

SSR DEGREE COLLEGE (AUTONOMOUS)
M.Sc. BIOTECHNOLOGY
Molecular Biology-I
Internal - II
Question Bank

I. MULTIPLE CHOICE QUESTIONS*

1. The "transforming principle" was proved to be DNA by which scientists?
a) Griffith b) Hershey & Chase c) Avery, MacLeod & McCarty d) Watson & Crick []
2. Which radioactive isotopes were used by Hershey & Chase to label bacteriophage?
a) ^{32}P & ^{35}S b) ^{14}C & ^3H c) ^{15}N & ^{32}P d) ^{35}S & ^{14}C []
3. The genetic material in TMV is?
a) dsDNA b) ssDNA c) ssRNA d) dsRNA []
4. Semi-conservative replication was proved by which experiment?
a) Griffith experiment b) Meselson-Stahl experiment c) Hershey-Chase experiment d) Avery experiment []
5. Which enzyme joins Okazaki fragments during DNA replication?
a) DNA Pol I b) DNA Pol III c) DNA Ligase d) Primase []
6. The protein that initiates replication in prokaryotes by binding to oriC is?
a) DnaA b) DnaB c) DnaC d) DnaG []
7. The main replicative polymerase in E. coli is?
a) DNA Pol I b) DNA Pol II c) DNA Pol III d) DNA Pol IV []
8. Fidelity of DNA replication is maintained by which activity?
a) 5'→3' polymerase b) 3'→5' exonuclease c) 5'→3' exonuclease d) Endonuclease []
9. Theta model of replication is observed in?
a) Bacteriophage λ only b) E. coli chromosome c) Plasmids d) Both b & c []
10. Rolling circle replication is typical of?

a) Eukaryotic nuclear DNA b) Mitochondrial DNA c) Bacteriophage ϕ X174 DNA d) Both c & Plasmid DNA []

11. Telomeres in eukaryotes are replicated by?

a) DNA Pol α b) DNA Pol δ c) Telomerase d) Primase []

12. A tautomeric shift can lead to which type of mutation?

a) Frameshift b) Transition c) Transversion d) Deletion []

13. The Ames test is used for checking?

a) DNA repair efficiency b) Mutagenicity of chemicals c) Rate of recombination d) Replication speed []

14. UV-induced thymine dimers are repaired by which pathway?

a) Mismatch repair b) Base excision repair c) Nucleotide excision repair d) Direct repair []

15. The key regulator protein in the SOS repair system is?

a) RecA b) LexA c) UvrA d) MutS []

16. Bacterial conjugation requires which structure?

a) Flagella b) Sex pilus c) Capsule d) Mesosome []

17. The vector involved in transduction is?

a) Plasmid b) Bacteriophage c) Transposon d) Cosmid []

18. Which is an example of site-specific recombination?

a) Homologous recombination b) Integration of λ phage into E. coli c) Transformation d) Conjugation []

19. IS elements are characterized by the presence of?

a) Antibiotic resistance gene b) Only transposase gene c) Origin of replication d) Promoter sequence []

20. Transposons that move via an RNA intermediate are called?

a) DNA transposons b) IS elements c) Retrotransposons d) Composite transposons []

FILL IN THE BLANKS*

1. In Griffith's experiment, the _____* strain of Streptococcus was virulent.
2. In Avery et al experiment, transformation was * _____* when DNase was added.
3. In Hershey & Chase experiment, _____'''_* isotope is present in DNA but not in protein.
4. TMV is a * _____'virus where RNA acts as the genetic material.
5. Meselson-Stahl experiment used ^{15}N heavy isotope to label * _____
6. DNA replication is * _____*, as proved by Meselson-Stahl experiment.
7. The origin of replication in prokaryotes is called * _____
8. DnaB protein has * _____ activity and unwinds DNA at the replication fork.
9. The RNA primer is removed by the 5'→3' exonuclease activity of * _____
10. Okazaki fragments are formed on the lagging strand because DNA synthesis is always * _____
11. Replisome is a multi-protein * _____* that carries out replication.
12. In Theta replication, the replication bubble looks like the Greek letter * _____
13. Rolling circle model produces a * _____ single-stranded DNA tail.
14. In eukaryotes, lagging strand synthesis is initiated by * _____ polymerase.
15. The end replication problem of linear DNA is solved by the enzyme * _____
16. A change from purine to purine or pyrimidine to pyrimidine is called * _____'''
17. The Ames test uses a histidine auxotroph strain of * _____* bacteria.
18. In mismatch repair, the MutS protein recognizes * _____ in DNA.
19. After F+ x F- conjugation, the recipient cell remains * _____'.
20. Tn3 transposon moves by * _____* replication mechanism.

SHORT ANSWER QUESTIONS*

1. *Define transformation*. Explain Griffith's experiment .
2. *Differentiate between conservative, semi-conservative and dispersive models* of DNA replication.
3. *List five enzymes/proteins involved in prokaryotic DNA replication* and write one specific function of each.

4. *What are transitions and transversions?* Give one example of each.

5. *Compare homologous recombination and site-specific recombination* with respect to mechanism and give one example for each.