

1) Describe the structure and function of a typical bacterial plasmid.

2) The DNA in a eukaryotic chromosome is best described as:

- A) a single circular double-helical molecule.
- B) a single linear double-helical molecule.
- C) a single linear single-stranded molecule.
- D) multiple linear double-helical molecules.
- E) multiple linear single-stranded molecules.

3) The linking number (Lk) of a closed-circular, double-stranded DNA molecule is changed by:

- A) breaking a strand, then rejoining it.
- B) breaking a strand, unwinding or rewinding the DNA, then rejoining it.
- C) breaking all hydrogen bonds in the DNA.
- D) supercoiling without the breaking of any phosphodiester bonds.
- E) underwinding without the breaking of any phosphodiester bonds.

4) Topoisomerases:

- A) always change the linking number in increments of 1.
- B) can act on single-stranded DNA circles.
- C) change the degree of supercoiling of a DNA molecule but not its linking number of DNA.
- D) occur in bacteria, but not in eukaryotes.
- E) require energy from ATP.

5) Which of the following contributes to the structure of nucleosomes?

- A) Plectonemic supercoiled DNA
- B) Relaxed closed-circular DNA
- C) Solenoidal supercoiled DNA
- D) Spacer DNA
- E) Z (left-handed) DNA

6) Indicate whether the following statements are true (T) or false (F).

- ___ The linking number (Lk) of a closed-circular DNA molecule can be changed only by breaking one or both strands.
- ___ DNA of all organisms is overwound (i.e., positively supercoiled).
- ___ Topoisomerase I relaxes DNA that is highly negatively supercoiled.
- ___ In a nucleosome, eukaryotic DNA is wrapped around histone proteins.

7) What are histones and what is their principal role in chromatin structure?