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PAPER : MOLECULAR BIOLOGY

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QNO 2 ANS :- a) **common tool of M biology** :- molecular biology techniques are common methods used in genetics, biochemistry, and biophysics, to address issues such as

- Nucleic acid fractionation
- Polymerase chain reaction
- DNA sequencing
- Probe hybridization vector, molecular cloning, nucleic acid enzyme microarray
- Electrophoretic separation of nucleic acid, detection of genes
- DNA southern blotting, in situ hybridization, FISH technique
- RNA northern blotting
- Protein, western blotting, immunohistochemistry.

b) **nucleic acids** :-

- Nucleic acid store, transmit, and help express hereditary information
- The amino acid sequence of a polypeptide is programmed by a unit of inheritance called a gene
- Genes are made of DNA, a nucleic acid made of monomers called nucleotides

Types of nucleic acid -----

There are two types of nucleic acids

- Deoxyribonucleic acid (DNA)
- Ribonucleic acid (RNA)
- DNA provides directions for its own replication
- DNA directs synthesis of messenger RNA (mRNA) and, protein synthesis
- Protein synthesis occurs on ribosomes

c) **wobble hypothesis** :-

- Crick postulate the 'wobble hypothesis' to account for the degeneracy of genetic code. According to this hypothesis, the first two bases of a codon pair according to the normal base pairing rules with the last two bases of the anticodon. Base – pairing at the third position of a codon is wobble.

d) **Chargaff's rule** :-

- Adenine must pair with thymine
- Guanine must pair with cytosine
- Their amounts in a given DNA molecule will be about the same

e) **translation** :- the final product of gene expression is a polypeptide chain of amino acids whose sequence was prescribed by the genetic code .

steps in translation -----

- **Initiation** :- the two subunits of the ribosome come together and the start codon on the mRNA in the ribosome is aligned to set the reading frame.
- **Elongation** :- charged tRNAs attach and peptide bonds form between the amino acids
- **Termination**

Transcription :- transcription has three phases

- Initiation
 - Elongation
 - Termination
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- RNA is transcribed from a DNA template after the bases of DNA are exposed by unwinding of the double helix.
 - In a given region of DNA only one of the two strands can act as a template for transcription

Initiation :- unwind the DNA template and complementary strands initiation :RNA Polymerase recognizes and binds to a promoter sequence on DNA .

Elongation :- elongation RNA polymerase elongates the nascent RNA molecule in a 5'to 3' direction ,antiparallel to the template DNA

- Nucleotides are added by complementary base pairing with the template strand .

Termination :-

- Termination : special DNA sequences and protein helpers terminate transcription
- The transcript is released from the DNA .
- THIS Primary transcript is called the "pre -mRNA"
- The pre- mRNA is processed to generate the mature mRNA.

QNO 3 ANS :- **DNA replication process** :- the process of formation of two daughter DNA molecules from single parent cell is called DNA replication .

Main steps :- DNA replication contains three steps which are given below .

1) **initiation** :-

- Replication always start at a very specific points which is called ori-point or simply origion of replication .
- In eukaryotic DNA there may be more than one origion of replication sites but in prokaryotic DNA there is only one origion in replication .
- The enzymes used in initiating phase are DNA gyrase ,helicase .
- The DNA gyrase open the tern of DNA double strand .
- DNA helicase start the process where as replication double form .
- Helicase open the two strand from each other as a result unzipping occur in DNA molecule at replication sites .
- Both single strand of unzipping DNA act as template for the formation of new strand .
- The two separated strands are prevented from rejoining by single stranded binding protein .
- Each termed as replication fork .

2) **polymerization** :- the composition of new strand over template is called polymerization

- During the polymerization the daughter strand are synthesized by DNA polymerase .but this enzymes can not work unless some nucleotide are arranged on template .for this purpose primase enzymes is involved to arranged some nucleotide called primers on template strand .

3) **termination phase** :- termination phase occur in the presence of enzymes called DNA polymerase -1.

- This phase is characterized by the replacement of primer by DNA nucleotide in joining of okazaki fragment to form continuous strand .
- Polymerase -1 remove nucleotide from five end of primer in this way primers are removed .
- Two okazaki s fragments extended and then join by enzymes called DNA ligase .

QNO 1 ANS :- FILL IN THE BLANKS -----.

- 1) James Watson ,Francis Crick and Maurice Wilkins .
- 2) 1962
- 3) DNA
- 4) Gene
- 5) Replication fork
- 6) Topoisomerase
- 7) Genetic code
- 8) Aminoacylation
- 9) DNA helicase .

THE END OF THE PAPER -----.

