Crick, and Wilkins were awarded a noble prize in 1962.

2. Which form of DNA is described by Watson-Crick model?
a) B-DNA
b) Z-DNA
c) A-DNA
d) Quadraplex DNA
View Answer

Answer: a
Explanation: There are many forms of DNA which are biologically important, out of which Watson-Crick double helix model describes the B form of DNA. The confirmation of DNA would depend on the hydration level, base modification etc.

3. How many base pairs are there in every helical turn of Watson-Crick double helix model?
a) 32.3
b) 11.6
c) 20
d) 10.4
View Answer

Answer: d
Explanation: Watson-Crick double helix model consists of 10.4 base pairs per helical turn. Since one helical turn formed by 360° and there would be 34.3° twist angle per residue among adjacent base pair.

4. Which one of the following statement is INCORRECT for Z-DNA?
a) Left-handed DNA
b) Mostly found in alternating purine-pyrimidine sequences
c) Only one deep, narrow groove
d) Anti glycosidic bond conformation
View Answer

Answer: d
Explanation: Anti glycosidic bond conformation is incorrect as in Z-DNA the sugar and glycosidic bond conformations alternate, anti for C and syn for G while in B form there is only anti glycosidic bond conformation.

5. The third strand of triple helix is paired in which scheme?
a) Hoogsteen base pair scheme
b) Intermolecular base pair scheme
c) Intramolecular base pair scheme
d) G-quartet scheme
View Answer

Answer: a
Explanation: Triple helix formed by three strands polypurine, polypyrimidine and the third strand which lay in the major groove of DNA and makes a hydrogen bond to duplex. The third strand is paired in hoogsteen base pairing scheme where the central strand is purine rich.

6. Name the nitrogenous base which is found in abundance in G-quadruplex?
a) Adenine
b) Guanine
c) Cytosine
d) Thymine
View Answer

Answer: b
Explanation: When nucleic acid sequences are rich in guanine and can form four-stranded structure, it will term as G-quadruplex. It is a square arrangement of guanine, stabilized by hoogsteen hydrogen bonding.

7. The stability and formation of G-quadruplex depends on _____
a) Monovalent cation
b) Divalent cation
c) Bivalent cation
d) Pentavalent ion
View Answer

Answer: a
Explanation: A monovalent cation is responsible for the stability of G-quadruplex as it is present in the center of the tetrad. It can be formed in either DNA or RNA.

8. Which of this factor is not responsible for thermal denaturation of DNA?
a) PH
b) Temperature
c) Ionic strength
d) Humidity
View Answer

Answer: d
Explanation: When DNA duplex is laid open to the specific conditions like temperature, pH, or ionic strength it will interrupt the hydrogen bond between strands and they are no longer held together. After denaturation, the strand separates as individual coils and the double helix is denatured.

9. Double-stranded DNA with high GC content has higher thermal stability than that of lower GC content?

a) True
b) False
View Answer

Answer: a
Explanation: There is three hydrogen bond in G:C while only two between A: T, this shows higher no of hydrogen bonds and interaction in G:C than A:T. Higher G:C content has a higher melting temperature. So, it has more thermal stability as compared to A:T.

10. What is the term given to the supercoiling of circular DNA?
a) Twist number
b) Linking number
c) Writhe number
d) Cross-linking
View Answer

Answer: b
Explanation: Linking number defines the no. of times one strand crosses other in closed circular DNA. It is the sum of twist number (total number of helical turn) and writhe number (supercoiling in the helix).
Lk = Tw + Wr.